

AMENDMENT NO. \_\_\_\_\_ Calendar No. \_\_\_\_\_

Purpose: To improve the bill.

**IN THE SENATE OF THE UNITED STATES—117th Cong., 2d Sess.**

**H. R. 4346**

Making appropriations for Legislative Branch for the fiscal year ending September 30, 2022, and for other purposes.

Referred to the Committee on \_\_\_\_\_ and ordered to be printed

Ordered to lie on the table and to be printed

AMENDMENT intended to be proposed by Mr. SCHUMER

Viz:

1 In lieu of the matter proposed to be inserted by the  
2 amendment of the House to the amendment of the Senate,  
3 insert the following:

4 **SECTION 1. TABLE OF CONTENTS.**

5 The table of contents for this Act is as follows:

Sec. 1. Table of contents.

Sec. 2. References.

DIVISION A—CHIPS ACT OF 2022

Sec. 101. Short title.

Sec. 102. Creating helpful incentives to produce semiconductors (CHIPS) for America fund.

Sec. 103. Semiconductor incentives.

Sec. 104. Opportunity and inclusion.

Sec. 105. Additional GAO reporting requirements.

Sec. 106. Appropriations for wireless supply chain innovation.

Sec. 107. Advanced manufacturing investment credit.

DIVISION B—RESEARCH AND INNOVATION

Sec. 10000. Table of contents.

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- Sec. 10001. Short title.
- Sec. 10002. Definitions.
- Sec. 10003. Budgetary effects.

## TITLE I—DEPARTMENT OF ENERGY SCIENCE FOR THE FUTURE

- Sec. 10101. Mission of the Office of Science.
- Sec. 10102. Basic energy sciences program.
- Sec. 10103. Biological and environmental research.
- Sec. 10104. Advanced scientific computing research program.
- Sec. 10105. Fusion energy research.
- Sec. 10106. High energy physics program.
- Sec. 10107. Nuclear physics program.
- Sec. 10108. Science laboratories infrastructure program.
- Sec. 10109. Accelerator research and development.
- Sec. 10110. Isotope research, development, and production.
- Sec. 10111. Increased collaboration with teachers and scientists.
- Sec. 10112. High intensity laser research initiative; helium conservation program; Office of Science emerging biological threat preparedness research initiative; midscale instrumentation and research equipment program; authorization of appropriations.
- Sec. 10113. Established program to stimulate competitive research.
- Sec. 10114. Research security.

## TITLE II—NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY FOR THE FUTURE

- Sec. 10201. Definitions.

## Subtitle A—Authorization of Appropriations

- Sec. 10211. Authorization of appropriations.

## Subtitle B—Measurement Research

- Sec. 10221. Engineering biology and biometrology.
- Sec. 10222. Greenhouse gas measurement research.
- Sec. 10223. NIST authority for cybersecurity and privacy activities.
- Sec. 10224. Software security and authentication.
- Sec. 10225. Digital identity management research.
- Sec. 10226. Biometrics research and testing.
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- Sec. 10229. Dissemination of resources for research institutions.
- Sec. 10230. Advanced communications research.
- Sec. 10231. Neutron scattering.
- Sec. 10232. Artificial intelligence.
- Sec. 10233. Sustainable chemistry research and education.
- Sec. 10234. Premise plumbing research.
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- Sec. 10245. International standards development.
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- Sec. 10247. GAO study of NIST research security policies and protocols.
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- Sec. 10252. Update to Hollings Manufacturing Extension Partnership.
- Sec. 10253. National Supply Chain Database.
- Sec. 10254. Hollings Manufacturing Extension Partnership activities.
- Sec. 10255. Amendment to the Hollings Manufacturing Extension Partnership relating to institutions of higher education.

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- Sec. 10262. Expanding opportunities through the Manufacturing USA Program.
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1 **SEC. 2. REFERENCES.**

2       Except as expressly provided otherwise, any reference  
3 to “this Act” contained in any division of this Act shall  
4 be treated as referring only to the provisions of that divi-  
5 sion.

6 **DIVISION A—CHIPS ACT OF 2022**7 **SEC. 101. SHORT TITLE.**

8       This division may be cited as the “CHIPS Act of  
9 2022”.

10 **SEC. 102. CREATING HELPFUL INCENTIVES TO PRODUCE**  
11 **SEMICONDUCTORS (CHIPS) FOR AMERICA**  
12 **FUND.**

13       (a) CHIPS FOR AMERICA FUND.—

1           (1) ESTABLISHMENT.—There is established in  
2           the Treasury of the United States a fund to be  
3           known as the “Creating Helpful Incentives to  
4           Produce Semiconductors (CHIPS) for America  
5           Fund” (referred to in this subsection as the  
6           “Fund”) for the Secretary of Commerce to carry out  
7           sections 9902, 9904, and 9906 of the William M.  
8           (Mac) Thornberry National Defense Authorization  
9           Act for Fiscal Year 2021 (15 U.S.C. 4652, 4654,  
10          and 4656; Public Law 116–283). Amounts in the  
11          Fund to carry out sections 9904 and 9906 of Public  
12          Law 116–283 shall be transferred to and merged  
13          with accounts within the Department of Commerce  
14          to be used for such purposes, except that amounts  
15          transferred to carry out section 9904 of Public Law  
16          116–283 shall remain available until September 30,  
17          2025.

18           (2) APPROPRIATION.—

19           (A) In addition to amounts otherwise avail-  
20           able for such purposes, there is appropriated to  
21           the Fund established in subsection (a)(1), out  
22           of amounts in the Treasury not otherwise ap-  
23           propriated—

24                   (i) for fiscal year 2022,  
25                   \$24,000,000,000, to remain available until

1                   expended, of which \$19,000,000,000 shall  
2                   be for section 9902 of Public Law 116–  
3                   283, \$2,000,000,000 shall be for sub-  
4                   section (c) of section 9906 of Public Law  
5                   116–283, \$2,500,000,000 shall be for sub-  
6                   section (d) of section 9906 of Public Law  
7                   116–283, and \$500,000,000 shall be for  
8                   subsections (e) and (f) of section 9906 of  
9                   Public Law 116–283;

10                   (ii) for fiscal year 2023,  
11                   \$7,000,000,000 to remain available until  
12                   expended, of which \$5,000,000,000 shall  
13                   be for section 9902 of Public Law 116–  
14                   283 and \$2,000,000,000 shall be for sub-  
15                   sections (c), (d), (e), and (f) of section  
16                   9906 of Public Law 116–283;

17                   (iii) for fiscal year 2024,  
18                   \$6,300,000,000, to remain available until  
19                   expended, of which \$5,000,000,000 shall  
20                   be for section 9902 of Public Law 116–  
21                   283 and \$1,300,000,000 shall be for sub-  
22                   sections (c), (d), (e), and (f) of section  
23                   9906 of Public Law 116–283;

24                   (iv) for fiscal year 2025,  
25                   \$6,100,000,000, to remain available until

1                   expended, of which \$5,000,000,000 shall  
2                   be for section 9902 of Public Law 116–  
3                   283 and \$1,100,000,000 shall be for sub-  
4                   sections (c), (d), (e), and (f) of section  
5                   9906 of Public Law 116–283; and

6                   (v)     for     fiscal     year     2026,  
7                   \$6,600,000,000, to remain available until  
8                   expended, of which \$5,000,000,000 shall  
9                   be for section 9902 of Public Law 116–  
10                  283 and \$1,600,000,000 shall be for sub-  
11                  sections (c), (d), (e), and (f) of section  
12                  9906 of Public Law 116–283.

13                  (B) DIRECT LOANS AND LOAN GUARAN-  
14                  TEES.—The Secretary of Commerce may use—

15                  (i)     up to \$6,000,000,000 of the  
16                  amounts made available for fiscal year  
17                  2022 for section 9902 of Public Law 116–  
18                  283 for the cost of direct loans and loan  
19                  guarantees, as authorized by section 9902  
20                  of Public Law 116–283, provided that—

21                  (I) such costs, including the cost  
22                  of modifying such loans and loan  
23                  guarantees shall be as defined in sec-  
24                  tion 502 of the Congressional Budget  
25                  Act of 1974; and

1 (II) these funds are available to  
2 subsidize gross obligations for the  
3 principal amount of direct loans and  
4 total loan principal, any part of which  
5 is to be guaranteed, not to exceed  
6 \$75,000,000,000;

7 (ii) up to 2 percent of the amounts  
8 made available in each fiscal year for sala-  
9 ries and expenses, administration, and  
10 oversight purposes to carry out sections  
11 9902 and 9906 of Public Law 116–283, of  
12 which \$5,000,000 in each of fiscal years  
13 2022 through 2026 shall be transferred to  
14 the Office of Inspector General of the De-  
15 partment of Commerce to oversee expendi-  
16 tures from the Fund; and

17 (iii) up to \$2,300,000 of the amounts  
18 made available in fiscal year 2022 to carry  
19 out section 9904 of Public Law 116–283.

20 (3) ASSISTANCE FOR MATURE TECHNOLOGY  
21 NODES.—Of the amount available in fiscal year  
22 2022 to implement section 9902 of the William M.  
23 (Mac) Thornberry National Defense Authorization  
24 Act for Fiscal Year 2021 (15 U.S.C. 4652),  
25 \$2,000,000,000 shall be to provide Federal financial

1 assistance to covered entities to incentivize invest-  
2 ment in facilities and equipment in the United  
3 States for the fabrication, assembly, testing, or  
4 packaging of semiconductors at mature technology  
5 nodes under subsection (e) of that section, as added  
6 by section 103 of this Act.

7 (4) ALLOCATION AUTHORITY.—

8 (A) SUBMISSION OF COST ESTIMATES.—

9 The President shall submit to Congress detailed  
10 account, program, and project allocations of the  
11 full amount made available under subsection  
12 (a)(2)—

13 (i) for fiscal years 2022 and 2023, not  
14 later than 60 days after the date of enact-  
15 ment of this Act; and

16 (ii) for each subsequent fiscal year  
17 through 2026, as part of the annual budg-  
18 et submission of the President under sec-  
19 tion 1105(a) of title 31, United States  
20 Code.

21 (B) ALTERNATE ALLOCATION.—

22 (i) IN GENERAL.—The Committees on  
23 Appropriations of the House of Represent-  
24 atives and the Senate may provide for al-  
25 ternate allocation of amounts made avail-



1 less than the full amount appropriated  
2 under that subsection, the difference  
3 between the amount appropriated and  
4 the alternate allocation shall be allo-  
5 cated by the President and appor-  
6 tioned and allotted by account, pro-  
7 gram, and project pursuant to title  
8 31, United States Code.

9 (b) CHIPS FOR AMERICA DEFENSE FUND.—

10 (1) ESTABLISHMENT.—There is established in  
11 the Treasury of the United States a fund to be  
12 known as the “Creating Helpful Incentives to  
13 Produce Semiconductors (CHIPS) for America De-  
14 fense Fund” (referred to in this subsection as the  
15 “Fund”) to provide for those requirements that are  
16 necessary to carry out section 9903(b) of the Wil-  
17 liam M. (Mac) Thornberry National Defense Author-  
18 ization Act for Fiscal Year 2021 (15 U.S.C.  
19 4653(b)). Amounts in the Fund shall be transferred  
20 to and merged with accounts within the Department  
21 of Defense to be used for such purposes. Amounts  
22 in the Fund or transferred to and merged with ac-  
23 counts within the Department of Defense may not  
24 be used for construction of facilities.



1           (2) APPROPRIATION.—In addition to amounts  
2 otherwise available for such purposes, there is appro-  
3 priated to the Fund established in subsection (b)(1),  
4 out of amounts in the Treasury not otherwise appro-  
5 priated—

6           (A) for fiscal year 2023, \$400,000,000, to  
7 remain available until September 30, 2023;

8           (B) for fiscal year 2024, \$400,000,000, to  
9 remain available until September 30, 2024;

10          (C) for fiscal year 2025, \$400,000,000, to  
11 remain available until September 30, 2025;

12          (D) for fiscal year 2026, \$400,000,000, to  
13 remain available until September 30, 2026; and

14          (E) for fiscal year 2027, \$400,000,000, to  
15 remain available until September 30, 2027.

16          (3) ALLOCATION AUTHORITY.—

17           (A) SUBMISSION OF COST ESTIMATES.—  
18 The President shall submit to Congress detailed  
19 account, program element, and project alloca-  
20 tions of the full amount made available under  
21 subsection (b)(2)—

22           (i) for fiscal year 2023, not later than  
23 60 days after the date of enactment of this  
24 Act; and

1 (ii) for each subsequent fiscal year  
2 through 2027, as part of the annual budg-  
3 et submission of the President under sec-  
4 tion 1105(a) of title 31, United States  
5 Code.

6 (B) ALTERNATE ALLOCATION.—

7 (i) IN GENERAL.—The Committees on  
8 Appropriations of the House of Represent-  
9 atives and the Senate may provide for al-  
10 ternate allocation of amounts made avail-  
11 able under subsection (b)(2), including by  
12 account, program element, and project.

13 (ii) ALLOCATION BY PRESIDENT.—

14 (I) NO ALTERNATE ALLOCA-  
15 TIONS.—If Congress has not enacted  
16 legislation establishing alternate allo-  
17 cations, including by account, pro-  
18 gram element, and project, by the  
19 date on which the Act making full-  
20 year appropriations for the Depart-  
21 ment of Defense for the applicable fis-  
22 cal year is enacted into law, only then  
23 shall amounts made available under  
24 subsection (b)(2) be allocated by the  
25 President or apportioned or allotted

1 by account, program element, and  
2 project pursuant to title 31, United  
3 States Code.

4 (II) INSUFFICIENT ALTERNATE  
5 ALLOCATION.—If Congress enacts leg-  
6 islation establishing alternate alloca-  
7 tions, including by account, program  
8 element, and project, for amounts  
9 made available under subsection  
10 (b)(2) that are less than the full  
11 amount appropriated under that sub-  
12 section, the difference between the  
13 amount appropriated and the alter-  
14 nate allocation shall be allocated by  
15 the President and apportioned and al-  
16 lotted by account, program element,  
17 and project pursuant to title 31,  
18 United States Code.

19 (c) CHIPS FOR AMERICA INTERNATIONAL TECH-  
20 NOLOGY SECURITY AND INNOVATION FUND.—

21 (1) ESTABLISHMENT.—There is established in  
22 the Treasury of the United States a fund to be  
23 known as the “Creating Helpful Incentives to  
24 Produce Semiconductors (CHIPS) for America  
25 International Technology Security and Innovation

1 Fund” (referred to in this subsection as the  
2 “Fund”) to provide for international information  
3 and communications technology security and semi-  
4 conductor supply chain activities, including to sup-  
5 port the development and adoption of secure and  
6 trusted telecommunications technologies, secure  
7 semiconductors, secure semiconductors supply  
8 chains, and other emerging technologies and to carry  
9 out sections 9905 and 9202(a)(2) of the William M.  
10 (Mac) Thornberry National Defense Authorization  
11 Act for Fiscal Year 2021 (15 U.S.C. 4655 and 47  
12 U.S.C. 906(a)(2)), as appropriate. Amounts in the  
13 Fund shall be transferred by the Secretary of State  
14 to accounts within the Department of State, the  
15 United States Agency for International Develop-  
16 ment, the Export-Import Bank, and the United  
17 States International Development Finance Corpora-  
18 tion, as appropriate, to be used for such purposes  
19 and under the terms and conditions of the account  
20 to which transferred.

21 (2) APPROPRIATION.—

22 (A) In addition to amounts otherwise avail-  
23 able for such purposes, there is appropriated to  
24 the Fund established in subsection (c)(1), out

1 of amounts in the Treasury not otherwise ap-  
2 propriated—

3 (i) for fiscal year 2023, \$100,000,000,  
4 to remain available until September 30,  
5 2027;

6 (ii) for fiscal year 2024,  
7 \$100,000,000, to remain available until  
8 September 30, 2028;

9 (iii) for fiscal year 2025,  
10 \$100,000,000, to remain available until  
11 September 30, 2029;

12 (iv) for fiscal year 2026,  
13 \$100,000,000, to remain available until  
14 September 30, 2030; and

15 (v) for fiscal year 2027,  
16 \$100,000,000, to remain available until  
17 September 30, 2031.

18 (B) USE.—In carrying out this subsection,  
19 the Secretary of State may use up to  
20 \$5,000,000 of the amounts made available in  
21 each fiscal year for the Fund for salaries and  
22 expenses, administration, and oversight pur-  
23 poses, of which \$500,000 in each of fiscal years  
24 2023 through 2027 shall be transferred to the  
25 Office of Inspector General of the Department

1 of State to oversee expenditures under the  
2 Fund.

3 (3) ALLOCATION AUTHORITY.—

4 (A) SUBMISSION OF COST ESTIMATES.—

5 The President shall submit to Congress detailed  
6 account, program, project, and activity alloca-  
7 tions of the full amount made available under  
8 subsection (c)(2)—

9 (i) for fiscal year 2023, not later than  
10 90 days after the date of enactment of this  
11 Act; and

12 (ii) for each subsequent fiscal year  
13 through 2027, as part of the annual budg-  
14 et submission of the President under sec-  
15 tion 1105(a) of title 31, United States  
16 Code.

17 (B) ALTERNATE ALLOCATION.—

18 (i) IN GENERAL.—The Committees on  
19 Appropriations of the House of Represent-  
20 atives and the Senate may provide for al-  
21 ternate allocation of amounts made avail-  
22 able under subsection (c)(2), including by  
23 account, program, project, and activity.

24 (ii) ALLOCATION BY PRESIDENT.—

1 (I) NO ALTERNATE ALLOCA-  
2 TIONS.—If Congress has not enacted  
3 legislation establishing alternate allo-  
4 cations, including by account, pro-  
5 gram, project, and activity, by the  
6 date on which the Act making full-  
7 year appropriations for the Depart-  
8 ment of State, Foreign Operations,  
9 and Related Programs for the applica-  
10 ble fiscal year is enacted into law,  
11 only then shall amounts made avail-  
12 able under subsection (c)(2) be allo-  
13 cated by the President or apportioned  
14 or allotted by account, program,  
15 project, and activity pursuant to title  
16 31, United States Code.

17 (II) INSUFFICIENT ALTERNATE  
18 ALLOCATION.—If Congress enacts leg-  
19 islation establishing alternate alloca-  
20 tions, including by account, program,  
21 project, and activity, for amounts  
22 made available under subsection  
23 (c)(2) that are less than the full  
24 amount appropriated under that sub-  
25 section, the difference between the

1 amount appropriated and the alter-  
2 nate allocation shall be allocated by  
3 the President and apportioned and al-  
4 lotted by account, program, project,  
5 and activity pursuant to title 31,  
6 United States Code.

7 (d) CREATING HELPFUL INCENTIVES TO PRODUCE  
8 SEMICONDUCTORS (CHIPS) FOR AMERICA WORKFORCE  
9 AND EDUCATION FUND.—

10 (1) ESTABLISHMENT.—There is established in  
11 the Treasury of the United States a fund to be  
12 known as the “Creating Helpful Incentives to  
13 Produce Semiconductors (CHIPS) for America  
14 Workforce and Education Fund” (referred to in this  
15 subsection as the “Fund”) for the National Science  
16 Foundation for microelectronics workforce develop-  
17 ment activities to meet the requirements under sec-  
18 tion 9906 of the William M. (Mac) Thornberry Na-  
19 tional Defense Authorization Act for Fiscal Year  
20 2021 (15 U.S.C. 4656).

21 (2) APPROPRIATION.—In addition to amounts  
22 otherwise available for such purposes, there is appro-  
23 priated to the Fund established in subsection (d)(1),  
24 out of amounts in the Treasury not otherwise appro-  
25 priated—



1 (A) for fiscal year 2023, \$25,000,000, to  
2 remain available until expended;

3 (B) for fiscal year 2024, \$25,000,000, to  
4 remain available until expended;

5 (C) for fiscal year 2025, \$50,000,000, to  
6 remain available until expended;

7 (D) for fiscal year 2026, \$50,000,000, to  
8 remain available until expended; and

9 (E) for fiscal year 2027, \$50,000,000, to  
10 remain available until expended.

11 (3) ALLOCATION AUTHORITY.—

12 (A) SUBMISSION OF COST ESTIMATES.—

13 The President shall submit to Congress detailed  
14 account, program, and project allocations of the  
15 full amount made available under paragraph  
16 (2)—

17 (i) for fiscal year 2023, not later than  
18 60 days after the date of enactment of this  
19 Act; and

20 (ii) for each subsequent fiscal year  
21 through 2027, as part of the annual budg-  
22 et submission of the President under sec-  
23 tion 1105(a) of title 31, United States  
24 Code.

25 (B) ALTERNATE ALLOCATION.—

1 (i) IN GENERAL.—The Committees on  
2 Appropriations of the House of Represent-  
3 atives and the Senate may provide for al-  
4 ternate allocation of amounts made avail-  
5 able under paragraph (2), including by ac-  
6 count, program, and project.

7 (ii) ALLOCATION BY PRESIDENT.—

8 (I) NO ALTERNATE ALLOCA-  
9 TIONS.—If Congress has not enacted  
10 legislation establishing alternate allo-  
11 cations, including by account, pro-  
12 gram, and project, by the date on  
13 which the Act making full-year appro-  
14 priations for the Departments of  
15 Commerce and Justice, Science, and  
16 Related Agencies for the applicable  
17 fiscal year is enacted into law, only  
18 then shall amounts made available  
19 under subsection (d)(2) be allocated  
20 by the President or apportioned or al-  
21 lotted by account, program, and  
22 project pursuant to title 31, United  
23 States Code.

24 (II) INSUFFICIENT ALTERNATE  
25 ALLOCATION.—If Congress enacts leg-

1 islation establishing alternate alloca-  
2 tions, including by account, program,  
3 and project, for amounts made avail-  
4 able under subsection (d)(2) that are  
5 less than the full amount appropriated  
6 under that subsection, the difference  
7 between the amount appropriated and  
8 the alternate allocation shall be allo-  
9 cated by the President and appor-  
10 tioned and allotted by account, pro-  
11 gram, and project pursuant to title  
12 31, United States Code.

13 (e) SEQUESTRATION.—Section 255(g)(1)(A) of the  
14 Balanced Budget and Emergency Deficit Control Act of  
15 1985 (2 U.S.C. 905(g)(1)(A)) is amended by inserting  
16 after “Continuing Fund, Southwestern Power Administra-  
17 tion (89–5649–0–2–271).” the following:

18 “Creating Helpful Incentives to Produce  
19 Semiconductors (CHIPS) for America Fund.

20 “Creating Helpful Incentives to Produce  
21 Semiconductors (CHIPS) for America Defense  
22 Fund.

23 “Creating Helpful Incentives to Produce  
24 Semiconductors (CHIPS) for America Inter-

1 national Technology Security and Innovation  
2 Fund.

3 “Creating Helpful Incentives to Produce  
4 Semiconductors (CHIPS) for America Work-  
5 force and Education Fund”.

6 (f) BUDGETARY EFFECTS.—

7 (1) STATUTORY PAYGO SCORECARDS.—The  
8 budgetary effects of this section shall not be entered  
9 on either PAYGO scorecard maintained pursuant to  
10 section 4(d) of the Statutory Pay-As-You-Go Act of  
11 2010 (2 U.S.C. 933(d)).

12 (2) SENATE PAYGO SCORECARDS.—The budg-  
13 etary effects of this section shall not be entered on  
14 any PAYGO scorecard maintained for purposes of  
15 section 4106 of H. Con. Res. 71 (115th Congress).

16 (3) CLASSIFICATION OF BUDGETARY EF-  
17 FECTS.—Notwithstanding Rule 3 of the Budget  
18 Scorekeeping Guidelines set forth in the joint ex-  
19 planatory statement of the committee of conference  
20 accompanying Conference Report 105–217 and sec-  
21 tion 250(c)(8) of the Balanced Budget and Emer-  
22 gency Deficit Control Act of 1985, the budgetary ef-  
23 fects of this section shall not be estimated—

24 (A) for purposes of section 251 of such  
25 Act;

1 (B) for purposes of an allocation to the  
2 Committee on Appropriations pursuant to sec-  
3 tion 302(a) of the Congressional Budget Act of  
4 1974; and

5 (C) for purposes of paragraph (4)(C) of  
6 section 3 of the Statutory Pay-As-You-Go Act  
7 of 2010 as being included in an appropriation  
8 Act.

9 (g) LIMITATION ON USING AMOUNTS FOR STOCK  
10 BUYBACKS OR THE PAYMENT OF DIVIDENDS.—

11 (1) IN GENERAL.—A person receiving amounts  
12 appropriated under this section or from a covered  
13 fund may not use such amounts, as determined  
14 using the criteria for eligible uses of amounts under  
15 sections 9902(a)(4) and 9905(a)(4) of the William  
16 M. (Mac) Thornberry National Defense Authoriza-  
17 tion Act for Fiscal Year 2021 (15 U.S.C.  
18 4652(a)(4), 15 U.S.C. 4655(a)(4)), the activities  
19 under section 9903(b) of such Act (15 U.S.C.  
20 4653(b)), and the functions under 9906(c)(2) of  
21 such Act (15 U.S.C. 4656(c)(2)) —

22 (A) to purchase an equity security that is  
23 listed on a national securities exchange of such  
24 person or any parent company of such person;  
25 or

1 (B) to pay dividends or make other capital  
2 distributions with respect to the common stock  
3 (or equivalent interest) of the person.

4 (2) COVERED FUND.—In this subsection, the  
5 term “covered fund” means—

6 (A) the Creating Helpful Incentives to  
7 Produce Semiconductors (CHIPS) for America  
8 Fund;

9 (B) the Creating Helpful Incentives to  
10 Produce Semiconductors (CHIPS) for America  
11 Defense Fund;

12 (C) the Creating Helpful Incentives to  
13 Produce Semiconductors (CHIPS) for America  
14 International Technology Security and Innova-  
15 tion Fund; and

16 (D) the Creating Helpful Incentives to  
17 Produce Semiconductors (CHIPS) for America  
18 Workforce and Education Fund.

19 **SEC. 103. SEMICONDUCTOR INCENTIVES.**

20 (a) DEFINITIONS.—Section 9901 of the William M.  
21 (Mac) Thornberry National Defense Authorization Act for  
22 Fiscal Year 2021 (15 U.S.C. 4651) is amended—

23 (1) in paragraph (2)—

24 (A) by striking “a private entity, a consor-  
25 tium of private entities, or a consortium of pub-

1           lic and private entities” and inserting “a non-  
2           profit entity, a private entity, a consortium of  
3           private entities, or a consortium of nonprofit,  
4           public, and private entities”;

5                   (B) by inserting “production,” before “or  
6           research and development”; and

7                   (C) by striking “of semiconductors.” and  
8           inserting “of semiconductors, materials used to  
9           manufacture semiconductors, or semiconductor  
10          manufacturing equipment.”;

11           (2) by redesignating paragraphs (5), (6), (7),  
12          (8), and (9) as paragraphs (6), (8), (9), (12), and  
13          (13), respectively;

14           (3) by inserting after paragraph (4), the fol-  
15          lowing:

16                   “(5) The term ‘critical manufacturing indus-  
17          try’—

18                           “(A) means an industry, industry group,  
19                           or a set of related industries or related industry  
20                           groups—

21                                   “(i) assigned a North American In-  
22                                   dustry Classification System code begin-  
23                                   ning with 31, 32, or 33; and

24                                   “(ii) for which the applicable industry  
25                                   group or groups in the North American In-

1 industry Classification System code cumula-  
2 tively—

3 “(I) manufacture primary prod-  
4 ucts and parts, the sum of which ac-  
5 count for not less than 5 percent of  
6 the manufacturing value added by in-  
7 dustry gross domestic product of the  
8 United States; and

9 “(II) employ individuals for pri-  
10 mary products and parts manufac-  
11 turing activities that, combined, ac-  
12 count for not less than 5 percent of  
13 manufacturing employment in the  
14 United States; and

15 “(B) may include any other manufacturing  
16 industry designated by the Secretary based on  
17 the relevance of the manufacturing industry to  
18 the national and economic security of the  
19 United States, including the impacts of job  
20 losses.”; and

21 (4) by inserting after paragraph (6), as so re-  
22 designated, the following:

23 “(7) The term ‘foreign country of concern’  
24 means—



1           “(A) a country that is a covered nation (as  
2           defined in section 4872(d) of title 10 United  
3           States Code); and

4           “(B) any country that the Secretary, in  
5           consultation with the Secretary of Defense, the  
6           Secretary of State, and the Director of National  
7           Intelligence, determines to be engaged in con-  
8           duct that is detrimental to the national security  
9           or foreign policy of the United States.”; and

10          (5) by inserting after paragraph (9), as so re-  
11          designated, the following:

12          “(10) The term ‘mature technology node’ has  
13          the meaning given the term by the Secretary.

14          “(11) The term ‘nonprofit entity’ means an en-  
15          tity described in section 501(c)(3) of the Internal  
16          Revenue Code of 1986 and exempt from taxation  
17          under section 501(a) of such Code.”.

18          (b) SEMICONDUCTOR PROGRAM.—Section 9902 of  
19          the William M. (Mac) Thornberry National Defense Au-  
20          thorization Act for Fiscal Year 2021 (15 U.S.C. 4652)  
21          is amended—

22                 (1) in subsection (a)(1)—

23                         (A) by striking “for semiconductor fabrica-  
24                         tion” and inserting “for the fabrication”;

1 (B) by inserting “production,” before “or  
2 research and development”; and

3 (C) by striking the period at the end and  
4 inserting “of semiconductors, materials used to  
5 manufacture semiconductors, or semiconductor  
6 manufacturing equipment.”; and

7 (2) in subsection (a)(2)—

8 (A) in subparagraph (B)(i), by striking “;  
9 and” at the end;

10 (B) in subparagraph (B)(ii)—

11 (i) in subclause (III), by striking  
12 “and” at the end;

13 (ii) in subclause (IV), by striking the  
14 period at the end and inserting a semi-  
15 colon; and

16 (iii) by adding at the end the fol-  
17 lowing:

18 “(V) determined—

19 “(aa) the type of semicon-  
20 ductor technology, equipment,  
21 materials, or research and devel-  
22 opment the covered entity will  
23 produce at the facility described  
24 in clause (i); and

1                   “(bb) the customers, or cat-  
2                   egories of customers, to which  
3                   the covered entity plans to sell  
4                   the semiconductor technology,  
5                   equipment, materials, or research  
6                   and development described in  
7                   item (aa); and

8                   “(VI) documented, to the extent  
9                   practicable, workforce needs and de-  
10                  veloped a strategy to meet such work-  
11                  force needs consistent with the com-  
12                  mitments described in subclauses (II)  
13                  and (III);”; and

14                  (C) by inserting after subparagraph (B)(ii)  
15                  the following—

16                  “(iii) with respect to the project de-  
17                  scribed in clause (i), the covered entity has  
18                  an executable plan to identify and mitigate  
19                  relevant semiconductor supply chain secu-  
20                  rity risks, such as risks associated with ac-  
21                  cess, availability, confidentiality, integrity,  
22                  and a lack of geographic diversification in  
23                  the covered entity’s supply chain; and

24                  “(iv) with respect to any project for  
25                  the production, assembly, or packaging of

1           semiconductors, the covered entity has im-  
2           plemented policies and procedures to com-  
3           bat cloning, counterfeiting, and relabeling  
4           of semiconductors, as applicable.”;

5           (D) in subparagraph (C)—

6                 (i) in clause (i)—

7                         (I) in subclause (II), by striking  
8                         “is in the interest of the United  
9                         States” and inserting “is in the eco-  
10                        nomic and national security interests  
11                        of the United States”; and

12                       (II) in subclause (III), by strik-  
13                       ing “and” at the end;

14                       (ii) in clause (ii)(IV), by striking  
15                       “and” at the end;

16                       (iii) by redesignating clause (iii) as  
17                       clause (v); and

18                       (iv) by inserting after clause (ii) the  
19                       following:

20                                 “(iii) the Secretary shall consider the  
21                                 type of semiconductor technology produced  
22                                 by the covered entity and whether that  
23                                 semiconductor technology advances the  
24                                 economic and national security interests of  
25                                 the United States;



1                    tional security, manufacturing, critical  
2                    infrastructure, and technology leader-  
3                    ship of the United States and other  
4                    essential elements of the economy of  
5                    the United States; and

6                    “(ii) ensure that the assistance is  
7                    awarded to covered entities for both ad-  
8                    vanced and mature technology nodes to  
9                    meet the priorities described in clause  
10                    (i).”;

11                    (3) in subsection (a)(4)(A), by striking “used  
12                    for semiconductors” and inserting “used for the pur-  
13                    poses”;

14                    (4) in subsection (a)(5)—

15                    (A) in subparagraph (A), by striking  
16                    “major”;

17                    (B) in subparagraph (D), by striking  
18                    “major”; and

19                    (C) in subparagraph (E)(i), by striking  
20                    “major”;

21                    (5) by inserting after subsection (a)(5) the fol-  
22                    lowing:

23                    “(6) EXPANSION CLAWBACK.—

24                    “(A) DEFINITION OF LEGACY SEMICON-  
25                    DUCTOR.—

1                   “(i) IN GENERAL.—In this paragraph,  
2                   the term ‘legacy semiconductor’—

3                   “(I) includes—

4                   “(aa) a semiconductor tech-  
5                   nology that is of the 28  
6                   nanometer generation or older  
7                   for logic;

8                   “(bb) with respect to mem-  
9                   ory technology, analog tech-  
10                  nology, packaging technology,  
11                  and any other relevant tech-  
12                  nology, any legacy generation of  
13                  semiconductor technology relative  
14                  to the generation described in  
15                  item (aa), as determined by the  
16                  Secretary, in consultation with  
17                  the Secretary of Defense and the  
18                  Director of National Intelligence;  
19                  and

20                  “(cc) any additional semi-  
21                  conductor technology identified  
22                  by the Secretary in a public no-  
23                  tice issued under clause (ii); and

24                  “(II) does not include a semicon-  
25                  ductor that is critical to national secu-

1                   rity, as determined by the Secretary,  
2                   in consultation with the Secretary of  
3                   Defense and the Director of National  
4                   Intelligence.

5                   “(ii) UPDATES.—Not later than 2  
6                   years after the date of enactment of the  
7                   CHIPS Act of 2022, and not less fre-  
8                   quently than once every 2 years thereafter  
9                   for the 8-year period after the last award  
10                  under this section is made, the Secretary,  
11                  after public notice and an opportunity for  
12                  comment and if applicable and necessary,  
13                  shall issue a public notice identifying any  
14                  additional semiconductor technology in-  
15                  cluded in the meaning of the term ‘legacy  
16                  semiconductor’ under clause (i).

17                  “(iii) FUNCTIONS OF THE SEC-  
18                  RETARY.—The functions of the Secretary  
19                  under this paragraph shall not be subject  
20                  to sections 551, 553 through 559, and 701  
21                  through 706 of title 5, United States Code.

22                  “(iv) CONSULTATION.—In carrying  
23                  out clause (ii), the Secretary shall consult  
24                  with the Director of National Intelligence  
25                  and the Secretary of Defense.



1                   “(v) CONSIDERATIONS.—In carrying  
2 out clause (ii), the Secretary shall con-  
3 sider—

4                   “(I) state-of-the-art semicon-  
5 ductor technologies in the United  
6 States and internationally, including  
7 in foreign countries of concern; and

8                   “(II) consistency with export con-  
9 trols relating to semiconductors.

10                   “(B) DEFINITION OF SEMICONDUCTOR  
11 MANUFACTURING.—In this paragraph, the term  
12 ‘semiconductor manufacturing’—

13                   “(i) has the meaning given the term  
14 by the Secretary, in consultation with the  
15 Secretary of Defense and the Director of  
16 National Intelligence; and

17                   “(ii) includes front-end semiconductor  
18 fabrication.

19                   “(C) REQUIRED AGREEMENT.—

20                   “(i) IN GENERAL.—On or before the  
21 date on which the Secretary awards Fed-  
22 eral financial assistance to a covered entity  
23 under this section, the covered entity shall  
24 enter into an agreement with the Secretary  
25 specifying that, during the 10-year period

1 beginning on the date of the award, sub-  
2 ject to clause (ii), the covered entity may  
3 not engage in any significant transaction,  
4 as defined in the agreement, involving the  
5 material expansion of semiconductor man-  
6 ufacturing capacity in the People’s Repub-  
7 lic of China or any other foreign country of  
8 concern.

9 “(ii) EXCEPTIONS.—The prohibition  
10 in the agreement required under clause (i)  
11 shall not apply to—

12 “(I) existing facilities or equip-  
13 ment of a covered entity for manufac-  
14 turing legacy semiconductors; or

15 “(II) significant transactions in-  
16 volving the material expansion of  
17 semiconductor manufacturing capacity  
18 that—

19 “(aa) produces legacy semi-  
20 conductors; and

21 “(bb) predominately serves  
22 the market of a foreign country  
23 of concern.

24 “(iii) AFFILIATED GROUP.—For the  
25 purpose of applying the requirements in an

1 agreement required under clause (i), a cov-  
2 ered entity shall include the covered entity  
3 receiving financial assistance under this  
4 section, as well as any member of the cov-  
5 ered entity's affiliated group under section  
6 1504(a) of the Internal Revenue Code of  
7 1986, without regard to section 1504(b)(3)  
8 of such Code.

9 “(D) NOTIFICATION REQUIREMENTS.—  
10 During the applicable term of the agreement of  
11 a covered entity required under subparagraph  
12 (C)(i), the covered entity shall notify the Sec-  
13 retary of any planned significant transactions of  
14 the covered entity involving the material expan-  
15 sion of semiconductor manufacturing capacity  
16 in the People's Republic of China or any other  
17 foreign country of concern.

18 “(E) VIOLATION OF AGREEMENT.—

19 “(i) NOTIFICATION TO COVERED EN-  
20 TITIES.—Not later than 90 days after the  
21 date of receipt of a notification described  
22 in subparagraph (D) from a covered entity,  
23 the Secretary, in consultation with the Sec-  
24 retary of Defense and the Director of Na-  
25 tional Intelligence, shall—



1           ITY.—Subject to clause (iv), if a covered  
2           entity fails to remedy a violation as set  
3           forth under clause (ii), the Secretary shall  
4           recover the full amount of the Federal fi-  
5           nancial assistance provided to the covered  
6           entity under this section.

7                   “(iv) MITIGATION.—If the Secretary,  
8           in consultation with the Secretary of De-  
9           fense and the Director of National Intel-  
10          ligence, determines that a covered entity  
11          planning a significant transaction that  
12          would violate the agreement required under  
13          subparagraph (C)(i) could take measures  
14          in connection with the transaction to miti-  
15          gate any risk to national security, the Sec-  
16          retary—

17                           “(I) may negotiate, enter into,  
18                           and enforce any agreement or condi-  
19                           tion for the mitigation; and,

20                           “(II) waive the recovery require-  
21                           ment under clause (iii).

22          “(F) SUBMISSION OF RECORDS.—

23                   “(i) IN GENERAL.—The Secretary  
24           may request from a covered entity records  
25           and other necessary information to review

1 the compliance of the covered entity with  
2 the agreement required under subpara-  
3 graph (C)(i).

4 “(ii) ELIGIBILITY.—In order to be eli-  
5 gible for Federal financial assistance under  
6 this section, a covered entity shall agree to  
7 provide records and other necessary infor-  
8 mation requested by the Secretary under  
9 clause (i).

10 “(G) CONFIDENTIALITY OF RECORDS.—

11 “(i) IN GENERAL.—Subject to clause  
12 (ii), any information derived from records  
13 or necessary information disclosed by a  
14 covered entity to the Secretary under this  
15 section—

16 “(I) shall be exempt from disclo-  
17 sure under section 552(b)(3) of title  
18 5, United States Code; and

19 “(II) shall not be made public.

20 “(ii) EXCEPTIONS.—Clause (i) shall  
21 not prevent the disclosure of any of the fol-  
22 lowing by the Secretary:

23 “(I) Information relevant to any  
24 administrative or judicial action or  
25 proceeding.

1                   “(II) Information that a covered  
2                   entity has consented to be disclosed to  
3                   third parties.

4                   “(III) Information necessary to  
5                   fulfill the requirement of the congres-  
6                   sional notification under subpara-  
7                   graph (H).

8                   “(H) CONGRESSIONAL NOTIFICATION.—  
9                   Not later than 60 days after the date on which  
10                  the Secretary finds a violation by a covered en-  
11                  tity of an agreement required under subpara-  
12                  graph (C)(i), and after providing the covered  
13                  entity with an opportunity to provide informa-  
14                  tion in response to that finding, the Secretary  
15                  shall provide to the appropriate Committees of  
16                  Congress—

17                         “(i) a notification of the violation;

18                         “(ii) a brief description of how the  
19                         Secretary determined the covered entity to  
20                         be in violation; and

21                         “(iii) a summary of any actions or  
22                         planned actions by the Secretary in re-  
23                         sponse to the violation.

1                   “(I) REGULATIONS.—The Secretary may  
2                   issue regulations implementing this para-  
3                   graph.”; and

4                   (6) by adding at the end the following:

5                   “(d) SENSE OF CONGRESS.—It is the sense of Con-  
6                   gress that, in carrying out subsection (a), the Secretary  
7                   should allocate funds in a manner that—

8                   “(1) strengthens the security and resilience of  
9                   the semiconductor supply chain, including by miti-  
10                  gating gaps and vulnerabilities;

11                  “(2) provides a supply of secure semiconductors  
12                  relevant for national security;

13                  “(3) strengthens the leadership of the United  
14                  States in semiconductor technology;

15                  “(4) grows the economy of the United States  
16                  and supports job creation in the United States;

17                  “(5) bolsters the semiconductor and skilled  
18                  technical workforces in the United States;

19                  “(6) promotes the inclusion of economically dis-  
20                  advantaged individuals and small businesses; and

21                  “(7) improves the resiliency of the semicon-  
22                  ductor supply chains of critical manufacturing in-  
23                  dustries.

24                  “(e) ADDITIONAL ASSISTANCE FOR MATURE TECH-  
25                  NOLOGY NODES.—



1           “(1) IN GENERAL.—The Secretary shall estab-  
2           lish within the program established under subsection  
3           (a) an additional program that provides Federal fi-  
4           nancial assistance to covered entities to incentivize  
5           investment in facilities and equipment in the United  
6           States for the fabrication, assembly, testing, or  
7           packaging of semiconductors at mature technology  
8           nodes.

9           “(2) ELIGIBILITY AND REQUIREMENTS.—In  
10          order for an entity to qualify to receive Federal fi-  
11          nancial assistance under this subsection, the covered  
12          entity shall agree to—

13                 “(A) submit an application under sub-  
14                 section (a)(2)(A);

15                 “(B) meet the eligibility requirements  
16                 under subsection (a)(2)(B);

17                 “(C)(i) provide equipment or materials for  
18                 the fabrication, assembly, testing, or packaging  
19                 of semiconductors at mature technology nodes  
20                 in the United States; or

21                 “(ii) fabricate, assemble using packaging,  
22                 or test semiconductors at mature technology  
23                 nodes in the United States;

24                 “(D) commit to using any Federal finan-  
25                 cial assistance received under this section to in-

1           crease the production of semiconductors at ma-  
2           ture technology nodes; and

3                   “(E) be subject to the considerations de-  
4           scribed in subsection (a)(2)(C).

5                   “(3) PROCEDURES.—In granting Federal finan-  
6           cial assistance to covered entities under this sub-  
7           section, the Secretary may use the procedures estab-  
8           lished under subsection (a).

9                   “(4) CONSIDERATIONS.—In addition to the con-  
10          siderations described in subsection (a)(2)(C), in  
11          granting Federal financial assistance under this sub-  
12          section, the Secretary may consider whether a cov-  
13          ered entity produces or supplies equipment or mate-  
14          rials used in the fabrication, assembly, testing, or  
15          packaging of semiconductors at mature technology  
16          nodes that are necessary to support a critical manu-  
17          facturing industry.

18                   “(5) PRIORITY.—In awarding Federal financial  
19          assistance to covered entities under this subsection,  
20          the Secretary shall give priority to covered entities  
21          that support the resiliency of semiconductor supply  
22          chains for critical manufacturing industries in the  
23          United States.

24                   “(6) AUTHORIZATION OF APPROPRIATIONS.—  
25          There are authorized to be appropriated to the Sec-

1       retary to carry out this subsection \$2,000,000,000,  
2       which shall remain available until expended.

3       “(f) CONSTRUCTION PROJECTS.—Section 602 of the  
4 Public Works and Economic Development Act of 1965 (42  
5 U.S.C. 3212) shall apply to a construction project that  
6 receives financial assistance from the Secretary under this  
7 section.

8       “(g) LOANS AND LOAN GUARANTEES.—

9             “(1) IN GENERAL.—Subject to the require-  
10       ments of subsection (a) and this subsection, the Sec-  
11       retary may make or guarantee loans to covered enti-  
12       ties as financial assistance under this section.

13             “(2) CONDITIONS.—The Secretary may select  
14       eligible projects to receive loans or loan guarantees  
15       under this subsection if the Secretary determines  
16       that—

17             “(A) the covered entity—

18                 “(i) has a reasonable prospect of re-  
19       paying the principal and interest on the  
20       loan; and

21                 “(ii) has met such other criteria as  
22       may be established and published by the  
23       Secretary; and

24             “(B) the amount of the loan (when com-  
25       bined with amounts available to the loan recipi-

1           ent from other sources) will be sufficient to  
2           carry out the project.

3           “(3) REASONABLE PROSPECT OF REPAY-  
4           MENT.—The Secretary shall base a determination of  
5           whether there is a reasonable prospect of repayment  
6           of the principal and interest on a loan under para-  
7           graph (2)(A)(i) on a comprehensive evaluation of  
8           whether the covered entity has a reasonable prospect  
9           of repaying the principal and interest, including, as  
10          applicable, an evaluation of—

11                   “(A) the strength of the contractual terms  
12                   of the project the covered entity plans to per-  
13                   form (if commercially reasonably available);

14                   “(B) the forecast of noncontractual cash  
15                   flows supported by market projections from rep-  
16                   utable sources, as determined by the Secretary;

17                   “(C) cash sweeps and other structure en-  
18                   hancements;

19                   “(D) the projected financial strength of the  
20                   covered entity—

21                           “(i) at the time of loan close; and

22                           “(ii) throughout the loan term after  
23                   the project is completed;

1           “(E) the financial strength of the investors  
2           and strategic partners of the covered entity, if  
3           applicable;

4           “(F) other financial metrics and analyses  
5           that the private lending community and nation-  
6           ally recognized credit rating agencies rely on, as  
7           determined appropriate by the Secretary; and

8           “(G) such other criteria the Secretary may  
9           determine relevant.

10           “(4) RATES, TERMS, AND REPAYMENTS OF  
11           LOANS.—A loan provided under this subsection—

12           “(A) shall have an interest rate that does  
13           not exceed a level that the Secretary determines  
14           appropriate, taking into account, as of the date  
15           on which the loan is made, the cost of funds to  
16           the Department of the Treasury for obligations  
17           of comparable maturity; and

18           “(B) shall have a term of not more than  
19           25 years.

20           “(5) ADDITIONAL TERMS.—A loan or guarantee  
21           provided under this subsection may include any  
22           other terms and conditions that the Secretary deter-  
23           mines to be appropriate.

1           “(6) RESPONSIBLE LENDER.—No loan may be  
2           guaranteed under this subsection, unless the Sec-  
3           retary determines that—

4                   “(A) the lender is responsible; and

5                   “(B) adequate provision is made for serv-  
6           icing the loan on reasonable terms and pro-  
7           tecting the financial interest of the United  
8           States.

9           “(7) ADVANCED BUDGET AUTHORITY.—New  
10          loans may not be obligated and new loan guarantees  
11          may not be committed to under this subsection, un-  
12          less appropriations of budget authority to cover the  
13          costs of such loans and loan guarantees are made in  
14          advance in accordance with section 504(b) of the  
15          Federal Credit Reform Act of 1990 (2 U.S.C.  
16          661c(b)).

17          “(8) CONTINUED OVERSIGHT.—The loan agree-  
18          ment for a loan guaranteed under this subsection  
19          shall provide that no provision of the loan agreement  
20          may be amended or waived without the consent of  
21          the Secretary.

22          “(h) OVERSIGHT.—Not later than 4 years after dis-  
23          bursement of the first financial award under subsection  
24          (a), the Inspector General of the Department of Com-

1 merce shall audit the program under this section to as-  
2 sess—

3 “(1) whether the eligibility requirements for  
4 covered entities receiving financial assistance under  
5 the program are met;

6 “(2) whether eligible entities use the financial  
7 assistance received under the program in accordance  
8 with the requirements of this section;

9 “(3) whether the covered entities receiving fi-  
10 nancial assistance under this program have carried  
11 out the commitments made to worker and commu-  
12 nity investment under subsection (a)(2)(B)(ii)(II) by  
13 the target date for completion set by the Secretary  
14 under subsection (a)(5)(A);

15 “(4) whether the required agreement entered  
16 into by covered entities and the Secretary under sub-  
17 section (a)(6)(C)(i), including the notification proc-  
18 ess, has been carried out to provide covered entities  
19 sufficient guidance about a violation of the required  
20 agreement;

21 “(5) whether the Secretary has provided timely  
22 Congressional notification about violations of the re-  
23 quired agreement under subsection (a)(6)(C)(i), in-  
24 cluding the required information on how the Sec-  
25 retary reached a determination of whether a covered

1       entity was in violation under subsection (a)(6)(E);  
2       and

3               “(6) whether the Secretary has sufficiently re-  
4       viewed any covered entity engaging in a listed excep-  
5       tion under subsection (a)(6)(C)(ii).

6       “(i) PROHIBITION ON USE OF FUNDS.—No funds  
7       made available under this section may be used to con-  
8       struct, modify, or improve a facility outside of the United  
9       States.”.

10       (c) ADVANCED MICROELECTRONICS RESEARCH AND  
11       DEVELOPMENT.—Section 9906 of the William M. (Mac)  
12       Thornberry National Defense Authorization Act for Fiscal  
13       Year 2021 (15 U.S.C. 4656) is amended—

14               (1) in subsection (a)(3)(A)(ii)—

15                       (A) in subclause (II), by inserting “, in-  
16       cluding for technologies based on organic and  
17       inorganic materials” after “components”; and

18                       (B) in subclause (V), by striking “and sup-  
19       ply chain integrity” and inserting “supply chain  
20       integrity, and workforce development”;

21               (2) in subsection (c)—

22                       (A) in paragraph (1)—

23                               (i) by inserting “and grow the domes-  
24       tic semiconductor workforce” after “proto-



1 typing of advanced semiconductor tech-  
2 nology”; and

3 (ii) by adding at the end the fol-  
4 lowing: “The Secretary may make financial  
5 assistance awards, including construction  
6 awards, in support of the national semicon-  
7 ductor technology center.”; and

8 (B) in paragraph (2)—

9 (i) in subparagraph (B), by inserting  
10 “and capitalize” before “an investment  
11 fund”; and

12 (ii) by striking subparagraph (C) and  
13 inserting the following:

14 “(C) To work with the Secretary of Labor,  
15 the Director of the National Science Founda-  
16 tion, the Secretary of Energy, the private sec-  
17 tor, institutions of higher education, and work-  
18 force training entities to incentivize and expand  
19 geographically diverse participation in graduate,  
20 undergraduate, and community college pro-  
21 grams relevant to microelectronics, including  
22 through—

23 “(i) the development and dissemina-  
24 tion of curricula and research training ex-  
25 periences; and

1                   “(ii) the development of workforce  
2                   training programs and apprenticeships in  
3                   advanced microelectronic design, research,  
4                   fabrication, and packaging capabilities.”;

5                   (3) in subsection (d)—

6                   (A) by striking “the Manufacturing USA  
7                   institute” and inserting “a Manufacturing USA  
8                   institute”; and

9                   (B) by adding at the end the following:  
10                  “The Director may make financial assistance  
11                  awards, including construction awards, in sup-  
12                  port of the National Advanced Packaging Man-  
13                  ufacturing Program.”;

14                  (4) in subsection (f)—

15                  (A) in the matter preceding paragraph  
16                  (1)—

17                         (i) by striking “a Manufacturing USA  
18                         Institute” and inserting “not more than 3  
19                         Manufacturing USA Institutes”;

20                         (ii) by striking “is focused on semi-  
21                         conductor manufacturing.” and inserting  
22                         “are focused on semiconductor manufac-  
23                         turing. The Secretary of Commerce may  
24                         award financial assistance to any Manufac-

1 turing USA Institute for work relating to  
2 semiconductor manufacturing.”; and

3 (iii) by striking “Such institute may  
4 emphasize” and inserting “Such institutes  
5 may emphasize”; and

6 (5) by adding at the end the following:

7 “(h) CONSTRUCTION PROJECTS.—Section 602 of the  
8 Public Works and Economic Development Act of 1965 (42  
9 U.S.C. 3212) shall apply to a construction project that  
10 receives financial assistance under this section.”.

11 (d) ADDITIONAL AUTHORITIES.—Division H of title  
12 XCIX of the William M. (Mac) Thornberry National De-  
13 fense Authorization Act for Fiscal Year 2021 (15 U.S.C.  
14 4651 et seq.) is amended by adding at the end the fol-  
15 lowing:

16 **“SEC. 9909. ADDITIONAL AUTHORITIES.**

17 “(a) IN GENERAL.—In carrying out the responsibil-  
18 ities of the Department of Commerce under this division,  
19 the Secretary may—

20 “(1) enter into agreements, including contracts,  
21 grants and cooperative agreements, and other trans-  
22 actions as may be necessary and on such terms as  
23 the Secretary considers appropriate;

24 “(2) make advance payments under agreements  
25 and other transactions authorized under paragraph

1 (1) without regard to section 3324 of title 31,  
2 United States Code;

3 “(3) require a person or other entity to make  
4 payments to the Department of Commerce upon ap-  
5 plication and as a condition for receiving support  
6 through an award of assistance or other transaction;

7 “(4) procure temporary and intermittent serv-  
8 ices of experts and consultants in accordance with  
9 section 3109 of title 5, United States Code;

10 “(5) notwithstanding section 3104 of title 5,  
11 United States Code, or the provisions of any other  
12 law relating to the appointment, number, classifica-  
13 tion, or compensation of employees, make appoint-  
14 ments of scientific, engineering, and professional  
15 personnel, and fix the basic pay of such personnel at  
16 a rate to be determined by the Secretary at rates not  
17 in excess of the highest total annual compensation  
18 payable at the rate determined under section 104 of  
19 title 3, United States Code, except that the Sec-  
20 retary shall appoint not more than 25 personnel  
21 under this paragraph;

22 “(6) with the consent of another Federal agen-  
23 cy, enter into an agreement with that Federal agen-  
24 cy to use, with or without reimbursement, any serv-

1 ice, equipment, personnel, or facility of that Federal  
2 agency; and

3 “(7) establish such rules, regulations, and pro-  
4 cedures as the Secretary considers appropriate.

5 “(b) REQUIREMENT.—Any funds received from a  
6 payment made by a person or entity pursuant to sub-  
7 section (a)(3) shall be credited to and merged with the  
8 account from which support to the person or entity was  
9 made”.

10 (e) CONFORMING AMENDMENT.—The table of con-  
11 tents for division H of title XCIX of the William M. (Mac)  
12 Thornberry National Defense Authorization Act for Fiscal  
13 Year 2021 (Public Law 116–283) is amended by adding  
14 after the item relating to section 9908 the following:

“9909. Additional authorities.”.

15 **SEC. 104. OPPORTUNITY AND INCLUSION.**

16 (a) ESTABLISHMENT.—Not later than 180 days after  
17 the date of enactment of this Act, the Secretary of Com-  
18 merce shall establish activities in the Department of Com-  
19 merce, within the program established under section 9902  
20 of the William M. (Mac) Thornberry National Defense Au-  
21 thorization Act for Fiscal Year 2021 (15 U.S.C. 4652),  
22 to carry out this section using funds appropriated under  
23 this Act.

24 (b) IN GENERAL.—The Secretary of Commerce shall  
25 assign personnel to lead and support the activities carried

1 out under this section, including coordination with other  
2 workforce development activities of the Department of  
3 Commerce or of Federal agencies, as defined in section  
4 551 of title 5, United States Code, as appropriate.

5 (c) ACTIVITIES.—Personnel assigned by the Sec-  
6 retary to carry out the activities under this section shall—

7 (1) assess the eligibility of a covered entity, as  
8 defined in section 9901 of the William M. (Mac)  
9 Thornberry National Defense Authorization Act for  
10 Fiscal Year 2021 (15 U.S.C. 4651), for financial as-  
11 sistance for a project with respect to the require-  
12 ments under subclauses (II) and (III) of section  
13 9902(a)(2)(B)(ii) of the William M. (Mac) Thorn-  
14 berry National Defense Authorization Act for Fiscal  
15 Year 2021 (15 U.S.C. 4652(a)(2)(B)(ii)(II) and  
16 (III));

17 (2) ensure that each covered entity, as defined  
18 in section 9901 of the William M. (Mac) Thornberry  
19 National Defense Authorization Act for Fiscal Year  
20 2021 (15 U.S.C. 4651), that is awarded financial as-  
21 sistance under section 9902 of that Act (15 U.S.C.  
22 4652) is carrying out the commitments of the cov-  
23 ered entity to economically disadvantaged individuals  
24 as described in the application of the covered entity  
25 under that section by the target dates for completion

1 established by the Secretary of Commerce under  
2 subsection(a)(5)(A) of that section; and

3 (3) increase participation of and outreach to  
4 economically disadvantaged individuals, minority-  
5 owned businesses, veteran-owned businesses, and  
6 women-owned businesses, as defined by the Sec-  
7 retary of Commerce, respectively, in the geographic  
8 area of a project under section 9902 of the William  
9 M. (Mac) Thornberry National Defense Authoriza-  
10 tion Act for Fiscal Year 2021 (15 U.S.C. 4652) and  
11 serve as a resource for those individuals, businesses,  
12 and covered entities.

13 (d) STAFF.—The activities under this section shall be  
14 staffed at the appropriate levels to carry out the functions  
15 and responsibilities under this section until 95 percent of  
16 the amounts of funds made available for the program es-  
17 tablished under section 9902 of the William M. (Mac)  
18 Thornberry National Defense Authorization Act for Fiscal  
19 Year 2021 (15 U.S.C. 4652) have been expended.

20 (e) REPORT.—Beginning on the date that is 1 year  
21 after the date on which the Secretary of Commerce estab-  
22 lishes the activities described in subsection (c), the Sec-  
23 retary of Commerce shall submit to the appropriate com-  
24 mittees of Congress, as defined in section 9901(1) of the  
25 William M. (Mac) Thornberry National Defense Author-

1 ization Act for Fiscal Year 2021 (15 U.S.C. 4651), and  
2 make publicly available on the website of the Department  
3 of Commerce an annual report regarding the actions taken  
4 by the Department of Commerce under this section.

5 **SEC. 105. ADDITIONAL GAO REPORTING REQUIREMENTS.**

6 (a) NDAA.—Section 9902(c) of William M. (Mac)  
7 Thornberry National Defense Authorization Act for Fiscal  
8 Year 2021 (15 U.S.C. 4652(c)) is amended—

9 (1) in paragraph (1)—

10 (A) in subparagraph (B)—

11 (i) in clause (i), by striking “; and”  
12 and inserting a semicolon; and

13 (ii) by adding at the end the fol-  
14 lowing:

15 “(iii) the Federal Government could  
16 take specific actions to address shortages  
17 in the semiconductor supply chain, includ-  
18 ing—

19 “(I) demand-side incentives, in-  
20 cluding incentives related to the infor-  
21 mation and communications tech-  
22 nology supply chain; and

23 “(II) additional incentives, at na-  
24 tional and global scales, to accelerate  
25 utilization of leading-edge semicon-



1                   ductor nodes to address shortages in  
2                   mature semiconductor nodes; and”;  
3                   and

4                   (B) in subparagraph (C)—

5                   (i) in clause (iii), by striking “; and”  
6                   and inserting a semicolon; and

7                   (ii) by inserting after clause (iv) the  
8                   following:

9                   “(v) how projects are supporting the  
10                  semiconductor needs of critical infrastruc-  
11                  ture industries in the United States, in-  
12                  cluding those industries designated by the  
13                  Cybersecurity and Infrastructure Security  
14                  Agency as essential infrastructure indus-  
15                  tries; and”;

16                  (2) by inserting after paragraph (1)(C)(iv) the  
17                  following:

18                  “(D) drawing on data made available by  
19                  the Department of Labor or other sources, to  
20                  the extent practicable, an analysis of—

21                  “(i) semiconductor industry data re-  
22                  garding businesses that are—

23                  “(I) majority owned and con-  
24                  trolled by minority individuals;

1 “(II) majority owned and con-  
2 trolled by women; or

3 “(III) majority owned and con-  
4 trolled by both women and minority  
5 individuals;

6 “(ii) the number and amount of con-  
7 tracts and subcontracts awarded by each  
8 covered entity using funds made available  
9 under subsection (a) disaggregated by re-  
10 cipients of each such contract or sub-  
11 contracts that are majority owned and con-  
12 trolled by minority individuals and major-  
13 ity owned and controlled by women; and

14 “(iii) aggregated workforce data, in-  
15 cluding data by race or ethnicity, sex, and  
16 job categories.”.

17 (b) DEPARTMENT OF DEFENSE.—Section  
18 9202(a)(1)(G)(ii)(I) of the William M. (Mac) Thornberry  
19 National Defense Authorization Act for Fiscal Year 2021  
20 (47 U.S.C. 906(a)(1)(G)(ii)(I)) is amended by inserting  
21 “(including whether recipients are majority owned and  
22 controlled by minority individuals and majority owned and  
23 controlled by women)” after “to whom”.

1 **SEC. 106. APPROPRIATIONS FOR WIRELESS SUPPLY CHAIN**  
2 **INNOVATION.**

3 (a) **DIRECT APPROPRIATIONS.**—In addition to  
4 amounts otherwise available for such purposes, there is  
5 appropriated to the Public Wireless Supply Chain Innova-  
6 tion Fund established under section 9202(a)(1) of the Wil-  
7 liam M. (Mac) Thornberry National Defense Authoriza-  
8 tion Act for Fiscal Year 2021 (15 U.S.C. 4652(a)(1)), out  
9 of amounts in the Treasury not otherwise appropriated—

10 (1) \$150,000,000 for fiscal year 2022, to re-  
11 main available until September 30, 2031; and

12 (2) \$1,350,000,000 for fiscal year 2023, to re-  
13 main available until September 30, 2032.

14 (b) **USE OF FUNDS, ADMINISTRATION, AND OVER-**  
15 **SIGHT.**—Of the amounts made available under subsection  
16 (a)—

17 (1) not more than 5 percent of the amounts al-  
18 located pursuant to subsection (c) in a given fiscal  
19 year may be used by the Assistant Secretary of  
20 Commerce for Communications and Information to  
21 administer the programs funded from the Public  
22 Wireless Supply Chain Innovation Fund; and

23 (2) not less than \$2,000,000 per fiscal year  
24 shall be transferred to the Office of Inspector Gen-  
25 eral of the Department of Commerce for oversight

1 related to activities conducted using amounts pro-  
2 vided under this section.

3 (c) ALLOCATION AUTHORITY.—

4 (1) SUBMISSION OF COST ESTIMATES.—The  
5 President shall submit to Congress detailed account,  
6 program, and project allocations of the amount rec-  
7 ommended for allocation in a fiscal year from  
8 amounts made available under subsection (a)—

9 (A) for fiscal years 2022 and 2023, not  
10 later than 60 days after the date of enactment  
11 of this Act; and

12 (B) for each subsequent fiscal year  
13 through 2032, as part of the annual budget  
14 submission of the President under section  
15 1105(a) of title 31, United States Code.

16 (2) ALTERNATE ALLOCATION.—

17 (A) IN GENERAL.—The Committees on  
18 Appropriations of the House of Representatives  
19 and the Senate may provide for alternate allo-  
20 cation of amounts recommended for allocation  
21 in a given fiscal year from amounts made avail-  
22 able under subsection (a), including by account,  
23 program, and project.

24 (B) ALLOCATION BY PRESIDENT.—

1 (i) NO ALTERNATE ALLOCATIONS.—If  
2 Congress has not enacted legislation estab-  
3 lishing alternate allocations, including by  
4 account, program, and project, by the date  
5 on which the Act making full-year appro-  
6 priations for the Departments of Com-  
7 merce and Justice, Science, and Related  
8 Agencies for the applicable fiscal year is  
9 enacted into law, only then shall amounts  
10 recommended for allocation for that fiscal  
11 year from amounts made available under  
12 subsection (a) be allocated by the Presi-  
13 dent or apportioned or allotted by account,  
14 program, and project pursuant to title 31,  
15 United States Code.

16 (ii) INSUFFICIENT ALTERNATE ALLO-  
17 CATION.—If Congress enacts legislation es-  
18 tablishing alternate allocations, including  
19 by account, program, and project, for  
20 amounts recommended for allocation in a  
21 given fiscal year from amounts made avail-  
22 able under subsection (a) that are less  
23 than the full amount recommended for al-  
24 location for that fiscal year, the difference  
25 between the amount recommended for allo-

1 cation and the alternate allocation shall be  
2 allocated by the President and apportioned  
3 and allotted by account, program, and  
4 project pursuant to title 31, United States  
5 Code.

6 (d) SEQUESTRATION.—Section 255(g)(1)(A) of the  
7 Balanced Budget and Emergency Deficit Control Act of  
8 1985 (2 U.S.C. 905(g)(1)(A)) is amended by inserting  
9 after “Postal Service Fund (18–4020–0–3–372).” the fol-  
10 lowing:

11 “Public Wireless Supply Chain Inno-  
12 vation Fund.”.

13 (e) BUDGETARY EFFECTS.—

14 (1) STATUTORY PAYGO SCORECARDS.—The  
15 budgetary effects of this section shall not be entered  
16 on either PAYGO scorecard maintained pursuant to  
17 section 4(d) of the Statutory Pay-As-You-Go Act of  
18 2010.

19 (2) SENATE PAYGO SCORECARDS.—The budg-  
20 etary effects of this section shall not be entered on  
21 any PAYGO scorecard maintained for purposes of  
22 section 4106 of H. Con. Res. 71 (115th Congress).

23 (3) CLASSIFICATION OF BUDGETARY EF-  
24 FECTS.—Notwithstanding Rule 3 of the Budget  
25 Scorekeeping Guidelines set forth in the joint ex-

1       planatory statement of the committee of conference  
2       accompanying Conference Report 105–217 and sec-  
3       tion 250(c)(8) of the Balanced Budget and Emer-  
4       gency Deficit Control Act of 1985, the budgetary ef-  
5       fects of this section shall not be estimated—

6               (A) for purposes of section 251 of such  
7       Act;

8               (B) for purposes of an allocation to the  
9       Committee on Appropriations pursuant to sec-  
10      tion 302(a) of the Congressional Budget Act of  
11      1974; and

12              (C) for purposes of paragraph (4)(C) of  
13      section 3 of the Statutory Pay-As-You-Go Act  
14      of 2010 as being included in an appropriation  
15      Act.

16 **SEC. 107. ADVANCED MANUFACTURING INVESTMENT CRED-**  
17 **IT.**

18       (a) IN GENERAL.—Subpart E of part IV of sub-  
19      chapter A of chapter 1 of the Internal Revenue Code of  
20      1986 is amended by inserting after section 48C the fol-  
21      lowing new section:

22 **“SEC. 48D. ADVANCED MANUFACTURING INVESTMENT**  
23 **CREDIT.**

24       “(a) ESTABLISHMENT OF CREDIT.—For purposes of  
25      section 46, the advanced manufacturing investment credit

1 for any taxable year is an amount equal to 25 percent  
2 of the qualified investment for such taxable year with re-  
3 spect to any advanced manufacturing facility of an eligible  
4 taxpayer.

5 “(b) QUALIFIED INVESTMENT.—

6 “(1) IN GENERAL.—For purposes of subsection  
7 (a), the qualified investment with respect to any ad-  
8 vanced manufacturing facility for any taxable year is  
9 the basis of any qualified property placed in service  
10 by the taxpayer during such taxable year which is  
11 part of an advanced manufacturing facility.

12 “(2) QUALIFIED PROPERTY.—

13 “(A) IN GENERAL.—For purposes of this  
14 subsection, the term ‘qualified property’ means  
15 property—

16 “(i) which is tangible property,

17 “(ii) with respect to which deprecia-  
18 tion (or amortization in lieu of deprecia-  
19 tion) is allowable,

20 “(iii) which is—

21 “(I) constructed, reconstructed,  
22 or erected by the taxpayer, or

23 “(II) acquired by the taxpayer if  
24 the original use of such property com-  
25 mences with the taxpayer, and



1                   “(iv) which is integral to the operation  
2                   of the advanced manufacturing facility.

3                   “(B) BUILDINGS AND STRUCTURAL COM-  
4                   PONENTS.—

5                   “(i) IN GENERAL.—The term ‘quali-  
6                   fied property’ includes any building or its  
7                   structural components which otherwise sat-  
8                   isfy the requirements under subparagraph  
9                   (A).

10                  “(ii) EXCEPTION.—Clause (i) shall  
11                  not apply with respect to a building or por-  
12                  tion of a building used for offices, adminis-  
13                  trative services, or other functions unre-  
14                  lated to manufacturing.

15                  “(3) ADVANCED MANUFACTURING FACILITY.—  
16                  For purposes of this section, the term ‘advanced  
17                  manufacturing facility’ means a facility for which  
18                  the primary purpose is the manufacturing of semi-  
19                  conductors or semiconductor manufacturing equip-  
20                  ment.

21                  “(4) COORDINATION WITH REHABILITATION  
22                  CREDIT.—The qualified investment with respect to  
23                  any advanced manufacturing facility for any taxable  
24                  year shall not include that portion of the basis of  
25                  any property which is attributable to qualified reha-

1        bilitation expenditures (as defined in section  
2        47(c)(2)).

3            “(5) CERTAIN PROGRESS EXPENDITURE RULES  
4        MADE APPLICABLE.—Rules similar to the rules of  
5        subsections (c)(4) and (d) of section 46 (as in effect  
6        on the day before the date of the enactment of the  
7        Revenue Reconciliation Act of 1990) shall apply for  
8        purposes of subsection (a).

9            “(c) ELIGIBLE TAXPAYER.—For purposes of this sec-  
10       tion, the term ‘eligible taxpayer’ means any taxpayer  
11       which—

12            “(1) is not a foreign entity of concern (as de-  
13        fined in section 9901(6) of the William M. (Mac)  
14        Thornberry National Defense Authorization Act for  
15        Fiscal Year 2021), and

16            “(2) has not made an applicable transaction (as  
17        defined in section 50(a)) during the taxable year.

18            “(d) ELECTIVE PAYMENT.—

19            “(1) IN GENERAL.—Except as otherwise pro-  
20        vided in paragraph (2)(A), in the case of a taxpayer  
21        making an election (at such time and in such man-  
22        ner as the Secretary may provide) under this sub-  
23        section with respect to the credit determined under  
24        subsection (a) with respect to such taxpayer, such  
25        taxpayer shall be treated as making a payment



1                   tributive share, or shareholder’s pro  
2                   rata share, of such credit,

3                   “(III) any amount with respect  
4                   to which the election in paragraph (1)  
5                   is made shall be treated as tax exempt  
6                   income for purposes of sections 705  
7                   and 1366, and

8                   “(IV) a partner’s distributive  
9                   share of such tax exempt income shall  
10                  be based on such partner’s distribu-  
11                  tive share of the otherwise applicable  
12                  credit for each taxable year.

13                  “(ii) COORDINATION WITH APPLICA-  
14                  TION AT PARTNER OR SHAREHOLDER  
15                  LEVEL.—In the case of any property held  
16                  directly by a partnership or S corporation,  
17                  no election by any partner or shareholder  
18                  shall be allowed under paragraph (1) with  
19                  respect to any credit determined under  
20                  subsection (a) with respect to such prop-  
21                  erty.

22                  “(B) ELECTIONS.—Any election under  
23                  paragraph (1) shall be made not later than the  
24                  due date (including extensions of time) for the  
25                  return of tax for the taxable year for which the

1 election is made, but in no event earlier than  
2 270 days after the date of the enactment of this  
3 section. Any such election, once made, shall be  
4 irrevocable. Except as otherwise provided in this  
5 subparagraph, any election under paragraph (1)  
6 shall apply with respect to any credit for the  
7 taxable year for which the election is made.

8 “(C) TIMING.—The payment described in  
9 paragraph (1) shall be treated as made on the  
10 later of the due date (determined without re-  
11 gard to extensions) of the return of tax for the  
12 taxable year or the date on which such return  
13 is filed.

14 “(D) TREATMENT OF PAYMENTS TO PART-  
15 NERSHIPS AND S CORPORATIONS.—For pur-  
16 poses of section 1324 of title 31, United States  
17 Code, the payments under subparagraph  
18 (A)(i)(I) shall be treated in the same manner as  
19 a refund due from a credit provision referred to  
20 in subsection (b)(2) of such section.

21 “(E) ADDITIONAL INFORMATION.—As a  
22 condition of, and prior to, any amount being  
23 treated as a payment which is made by the tax-  
24 payer under paragraph (1) or any payment  
25 being made pursuant to subparagraph (A), the

1 Secretary may require such information or reg-  
2 istration as the Secretary deems necessary or  
3 appropriate for purposes of preventing duplica-  
4 tion, fraud, improper payments, or excessive  
5 payments under this section.

6 “(F) EXCESSIVE PAYMENT.—

7 “(i) IN GENERAL.—In the case of any  
8 amount treated as a payment which is  
9 made by the taxpayer under paragraph  
10 (1), or any payment made pursuant to  
11 subparagraph (A), which the Secretary de-  
12 termines constitutes an excessive payment,  
13 the tax imposed on such taxpayer by chap-  
14 ter 1 for the taxable year in which such de-  
15 termination is made shall be increased by  
16 an amount equal to the sum of—

17 “(I) the amount of such excessive  
18 payment, plus

19 “(II) an amount equal to 20 per-  
20 cent of such excessive payment.

21 “(ii) REASONABLE CAUSE.—Clause  
22 (i)(II) shall not apply if the taxpayer dem-  
23 onstrates to the satisfaction of the Sec-  
24 retary that the excessive payment resulted  
25 from reasonable cause.

1                   “(iii) EXCESSIVE PAYMENT DE-  
2                   FINED.—For purposes of this subpara-  
3                   graph, the term ‘excessive payment’ means,  
4                   with respect to property for which an elec-  
5                   tion is made under this subsection for any  
6                   taxable year, an amount equal to the ex-  
7                   cess of—

8                                 “(I) the amount treated as a pay-  
9                                 ment which is made by the taxpayer  
10                                under paragraph (1), or the amount  
11                                of the payment made pursuant to sub-  
12                                paragraph (A), with respect to such  
13                                property for such taxable year, over

14                               “(II) the amount of the credit  
15                                which, without application of this sub-  
16                                section, would be otherwise allowable  
17                                (determined without regard to section  
18                                38(c)) under subsection (a) with re-  
19                                spect to such property for such tax-  
20                                able year.

21                               “(3) DENIAL OF DOUBLE BENEFIT.—In the  
22                                case of a taxpayer making an election under this  
23                                subsection with respect to the credit determined  
24                                under subsection (a), such credit shall be reduced to  
25                                zero and shall, for any other purposes under this

1 title, be deemed to have been allowed to the taxpayer  
2 for such taxable year.

3 “(4) MIRROR CODE POSSESSIONS.—In the case  
4 of any possession of the United States with a mirror  
5 code tax system (as defined in section 24(k)), this  
6 subsection shall not be treated as part of the income  
7 tax laws of the United States for purposes of deter-  
8 mining the income tax law of such possession unless  
9 such possession elects to have this subsection be so  
10 treated.

11 “(5) BASIS REDUCTION AND RECAPTURE.—  
12 Rules similar to the rules of subsections (a) and (c)  
13 of section 50 shall apply with respect to—

14 “(A) any amount treated as a payment  
15 which is made by the taxpayer under paragraph  
16 (1), and

17 “(B) any payment made pursuant to para-  
18 graph (2)(A).

19 “(6) REGULATIONS.—The Secretary shall issue  
20 such regulations or other guidance as may be nec-  
21 essary or appropriate to carry out the purposes of  
22 this subsection, including—

23 “(A) regulations or other guidance pro-  
24 viding rules for determining a partner’s dis-



1           tributive share of the tax exempt income de-  
2           scribed in paragraph (2)(A)(i)(III), and

3           “(B) guidance to ensure that the amount  
4           of the payment or deemed payment made under  
5           this subsection is commensurate with the  
6           amount of the credit that would be otherwise al-  
7           lowable (determined without regard to section  
8           38(c)).

9           “(e) TERMINATION OF CREDIT.—The credit allowed  
10          under this section shall not apply to property the construc-  
11          tion of which begins after December 31, 2026.”.

12          (b) RECAPTURE IN CONNECTION WITH CERTAIN EX-  
13          PANSIONS.—

14               (1) IN GENERAL.—Section 50(a) of the Internal  
15          Revenue Code of 1986 is amended redesignating  
16          paragraphs (3) through (5) as paragraphs (4)  
17          through (6), respectively, and by inserting after  
18          paragraph (2) the following new paragraph:

19               “(3) CERTAIN EXPANSIONS IN CONNECTION  
20          WITH ADVANCED MANUFACTURING FACILITIES.—

21               “(A) IN GENERAL.—If there is a an appli-  
22          cable transaction by an applicable taxpayer be-  
23          fore the close of the 10-year period beginning  
24          on the date such taxpayer placed in service in-  
25          vestment credit property which is eligible for

1           the advanced manufacturing investment credit  
2           under section 48D(a), then the tax under this  
3           chapter for the taxable year in which such  
4           transaction occurs shall be increased by 100  
5           percent of the aggregate decrease in the credits  
6           allowed under section 38 for all prior taxable  
7           years which would have resulted solely from re-  
8           ducing to zero any credit determined under sec-  
9           tion 46 which is attributable to the advanced  
10          manufacturing investment credit under section  
11          48D(a) with respect to such property.

12                 “(B)   EXCEPTION.—Subparagraph   (A)  
13           shall not apply if the applicable taxpayer dem-  
14           onstrates to the satisfaction of the Secretary  
15           that the applicable transaction has been ceased  
16           or abandoned within 45 days of a determination  
17           and notice by the Secretary.

18                 “(C)   REGULATIONS AND GUIDANCE.—The  
19           Secretary shall issue such regulations or other  
20           guidance as the Secretary determines necessary  
21           or appropriate to carry out the purposes of this  
22           paragraph, including regulations or other guid-  
23           ance which provide for requirements for record-  
24           keeping or information reporting for purposes

1 of administering the requirements of this para-  
2 graph.”.

3 (2) APPLICABLE TRANSACTION; APPLICABLE  
4 TAXPAYER.—Section 50(a)(6) of the Internal Rev-  
5 enue Code of 1986, as redesignated by paragraph  
6 (1), is amended adding at the end the following new  
7 subparagraphs:

8 “(D) APPLICABLE TRANSACTION.—For  
9 purposes of this subsection—

10 “(i) IN GENERAL.—The term ‘applica-  
11 ble transaction’ means, with respect to any  
12 applicable taxpayer, any significant trans-  
13 action (as determined by the Secretary, in  
14 coordination with the Secretary of Com-  
15 merce and the Secretary of Defense) in-  
16 volving the material expansion of semicon-  
17 ductor manufacturing capacity of such ap-  
18 plicable taxpayer in the People’s Republic  
19 of China or a foreign country of concern  
20 (as defined in section 9901(7) of the Wil-  
21 liam M. (Mac) Thornberry National De-  
22 fense Authorization Act for Fiscal Year  
23 2021).

24 “(ii) EXCEPTION.—Such term shall  
25 not include a transaction which primarily

1 involves the expansion of manufacturing  
2 capacity for legacy semiconductors (as de-  
3 fined in section 9902(a)(6) of the William  
4 M. (Mac) Thornberry National Defense  
5 Authorization Act for Fiscal Year 2021).

6 “(E) APPLICABLE TAXPAYER.—For pur-  
7 poses of this subsection, the term ‘applicable  
8 taxpayer’ means any taxpayer who has been al-  
9 lowed a credit under section 48D(a) for any  
10 prior taxable year.”.

11 (3) CONFORMING AMENDMENTS.—

12 (A) Section 50(a)(4) of the Internal Rev-  
13 enue Code of 1986, as redesignated by para-  
14 graph (1), is amended—

15 (i) by inserting “, or any applicable  
16 transaction to which paragraph (3)(A) ap-  
17 plies” after “paragraphs (1) and (2)”, and

18 (ii) by inserting “or applicable trans-  
19 action” after “such cessation”.

20 (B) Section 50(a)(6)(C) of such Code, as  
21 redesignated by paragraph (1), is amended by  
22 striking “paragraph (1) or (2)” and inserting  
23 “paragraph (1), (2), or (3)”.

1 (C) Section 1371(d)(1) of such Code is  
2 amended by striking “section 50(a)(4)” and in-  
3 serting “section 50(a)(5)”.

4 (c) EXEMPTION OF ELECTIVE PAYMENTS FROM SE-  
5 QUESTRATION.—Subsection (d) of section 255 of the Bal-  
6 anced Budget and Emergency Deficit Control Act of 1985  
7 (2 U.S.C. 905) is amended to read as follows:

8 “(d) REFUNDABLE INCOME TAX CREDITS AND CER-  
9 TAIN ELECTIVE PAYMENTS.—

10 “(1) REFUNDABLE INCOME TAX CREDITS.—  
11 Payments to individuals made pursuant to provisions  
12 of the Internal Revenue Code of 1986 establishing  
13 refundable tax credits shall be exempt from reduc-  
14 tion under any order issued under this part.

15 “(2) CERTAIN ELECTIVE PAYMENTS.—Pay-  
16 ments made to taxpayers pursuant to elections  
17 under subsection (d) of section 48D of the Internal  
18 Revenue Code of 1986, or amounts treated as pay-  
19 ments which are made by taxpayers under para-  
20 graph (1) of such subsection, shall be exempt from  
21 reduction under any order issued under this part.”.

22 (d) CONFORMING AMENDMENTS.—

23 (1) Paragraph (6) of section 46 of the Internal  
24 Revenue Code of 1986 is amended to read as fol-  
25 lows:

1           “(6) the advanced manufacturing investment  
2           credit.”.

3           (2) Section 49(a)(1)(C) of such Code is amend-  
4           ed—

5                   (A) by striking “and” at the end of clause  
6           (iv),

7                   (B) by striking the period at the end of  
8           clause (v) and inserting “, and”, and

9                   (C) by adding at the end the following new  
10          clause:

11                           “(vi) the basis of any qualified prop-  
12                           erty (as defined in subsection (b)(2) of sec-  
13                           tion 48D) which is part of an advanced  
14                           manufacturing facility (as defined in sub-  
15                           section (b)(3) of such section).”.

16          (3) Section 50(a)(2)(E) of such Code is amend-  
17          ed by striking “or 48C(b)(2)” and inserting  
18          “48C(b)(2), or 48D(b)(5)”.

19          (4) The table of sections for subpart E of part  
20          IV of subchapter A of chapter 1 of such Code is  
21          amended by inserting after the item relating to sec-  
22          tion 48C the following new item:

“Sec. 48D. Advanced manufacturing investment credit.”.

23          (e) BUDGETARY EFFECTS.—

24                  (1) STATUTORY PAYGO SCORECARDS.—The  
25          budgetary effects of this section shall not be entered

1 on either PAYGO scorecard maintained pursuant to  
2 section 4(d) of the Statutory Pay-As-You-Go Act of  
3 2010 (2 U.S.C. 933(d)).

4 (2) SENATE PAYGO SCORECARDS.—The budg-  
5 etary effects of this section shall not be entered on  
6 any PAYGO scorecard maintained for purposes of  
7 section 4106 of H. Con. Res. 71 (115th Congress).

8 (3) CLASSIFICATION OF BUDGETARY EF-  
9 FECTS.—Notwithstanding Rule 3 of the Budget  
10 Scorekeeping Guidelines set forth in the joint ex-  
11 planatory statement of the committee of conference  
12 accompanying Conference Report 105–217 and sec-  
13 tion 250(c)(8) of the Balanced Budget and Emer-  
14 gency Deficit Control Act of 1985, the budgetary ef-  
15 fects of this section shall not be estimated—

16 (A) for purposes of section 251 of such  
17 Act;

18 (B) for purposes of an allocation to the  
19 Committee on Appropriations pursuant to sec-  
20 tion 302(a) of the Congressional Budget Act of  
21 1974; and

22 (C) for purposes of paragraph (4)(C) of  
23 section 3 of the Statutory Pay-As-You-Go Act  
24 of 2010 as being included in an appropriation  
25 Act.

1 (f) EFFECTIVE DATE.—

2 (1) IN GENERAL.—Except as provided in para-  
 3 graph (2), the amendments made by this section  
 4 shall apply to property placed in service after De-  
 5 cember 31, 2022, and, for any property the con-  
 6 struction of which begins prior to January 1, 2023,  
 7 only to the extent of the basis thereof attributable  
 8 to the construction, reconstruction, or erection after  
 9 the date of enactment of this Act.

10 (2) EXEMPTION OF ELECTIVE PAYMENTS FROM  
 11 SEQUESTRATION.—The amendment made by sub-  
 12 section (c) shall apply to any sequestration order  
 13 issued under the Balanced Budget and Emergency  
 14 Deficit Control Act of 1985 (2 U.S.C. 900 et seq.)  
 15 on or after December 31, 2022.

16 **DIVISION B—RESEARCH AND**  
 17 **INNOVATION**

18 **SEC. 10000. TABLE OF CONTENTS.**

19 The table of contents for this division is as follows:

DIVISION B—RESEARCH AND INNOVATION

Sec. 10000. Table of contents.

Sec. 10001. Short title.

Sec. 10002. Definitions.

Sec. 10003. Budgetary effects.

TITLE I—DEPARTMENT OF ENERGY SCIENCE FOR THE FUTURE

Sec. 10101. Mission of the Office of Science.

Sec. 10102. Basic energy sciences program.

Sec. 10103. Biological and environmental research.

Sec. 10104. Advanced scientific computing research program.

Sec. 10105. Fusion energy research.

Sec. 10106. High energy physics program.



- Sec. 10107. Nuclear physics program.
- Sec. 10108. Science laboratories infrastructure program.
- Sec. 10109. Accelerator research and development.
- Sec. 10110. Isotope research, development, and production.
- Sec. 10111. Increased collaboration with teachers and scientists.
- Sec. 10112. High intensity laser research initiative; helium conservation program; Office of Science emerging biological threat preparedness research initiative; midscale instrumentation and research equipment program; authorization of appropriations.
- Sec. 10113. Established program to stimulate competitive research.
- Sec. 10114. Research security.

TITLE II—NATIONAL INSTITUTE OF STANDARDS AND  
TECHNOLOGY FOR THE FUTURE

- Sec. 10201. Definitions.

Subtitle A—Authorization of Appropriations

- Sec. 10211. Authorization of appropriations.

Subtitle B—Measurement Research

- Sec. 10221. Engineering biology and biometrology.
- Sec. 10222. Greenhouse gas measurement research.
- Sec. 10223. NIST authority for cybersecurity and privacy activities.
- Sec. 10224. Software security and authentication.
- Sec. 10225. Digital identity management research.
- Sec. 10226. Biometrics research and testing.
- Sec. 10227. Federal biometric performance standards.
- Sec. 10228. Protecting research from cybersecurity theft.
- Sec. 10229. Dissemination of resources for research institutions.
- Sec. 10230. Advanced communications research.
- Sec. 10231. Neutron scattering.
- Sec. 10232. Artificial intelligence.
- Sec. 10233. Sustainable chemistry research and education.
- Sec. 10234. Premise plumbing research.
- Sec. 10235. Dr. David Satcher Cybersecurity Education Grant Program.

Subtitle C—General Activities

- Sec. 10241. Educational outreach and support for underrepresented communities.
- Sec. 10242. Other transactions authority.
- Sec. 10243. Report to Congress on collaborations with government agencies.
- Sec. 10244. Hiring critical technical experts.
- Sec. 10245. International standards development.
- Sec. 10246. Standard technical update.
- Sec. 10247. GAO study of NIST research security policies and protocols.
- Sec. 10248. Standards development organization grants.

Subtitle D—Hollings Manufacturing Extension Partnership

- Sec. 10251. Establishment of expansion awards pilot program as a part of the Hollings Manufacturing Extension Partnership.
- Sec. 10252. Update to Hollings Manufacturing Extension Partnership.
- Sec. 10253. National Supply Chain Database.

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- Sec. 10254. Hollings Manufacturing Extension Partnership activities.
- Sec. 10255. Amendment to the Hollings Manufacturing Extension Partnership relating to institutions of higher education.

Subtitle E—Manufacturing USA Program

- Sec. 10261. Supporting geographic diversity.
- Sec. 10262. Expanding opportunities through the Manufacturing USA Program.
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- Sec. 10301. Sense of Congress.
- Sec. 10302. Definitions.
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- Sec. 10311. PreK–12 STEM education.
- Sec. 10312. Undergraduate STEM education.
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- Sec. 10315. Cyber workforce development research and development.
- Sec. 10316. Federal cyber scholarship-for-service program.
- Sec. 10317. Cybersecurity workforce data initiative.
- Sec. 10318. Microelectronics workforce development activities.
- Sec. 10319. Incorporation of art and design into certain STEM education.
- Sec. 10320. Mandatory cost-sharing.
- Sec. 10321. Programs to address the STEM workforce.

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- Sec. 10321. Presidential awards for excellence in mathematics and science.
- Sec. 10322. Robert Noyce Teacher Scholarship program update.
- Sec. 10323. NSF Eddie Bernice Johnson INCLUDES Initiative.
- Sec. 10324. Broadening participation on major facilities awards.
- Sec. 10325. Expanding geographic and institutional diversity in research.
- Sec. 10326. Diversity in tech research.
- Sec. 10327. Chief Diversity Officer of the NSF.
- Sec. 10328. Research and dissemination to increase the participation of women and underrepresented minorities in STEM fields.
- Sec. 10329. Activities to expand STEM opportunities.
- Sec. 10330. Intramural emerging research institutions pilot program.

Subtitle D—NSF Research Security

- Sec. 10331. Office of Research Security and Policy.
- Sec. 10332. Chief of Research Security.
- Sec. 10333. Reporting to Congress.
- Sec. 10334. Online resource.
- Sec. 10335. Research awards.
- Sec. 10336. Authorities.
- Sec. 10337. Responsible conduct in research training.

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- Sec. 10338. Research security and integrity information sharing analysis organization.
- Sec. 10339. Plan with respect to controlled information and background screening.
- Sec. 10339A. Foundation funding to institutions hosting or supporting Confucius Institutes.
- Sec. 10339B. Foreign financial support.
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## Subtitle E—Fundamental Research

- Sec. 10341. Broader impacts.
- Sec. 10342. Sense of Congress.
- Sec. 10343. Research ethics.
- Sec. 10344. Research reproducibility and replicability.
- Sec. 10345. Climate change research.
- Sec. 10346. Social, behavioral, and economic sciences.
- Sec. 10347. Measuring impacts of Federally funded research and development.
- Sec. 10348. Food-energy-water research.
- Sec. 10349. Biological Field Stations and Marine Laboratories.
- Sec. 10350. Sustainable chemistry research and education.
- Sec. 10351. Risk and resilience research.
- Sec. 10352. Unmanned aircraft systems technologies.
- Sec. 10353. Accelerating unmanned maritime systems technologies.
- Sec. 10354. Leveraging international expertise in research.
- Sec. 10355. Biological research collections.
- Sec. 10356. Clean water research and technology acceleration.
- Sec. 10357. Technology and behavioral science research.
- Sec. 10358. Manufacturing research amendment.
- Sec. 10359. Critical minerals mining research and development.
- Sec. 10360. Study of AI research capacity.
- Sec. 10361. Advancing IoT for Precision Agriculture Capabilities Act.
- Sec. 10362. Astronomy and satellite constellations.
- Sec. 10363. Research on the impact of inflation.
- Sec. 10364. Microgravity utilization policy.
- Sec. 10365. Recognition of the Arecibo Observatory.

## Subtitle F—Research Infrastructure

- Sec. 10371. Facility operation and maintenance.
- Sec. 10372. Reviews.
- Sec. 10373. Helium conservation.
- Sec. 10374. Advanced computing.
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## Subtitle G—Directorate for Technology, Innovation, and Partnerships

- Sec. 10381. Establishment.
- Sec. 10382. Purposes.
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- Sec. 10390. Test beds.
- Sec. 10391. Planning and capacity building awards.
- Sec. 10392. Entrepreneurial fellowships.
- Sec. 10393. Scholarships and fellowships.
- Sec. 10394. Research and development awards.
- Sec. 10395. Scaling innovations in PreK–12 STEM education.
- Sec. 10396. Authorities.
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### TITLE IV—BIOECONOMY RESEARCH AND DEVELOPMENT

- Sec. 10401. Definitions.
- Sec. 10402. National engineering biology research and development initiative.
- Sec. 10403. Initiative coordination.
- Sec. 10404. Advisory committee on engineering biology research and development.
- Sec. 10405. External review of ethical, legal, environmental, safety, security, and societal issues.
- Sec. 10406. Agency activities.
- Sec. 10407. Rule of construction.

### TITLE V—BROADENING PARTICIPATION IN SCIENCE

#### Subtitle A—STEM Opportunities

- Sec. 10501. Federal research agency policies for caregivers.
- Sec. 10502. Collection and reporting of data on federal research awards.
- Sec. 10503. Policies for review of Federal research awards.
- Sec. 10504. Collection of data on demographics of faculty.
- Sec. 10505. Cultural and institutional barriers to expanding the academic and Federal STEM workforce.
- Sec. 10506. Existing activities.
- Sec. 10507. Report to Congress.
- Sec. 10508. Merit review.
- Sec. 10509. Determination of budgetary effects.
- Sec. 10510. Definition.

#### Subtitle B—Rural STEM Education Research

- Sec. 10511. Definition.
- Sec. 10512. National Science Foundation rural STEM activities.
- Sec. 10513. Opportunities for online education.
- Sec. 10514. National Academies evaluation.
- Sec. 10515. GAO review.
- Sec. 10516. NIST engagement with rural communities.

#### Subtitle C—MSI STEM Achievement

- Sec. 10521. GAO review.

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- Sec. 10522. Agency responsibilities.
- Sec. 10523. Research at the National Science Foundation.
- Sec. 10524. Capacity-building program for developing universities.
- Sec. 10525. Tribal Colleges and Universities program.
- Sec. 10526. Definitions.

Subtitle D—Combating Sexual Harassment in Science

- Sec. 10531. Findings.
- Sec. 10532. Purpose.
- Sec. 10533. Definition.
- Sec. 10534. Research awards.
- Sec. 10535. Responsible Conduct Guide.
- Sec. 10536. Interagency working group.
- Sec. 10537. National Academies assessment.
- Sec. 10538. GAO study.
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TITLE VI—MISCELLANEOUS SCIENCE AND TECHNOLOGY  
PROVISIONS

Subtitle A—Supporting Early-career Researchers

- Sec. 10601. Early-career research fellowship program.
- Sec. 10602. Authorization of appropriations.

Subtitle B—National Science and Technology Strategy

- Sec. 10611. National science and technology strategy.
- Sec. 10612. Strategy and report on the Nation's economic security, science, research, and innovation to support the national security strategy.
- Sec. 10613. Quadrennial science and technology review.

Subtitle C—Regional Innovation

- Sec. 10621. Regional innovation capacity.
- Sec. 10622. Regional Clean Energy Innovation Program.

Subtitle D—Research Security

- Sec. 10631. Requirements for foreign talent recruitment programs.
- Sec. 10632. Malign foreign talent recruitment program prohibition.
- Sec. 10633. Review of contracts and agreements.
- Sec. 10634. Research security training requirement for Federal research award personnel.
- Sec. 10635. Research funds accounting.
- Sec. 10636. Person or entity of concern prohibition.
- Sec. 10637. Nondiscrimination.
- Sec. 10638. Definitions.

Subtitle E—Coastal and Ocean Acidification Research and Innovation

- Sec. 10641. Short title.
- Sec. 10642. Purposes.
- Sec. 10643. Definitions.
- Sec. 10644. Interagency working group.
- Sec. 10645. Strategic research plan.

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- Sec. 10646. NOAA ocean acidification activities.
- Sec. 10647. NSF ocean acidification activities.
- Sec. 10648. NASA ocean acidification activities.
- Sec. 10649. Authorization of appropriations.

Subtitle F—Interagency Working Group

- Sec. 10651. Interagency working group.

Subtitle G—Quantum Networking and Communications

- Sec. 10661. Quantum networking and communications.

Subtitle H—Blockchain Specialist

- Sec. 10671. Establishment of blockchain and cryptocurrency specialist position within OSTP.

Subtitle I—Partnerships for Energy Security and Innovation

- Sec. 10691. Foundation for Energy Security and Innovation.

Subtitle J—Energizing Technology Transfer

- Sec. 10701. Definitions.

PART 1—NATIONAL CLEAN ENERGY TECHNOLOGY TRANSFER PROGRAMS

- Sec. 10713. National clean energy incubator program.
- Sec. 10714. Clean energy technology university prize competition.
- Sec. 10715. Clean energy technology transfer coordination.

PART 2—SUPPORTING TECHNOLOGY DEVELOPMENT AT THE NATIONAL  
LABORATORIES

- Sec. 10716. Lab partnering service pilot program.
- Sec. 10717. Lab-embedded entrepreneurship program.
- Sec. 10718. Small business voucher program.
- Sec. 10719. Entrepreneurial leave program.
- Sec. 10720. National Laboratory non-Federal employee outside employment authority.

PART 3—DEPARTMENT OF ENERGY MODERNIZATION

- Sec. 10722. Office of Technology Transitions.
- Sec. 10723. Management of Department of Energy demonstration projects.
- Sec. 10724. Streamlining prize competitions.
- Sec. 10725. Cost-share waiver extension.
- Sec. 10726. Special hiring authority for scientific, engineering, and project management personnel.
- Sec. 10727. Technology transfer reports and evaluation.

Subtitle K—Micro Act

- Sec. 10731. Microelectronics research for energy innovation.

Subtitle L—National Nuclear University Research Infrastructure  
Reinvestment

- Sec. 10741. Short title.

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- Sec. 10742. Purposes.
- Sec. 10743. University infrastructure collaboration.
- Sec. 10744. Advanced nuclear research infrastructure enhancement subprogram.
- Sec. 10745. Science education and human resources scholarships, fellowships, and research and development projects.

Subtitle M—Steel Upgrading Partnerships and Emissions Reduction

- Sec. 10751. Low-emissions steel manufacturing research program.

Subtitle N—Applied Laboratories Infrastructure Restoration and Modernization

- Sec. 10761. Applied laboratories infrastructure restoration and modernization.

Subtitle O—Department of Energy Research, Development, and Demonstration Activities

- Sec. 10771. Department of Energy research, development, and demonstration activities.

Subtitle P—Fission for the Future

- Sec. 10781. Advanced nuclear technologies Federal research, development, and demonstration program.

TITLE VII—NATIONAL AERONAUTICS AND SPACE  
ADMINISTRATION AUTHORIZATION ACT

- Sec. 10801. Short title.
- Sec. 10802. Definitions.

Subtitle A—Exploration

- Sec. 10811. Moon to Mars.
- Sec. 10812. Space Launch System configurations.
- Sec. 10813. Rocket engine test infrastructure.
- Sec. 10814. Pearl River maintenance.
- Sec. 10815. Extension and modification relating to International Space Station.
- Sec. 10816. Priorities for International Space Station.
- Sec. 10817. Technical amendments relating to Artemis missions.

Subtitle B—Science

- Sec. 10821. Science priorities.
- Sec. 10822. Search for life.
- Sec. 10823. Next generation of astrophysics great observatories.
- Sec. 10824. Earth science missions and programs.
- Sec. 10825. Planetary Defense Coordination Office.

Subtitle C—Aeronautics

- Sec. 10831. Experimental aircraft projects.
- Sec. 10832. Unmanned aircraft systems.
- Sec. 10833. Cleaner, quieter airplanes.

Subtitle D—Space Technology

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- Sec. 10841. Space nuclear capabilities.  
Sec. 10842. Prioritization of low-enriched uranium technology.

## Subtitle E—STEM Engagement

- Sec. 10851. Office of STEM Engagement.

## Subtitle F—Miscellaneous

- Sec. 10861. Program, workforce, and industrial base reviews.  
Sec. 10862. Modification of lease of non-excess property.

**1 SEC. 10001. SHORT TITLE.**

- 2 This division may be cited as the “Research and De-  
3 velopment, Competition, and Innovation Act”.

**4 SEC. 10002. DEFINITIONS.**

- 5 In this division:

6 (1) **ARTIFICIAL INTELLIGENCE.**—The term “ar-  
7 tificial intelligence” or “AI” has the meaning given  
8 such term in section 5002 of the William M. (Mac)  
9 Thornberry National Defense Authorization Act for  
10 Fiscal Year 2021 (15 U.S.C. 9401).

11 (2) **AWARDEE.**—The term “awardee” means  
12 the legal entity to which Federal assistance is  
13 awarded and that is accountable to the Federal Gov-  
14 ernment for the use of the funds provided.

15 (3) **AWARD PERSONNEL.**—The term “award  
16 personnel” means principal investigators and co-  
17 principal investigators, faculty, postdoctoral re-  
18 searchers, and other employees supported by a  
19 grant, cooperative agreement, or contract under  
20 Federal law.



1           (4) BIOMANUFACTURING.—The term “bio-  
2           manufacturing” means the utilization of biological  
3           systems to develop new and advance existing prod-  
4           ucts, tools, and processes at commercial scale.

5           (5) EMERGING RESEARCH INSTITUTION.—The  
6           term “emerging research institution” means an in-  
7           stitution of higher education with an established un-  
8           dergraduate or graduate program that has less than  
9           \$50,000,000 in Federal research expenditures.

10          (6) ENGINEERING BIOLOGY.—The term “engi-  
11          neering biology” means the application of engineer-  
12          ing design principles and practices to biological sys-  
13          tems, including molecular and cellular systems, to  
14          advance fundamental understanding of complex nat-  
15          ural systems and to enable novel or optimize func-  
16          tions and capabilities.

17          (7) EPSCoR.—The term “EPSCoR” has the  
18          meaning given the term in section 502 of the Amer-  
19          ica COMPETES Reauthorization Act of 2010 (42  
20          U.S.C. 1862p note).

21          (8) EPSCoR INSTITUTION.—The term  
22          “EPSCoR institution” means an institution of high-  
23          er education, nonprofit organization, or other insti-  
24          tution located in a jurisdiction eligible to participate  
25          in the program under section 113 of the National

1 Science Foundation Authorization Act of 1988 (42  
2 U.S.C. 1862g).

3 (9) FEDERAL LABORATORY.—The term “Fed-  
4 eral laboratory” has the meaning given such term in  
5 section 4 of the Stevenson-Wydler Technology Inno-  
6 vation Act of 1980 (15 U.S.C. 3703).

7 (10) FEDERAL RESEARCH AGENCY.—The term  
8 “Federal research agency” means any Federal agen-  
9 cy with an annual extramural research expenditure  
10 of over \$100,000,000 in fiscal year 2022 constant  
11 dollars.

12 (11) FOUNDATION.—The term “Foundation”  
13 means the National Science Foundation.

14 (12) HISTORICALLY BLACK COLLEGE AND UNI-  
15 VERSITY.—The term “historically Black college and  
16 university” has the meaning given the term “part B  
17 institution” in section 322 of the Higher Education  
18 Act of 1965 (20 U.S.C. 1061).

19 (13) INSTITUTION OF HIGHER EDUCATION.—  
20 The term “institution of higher education” has the  
21 meaning given the term in section 101(a) of the  
22 Higher Education Act of 1965 (20 U.S.C. 1001(a)).

23 (14) INTERAGENCY WORKING GROUP ON INCLU-  
24 SION IN STEM.—The term “interagency working  
25 group on inclusion in STEM” means the interagency

1 working group established by section 308 of the  
2 American Innovation and Competitiveness Act (42  
3 U.S.C. 6626).

4 (15) LABOR ORGANIZATION.—The term “labor  
5 organization” has the meaning given the term in  
6 section 2(5) of the National Labor Relations Act (29  
7 U.S.C. 152(5)), except that such term shall also in-  
8 clude—

9 (A) any organization composed of labor or-  
10 ganizations, such as a labor union federation or  
11 a State or municipal labor body; and

12 (B) any organization which would be in-  
13 cluded in the definition for such term under  
14 such section 2(5) but for the fact that the orga-  
15 nization represents—

16 (i) individuals employed by the United  
17 States, any wholly owned Government cor-  
18 poration, any Federal Reserve Bank, or  
19 any State or political subdivision thereof;

20 (ii) individuals employed by persons  
21 subject to the Railway Labor Act (45  
22 U.S.C. 151 et seq.); or

23 (iii) individuals employed as agricul-  
24 tural laborers.

1           (16) LOW-INCOME INDIVIDUAL.—The term  
2           “low-income individual” means an individual from a  
3           family whose taxable income for the preceding year  
4           did not exceed 150 percent of an amount equal to  
5           the poverty level determined by using criteria of pov-  
6           erty established by the Bureau of the Census.

7           (17) MANUFACTURING EXTENSION CENTER.—  
8           The term “manufacturing extension center” has the  
9           meaning given the term “Center” in section 25(a) of  
10          the National Institute of Standards and Technology  
11          Act (15 U.S.C. 278k(a)).

12          (18) MANUFACTURING USA INSTITUTE.—The  
13          term “Manufacturing USA institute” means a Man-  
14          ufacturing USA institute described in section 34(d)  
15          of the National Institute of Standards and Tech-  
16          nology Act (15 U.S.C. 278s(d)).

17          (19) MINORITY-SERVING INSTITUTION.—The  
18          term “minority-serving institution” means a His-  
19          panic-serving institution as defined in section 502(a)  
20          of the Higher Education Act of 1965 (20 U.S.C.  
21          1101a(a)); an Alaska Native-serving institution or  
22          Native Hawaiian-serving institution as defined in  
23          section 317(b) of such Act (20 U.S.C. 1059d(b)); or  
24          a Predominantly Black institution, Asian American  
25          and Native American Pacific Islander-serving insti-

1       tution, or Native American-serving nontribal institu-  
2       tion as defined in section 371(c) of such Act (20  
3       U.S.C. 1067q(e)).

4               (20) NATIONAL ACADEMIES.—The term “Na-  
5       tional Academies” means the National Academies of  
6       Sciences, Engineering, and Medicine.

7               (21) NON-PROFIT ORGANIZATION.—The term  
8       “non-profit organization” means an organization  
9       which is described in section 501(c)(3) of the Inter-  
10      nal Revenue Code of 1986 and exempt from tax  
11      under section 501(a) of such code.

12              (22) PREK–12.—The term “PreK–12” means  
13      pre-kindergarten through grade 12.

14              (23) QUANTUM INFORMATION SCIENCE.—The  
15      term “quantum information science” has the mean-  
16      ing given such term in section 2 of the National  
17      Quantum Initiative Act (15 U.S.C. 8801).

18              (24) RECIPIENT.—The term “recipient” means  
19      an entity, usually a non-Federal entity, that receives  
20      a Federal award directly from a Federal research  
21      agency. The term “recipient” does not include enti-  
22      ties that receive subawards or individuals that are  
23      the beneficiaries of the award.

24              (25) RESEARCH AND DEVELOPMENT AWARD.—  
25      The term “research and development award” means

1 support provided to an individual or entity by a Fed-  
2 eral research agency to carry out research and devel-  
3 opment activities, which may include support in the  
4 form of a grant, contract, cooperative agreement, or  
5 other such transaction. The term does not include a  
6 grant, contract, agreement or other transaction for  
7 the procurement of goods or services to meet the ad-  
8 ministrative needs of a Federal research agency.

9 (26) SKILLED TECHNICAL WORK.—The term  
10 “skilled technical work” means an occupation that  
11 requires a high level of knowledge in a technical do-  
12 main and does not require a bachelor’s degree for  
13 entry.

14 (27) STEM.—The term “STEM” means  
15 science, technology, engineering, and mathematics,  
16 including computer science.

17 (28) STEM EDUCATION.—The term “STEM  
18 education” has the meaning given the term in sec-  
19 tion 2 of the STEM Education Act of 2015 (42  
20 U.S.C. 6621 note).

21 (29) TECHNICAL STANDARD.—The term “tech-  
22 nical standard” has the meaning given such term in  
23 section 12(d)(5) of the National Technology Trans-  
24 fer and Advancement Act of 1995 (15 U.S.C. 272  
25 note).

1           (30) TRIBAL COLLEGE OR UNIVERSITY.—The  
2           term “Tribal College or University” has the meaning  
3           given such term in section 316 of the Higher Edu-  
4           cation Act of 1965 (20 U.S.C. 1059c).

5   **SEC. 10003. BUDGETARY EFFECTS.**

6           (a) STATUTORY PAYGO SCORECARDS.—The budg-  
7           etary effects of this division shall not be entered on either  
8           PAYGO scorecard maintained pursuant to section 4(d) of  
9           the Statutory Pay-As-You-Go Act of 2010 (2 U.S.C.  
10          933(d)).

11          (b) SENATE PAYGO SCORECARDS.—The budgetary  
12          effects of this division shall not be entered on any PAYGO  
13          scorecard maintained for purposes of section 4106 of H.  
14          Con. Res. 71 (115th Congress).

15          (c) CLASSIFICATION OF BUDGETARY EFFECTS.—  
16          Notwithstanding Rule 3 of the Budget Scorekeeping  
17          Guidelines set forth in the joint explanatory statement of  
18          the committee of conference accompanying Conference Re-  
19          port 105–217 and section 250(c)(8) of the Balanced  
20          Budget and Emergency Deficit Control Act of 1985, the  
21          budgetary effects of this division shall not be estimated—

22                 (1) for purposes of section 251 of such Act;

23                 (2) for purposes of an allocation to the Com-  
24          mittee on Appropriations pursuant to section 302(a)  
25          of the Congressional Budget Act of 1974; and

1           (3) for purposes of paragraph (4)(C) of section  
2           3 of the Statutory Pay-As-You-Go Act of 2010 as  
3           being included in an appropriation Act.

4   **TITLE I—DEPARTMENT OF EN-**  
5   **ERGY SCIENCE FOR THE FU-**  
6   **TURE**

7   **SEC. 10101. MISSION OF THE OFFICE OF SCIENCE.**

8           Section 209 of the Department of Energy Organiza-  
9           tion Act (42 U.S.C. 7139) is amended by adding at the  
10          end the following:

11          “(d) USER FACILITIES.—The Director shall carry  
12          out the construction, operation, and maintenance of user  
13          facilities to support the mission described in subsection  
14          (c). As practicable, these facilities shall serve the needs  
15          of the Department, industry, the academic community,  
16          and other relevant entities for the purposes of advancing  
17          the missions of the Department, improving the competi-  
18          tiveness of the United States, protecting public health and  
19          safety, and addressing other national priorities including  
20          emergencies.

21          “(e) COORDINATION.—

22                  “(1) IN GENERAL.—The Secretary—

23                          “(A) shall ensure the coordination of the  
24                          Office of Science with the other activities of the  
25                          Department, including the transfer of knowl-



1 edge, capabilities, and relevant technologies  
2 from basic research programs of the Depart-  
3 ment to applied research and development pro-  
4 grams of the Department for the purpose of en-  
5 abling development of mission-relevant tech-  
6 nologies;

7 “(B) shall support joint activities among  
8 the programs of the Department;

9 “(C) shall coordinate with other relevant  
10 Federal agencies operating under existing au-  
11 thorizations relating to subjects relating to the  
12 mission described in subsection (c) in sup-  
13 porting advancements in related research areas  
14 as appropriate; and

15 “(D) may form partnerships to enhance  
16 the utilization of and ensure access to user fa-  
17 cilities by other Federal agencies.

18 “(2) OFFICE OF SCIENCE.—The Director—

19 “(A) shall ensure the coordination of pro-  
20 grams and activities carried out by the Office of  
21 Science; and

22 “(B) shall direct all programs which have  
23 not recently completed a future planning road-  
24 map consistent with the funding of such pro-  
25 grams authorized under the Research and De-

1           velopment, Competition, and Innovation Act to  
2           complete such a roadmap.”.

3 **SEC. 10102. BASIC ENERGY SCIENCES PROGRAM.**

4           (a) DEPARTMENT OF ENERGY RESEARCH AND INNO-  
5 VATION ACT.—Section 303 of the Department of Energy  
6 Research and Innovation Act (42 U.S.C. 18641) is amend-  
7 ed—

8           (1) by redesignating subsections (a) through (e)  
9           as subsections (c) through (g), respectively;

10           (2) by inserting before subsection (c), as so re-  
11           designated, the following:

12           “(a) PROGRAM.—As part of the activities authorized  
13 under section 209 of the Department of Energy Organiza-  
14 tion Act (42 U.S.C. 7139), the Director shall carry out  
15 a research and development program in basic energy  
16 sciences, including materials sciences and engineering,  
17 chemical sciences, physical biosciences, geosciences, and  
18 other disciplines, to understand, model, and control matter  
19 and energy at the electronic, atomic, and molecular levels  
20 in order to provide the foundations for new energy tech-  
21 nologies, address scientific grand challenges, and support  
22 the energy, environment, and national security missions  
23 of the Department.

24           “(b) SUSTAINABLE CHEMISTRY.—In carrying out  
25 chemistry-related research and development activities

1 under this section, the Director shall prioritize research  
2 and development of sustainable chemistry to support  
3 clean, safe, and economic alternatives and methodologies  
4 to traditional chemical products and processes.”;

5 (3) in subsection (d), as so redesignated—

6 (A) in paragraph (3)—

7 (i) in subparagraph (C), by striking  
8 “and” at the end;

9 (ii) by redesignating subparagraph  
10 (D) as subparagraph (E); and

11 (iii) by inserting after subparagraph  
12 (C) the following:

13 “(D) autonomous chemistry and materials  
14 synthesis and characterization facilities that le-  
15 verage advances in artificial intelligence; and”;  
16 and

17 (B) by adding at the end the following:

18 “(4) ADVANCED PHOTON SOURCE UPGRADE.—

19 “(A) DEFINITIONS.—In this paragraph:

20 “(i) FLUX.—The term ‘flux’ means  
21 the rate of flow of photons.

22 “(ii) HARD X-RAY.—The term ‘hard  
23 x-ray’ means a photon with energy greater  
24 than 20 kiloelectron volts.

1           “(B) UPGRADE.—The Secretary shall pro-  
2           vide for the upgrade to the Advanced Photon  
3           Source described in the publication approved by  
4           the Basic Energy Sciences Advisory Committee  
5           on June 9, 2016, entitled ‘Report on Facility  
6           Upgrades’, including the development of a  
7           multibend achromat lattice to produce a high  
8           flux of coherent x-rays within the hard x-ray  
9           energy region and a suite of beamlines opti-  
10          mized for this source.

11           “(C) START OF OPERATIONS.—The Sec-  
12          retary shall, subject to the availability of appro-  
13          priations, ensure that the start of full oper-  
14          ations of the upgrade under this paragraph oc-  
15          curs before March 31, 2026.

16           “(D) FUNDING.—Out of funds authorized  
17          to be appropriated under subsection (j), there is  
18          authorized to be appropriated to the Secretary  
19          to carry out the upgrade under this paragraph  
20          \$14,200,000 for fiscal year 2023.

21           “(5) SPALLATION NEUTRON SOURCE PROTON  
22          POWER UPGRADE.—

23           “(A) IN GENERAL.—The Secretary shall  
24          provide for the proton power upgrade to the  
25          Spallation Neutron Source.

1           “(B) PROTON POWER UPGRADE DE-  
2 FINED.—In this paragraph, the term ‘proton  
3 power upgrade’ means the Spallation Neutron  
4 Source power upgrade described in—

5           “(i) the publication entitled ‘Facilities  
6 for the Future of Science: A Twenty-Year  
7 Outlook’, published by the Office of  
8 Science of the Department in December,  
9 2003;

10           “(ii) the publication entitled ‘Four  
11 Years Later: An Interim Report on Facili-  
12 ties for the Future of Science: A Twenty-  
13 Year Outlook’, published by the Office of  
14 Science of the Department in August,  
15 2007; and

16           “(iii) the publication approved by the  
17 Basic Energy Sciences Advisory Committee  
18 on June 9, 2016, entitled ‘Report on Facil-  
19 ity Upgrades’.

20           “(C) START OF OPERATIONS.—The Sec-  
21 retary shall, subject to the availability of appro-  
22 priations, ensure that the start of full oper-  
23 ations of the upgrade under this paragraph oc-  
24 curs before July 30, 2028, with the option for  
25 early operation in 2025.

1           “(D) FUNDING.—Out of funds authorized  
2 to be appropriated under subsection (j), there is  
3 authorized to be appropriated to the Secretary  
4 to carry out the upgrade under this para-  
5 graph—

6                   “(i) \$17,000,000 for fiscal year 2023;

7                   “(ii) \$14,202,000 for fiscal year 2024;

8                   and

9                   “(iii) \$1,567,000 for fiscal year 2025.

10           “(6) SPALLATION NEUTRON SOURCE SECOND  
11 TARGET STATION.—

12                   “(A) IN GENERAL.—The Secretary shall  
13 provide for a second target station for the  
14 Spallation Neutron Source.

15                   “(B) SECOND TARGET STATION DE-  
16 FINED.—In this paragraph, the term ‘second  
17 target station’ means the Spallation Neutron  
18 Source second target station described in—

19                   “(i) the publication entitled, ‘Facilities  
20 for the Future of Science: A Twenty-Year  
21 Outlook’, published by the Office of  
22 Science of the Department in December,  
23 2003;

24                   “(ii) the publication entitled, ‘Four  
25 Years Later: An Interim Report on Facili-

1 ties for the Future of Science: A Twenty-  
2 Year Outlook’, published by the Office of  
3 Science of the Department in August,  
4 2007; and

5 “(iii) the publication approved by the  
6 Basic Energy Sciences Advisory Committee  
7 on June 9, 2016, entitled ‘Report on Facil-  
8 ity Upgrades’.

9 “(C) START OF OPERATIONS.—The Sec-  
10 retary shall, subject to the availability of appro-  
11 priations, ensure that the start of full oper-  
12 ations of the second target station under this  
13 paragraph occurs before December 31, 2033,  
14 with the option for early operation in 2029.

15 “(D) FUNDING.—Out of funds authorized  
16 to be appropriated under subsection (j), there  
17 are authorized to be appropriated to the Sec-  
18 retary to carry out the activities under this  
19 paragraph, including construction—

20 “(i) \$127,000,000 for fiscal year  
21 2023;

22 “(ii) \$205,000,000 for fiscal year  
23 2024;

24 “(iii) \$279,000,000 for fiscal year  
25 2025;

1                   “(iv) \$300,000,000 for fiscal year  
2                   2026; and

3                   “(v) \$281,000,000 for fiscal year  
4                   2027.

5                   “(7) ADVANCED LIGHT SOURCE UPGRADE.—

6                   “(A) DEFINITIONS.—In this paragraph:

7                   “(i) FLUX.—The term ‘flux’ means  
8                   the rate of flow of photons.

9                   “(ii) SOFT X-RAY.—The term ‘soft x-  
10                  ray’ means a photon with energy in the  
11                  range from 50 to 2,000 electron volts.

12                  “(B) UPGRADE.—The Secretary shall pro-  
13                  vide for the upgrade to the Advanced Light  
14                  Source described in the publication approved by  
15                  the Basic Energy Sciences Advisory Committee  
16                  on June 9, 2016, entitled ‘Report on Facility  
17                  Upgrades’, including the development of a  
18                  multibend achromat lattice to produce a high  
19                  flux of coherent x-rays within the soft x-ray en-  
20                  ergy region.

21                  “(C) START OF OPERATIONS.—The Sec-  
22                  retary shall, subject to the availability of appro-  
23                  priations, ensure that the start of full oper-  
24                  ations of the upgrade under this paragraph oc-  
25                  curs before September 30, 2029.



1           “(D) FUNDING.—Out of funds authorized  
2           to be appropriated under subsection (j), there  
3           are authorized to be appropriated to the Sec-  
4           retary to carry out the upgrade under this  
5           paragraph—

6                   “(i) \$135,000,000 for fiscal year  
7                   2023;

8                   “(ii) \$102,500,000 for fiscal year  
9                   2024;

10                   “(iii) \$50,000,000 for fiscal year  
11                   2025; and

12                   “(iv) \$1,400,000 for fiscal year 2026.

13           “(8) LINAC COHERENT LIGHT SOURCE II HIGH  
14           ENERGY UPGRADE.—

15           “(A) DEFINITIONS.—In this paragraph:

16                   “(i) HIGH ENERGY.—The term ‘high  
17                   energy’, with respect to an x-ray, means a  
18                   photon with an energy in the 5 to 13  
19                   kiloelectron volt range.

20                   “(ii) HIGH REPETITION RATE.—The  
21                   term ‘high repetition rate’ means the deliv-  
22                   ery of x-ray pulses up to 1,000,000 pulses  
23                   per second.

24                   “(iii) ULTRA-SHORT PULSE.—The  
25                   term ‘ultra-short pulse’, with respect to an

1 x-ray, means that the x-ray has bursts ca-  
2 pable of durations of less than 100  
3 femtoseconds.

4 “(B) UPGRADE.—The Secretary shall—

5 “(i) provide for the upgrade to the  
6 Linac Coherent Light Source II facility de-  
7 scribed in the publication approved by the  
8 Basic Energy Sciences Advisory Committee  
9 on June 9, 2016, entitled ‘Report on Facil-  
10 ity Upgrades’, including the development  
11 of experimental capabilities for high energy  
12 x-rays to reveal fundamental scientific dis-  
13 coveries; and

14 “(ii) ensure such upgrade enables the  
15 production and use of high energy, ultra-  
16 short pulse x-rays delivered at a high rep-  
17 etition rate.

18 “(C) START OF OPERATIONS.—The Sec-  
19 retary shall, subject to the availability of appro-  
20 priations, ensure that the start of full oper-  
21 ations of the upgrade under this paragraph oc-  
22 curs before December 31, 2026.

23 “(D) FUNDING.—Out of funds authorized  
24 to be appropriated under subsection (j), there  
25 are authorized to be appropriated to the Sec-

1           retary to carry out the upgrade under this  
2           paragraph—

3                   “(i) \$100,000,000 for fiscal year  
4                   2023;

5                   “(ii) \$130,000,000 for fiscal year  
6                   2024;

7                   “(iii) \$135,000,000 for fiscal year  
8                   2025; and

9                   “(iv) \$99,343,000 for fiscal year  
10                  2026.

11               “(9) CRYOMODULE REPAIR AND MAINTENANCE  
12               FACILITY.—

13                   “(A) IN GENERAL.—The Secretary shall  
14                   provide for the construction of a cryomodule re-  
15                   pair and maintenance facility to service the  
16                   Linac Coherent Light Source II and subsequent  
17                   upgrades.

18                   “(B) CONSULTATION REQUIRED.—The  
19                   Secretary shall consult with the private sector,  
20                   institutions of higher education, National Lab-  
21                   oratories, and relevant Federal agencies to en-  
22                   sure that the facility described in subparagraph  
23                   (A) has the capability to maintain, repair, and  
24                   test superconducting radio frequency accel-  
25                   erator components.

1           “(C) FUNDING.—Out of funds authorized  
2           to be appropriated under subsection (j), there  
3           are authorized to be appropriated to the Sec-  
4           retary to carry out the activities under this  
5           paragraph—

6                     “(i) \$29,300,000 for fiscal year 2023;

7                     “(ii) \$24,000,000 for fiscal year 2024;

8                     “(iii) \$20,000,000 for fiscal year  
9                     2025; and

10                    “(iv) \$15,700,000 for fiscal year  
11                    2026.

12           “(10) NANOSCALE SCIENCE RESEARCH CENTER  
13           RECAPITALIZATION PROJECT.—

14                    “(A) IN GENERAL.—The Secretary shall  
15                    provide for the recapitalization of the Nanoscale  
16                    Science Research Centers, to include the up-  
17                    grade of equipment at each Center supported  
18                    by the Office of Science on the date of enact-  
19                    ment of the Research and Development, Com-  
20                    petition, and Innovation Act, to accelerate ad-  
21                    vances in the various fields of science including  
22                    nanoscience, materials, chemistry, biology, and  
23                    quantum information science.

24                    “(B) FUNDING.—Out of funds authorized  
25                    to be appropriated under subsection (j), there

1 are authorized to be appropriated to the Sec-  
2 retary to carry out the recapitalization under  
3 this paragraph—

4 “(i) \$25,000,000 for fiscal year 2023;

5 and

6 “(ii) \$25,000,000 for fiscal year 2024.

7 “(11) NATIONAL SYNCHROTRON LIGHT SOURCE  
8 II BEAMLINE BUILDOUT.—

9 “(A) IN GENERAL.—The Secretary shall  
10 provide for the development and construction of  
11 experimental stations to provide significant ad-  
12 ditional beamline and instrument capacity, com-  
13 plement the existing portfolio of beamlines, and  
14 complete the buildout of the National Synchro-  
15 tron Light Source II.

16 “(B) START OF OPERATIONS.—Subject to  
17 the availability of appropriations, the Sec-  
18 retary—

19 “(i) shall begin carrying out subpara-  
20 graph (A) not later than September 30,  
21 2036; and

22 “(ii) may begin carrying out subpara-  
23 graph (A)—

24 “(I) in calendar year 2033; or

1                                   “(II) after the construction of in-  
2                                   dividual beamlines is complete.”; and

3                                   (4) by adding at the end the following:

4                   “(h) COMPUTATIONAL MATERIALS AND CHEMICAL  
5 SCIENCES.—

6                   “(1) IN GENERAL.—The Director shall support  
7                   a program of research and development for the ap-  
8                   plication of advanced computing practices to  
9                   foundational and emerging research problems in  
10                  chemistry and materials science. Research activities  
11                  shall include—

12                               “(A) chemical catalysis research and devel-  
13                               opment;

14                               “(B) the use of large data sets to model  
15                               materials phenomena, including through ad-  
16                               vanced characterization of materials, materials  
17                               synthesis, processing, and innovative use of ex-  
18                               perimental and theoretical data;

19                               “(C) codesign of chemical system and  
20                               chemistry modeling software with advanced  
21                               computing systems and hardware technologies;  
22                               and

23                               “(D) modeling of chemical processes, as-  
24                               semblies, and reactions such as molecular dy-

1           namics and quantum chemistry, including  
2           through novel computing methods.

3           “(2) COMPUTATIONAL MATERIALS AND CHEM-  
4           ICAL SCIENCES CENTERS.—

5           “(A) IN GENERAL.—In carrying out the  
6           activities authorized under paragraph (1), the  
7           Director shall select and establish up to 6 com-  
8           putational materials and chemical sciences cen-  
9           ters to—

10           “(i) develop open-source, robust, and  
11           validated computational codes and user-  
12           friendly software, coupled with innovative  
13           use of experimental and theoretical data,  
14           to enable the design, discovery, and devel-  
15           opment of new materials and chemical sys-  
16           tems; and

17           “(ii) focus on overcoming challenges  
18           and maximizing the benefits of exascale  
19           and other high performance computing  
20           underpinned by accelerated node tech-  
21           nologies.

22           “(B) SELECTION.—The Director shall se-  
23           lect centers under subparagraph (A) on a com-  
24           petitive, merit-reviewed basis. The Director  
25           shall consider applications from the National

1           Laboratories, institutions of higher education,  
2           multi-institutional collaborations, and other ap-  
3           propriate entities.

4           “(C) DURATION.—

5                   “(i) NEW CENTERS.—A center se-  
6                   lected under subparagraph (A) shall re-  
7                   ceive support for a period of not more than  
8                   5 years beginning on the date of establish-  
9                   ment of that center, subject to the avail-  
10                  ability of appropriations.

11                   “(ii) EXISTING CENTERS.—A center  
12                   already in existence on the date of enact-  
13                   ment of the Research and Development,  
14                   Competition, and Innovation Act may con-  
15                   tinue to receive support for a period of not  
16                   more than 5 years beginning on the date  
17                   of establishment of that center.

18           “(D) RENEWAL.—Upon the expiration of  
19           any period of support of a center under this  
20           subsection, the Director may renew support for  
21           the center, on a merit-reviewed basis, for a pe-  
22           riod of not more than 5 years.

23           “(i) MATERIALS RESEARCH DATABASE.—

24                   “(1) IN GENERAL.—The Director shall support  
25           the development of a web-based platform to develop



1 and provide access to a database of computed infor-  
2 mation on known and predicted materials properties  
3 and computational tools to accelerate breakthroughs  
4 in materials discovery and design.

5 “(2) PROGRAM.—In carrying out this sub-  
6 section, the Director shall—

7 “(A) conduct cooperative research among  
8 National Laboratories, industry, academia, and  
9 other research institutions to advance under-  
10 standing, prediction, and manipulation of mate-  
11 rials and facilitate the design of novel materials;

12 “(B) develop and maintain data infrastruc-  
13 ture at user facilities that generate data to col-  
14 lect, analyze, label, and otherwise prepare the  
15 data for inclusion in the database;

16 “(C) leverage existing high performance  
17 computing systems to conduct high throughput  
18 calculations, and develop computational and  
19 data mining algorithms for the prediction of  
20 material properties;

21 “(D) strengthen the foundation for new  
22 technologies and advanced manufacturing; and

23 “(E) drive the development of advanced  
24 materials for applications that span the Depart-

1           ment’s missions in energy, environment, and  
2           national security.

3           “(3) COORDINATION.—In carrying out this sub-  
4           section, the Director shall leverage programs and ac-  
5           tivities across the Department, including computa-  
6           tional materials and chemical sciences centers estab-  
7           lished under subsection (h).

8           “(4) FUNDING.—Out of funds authorized to be  
9           appropriated under subsection (j), there is author-  
10          ized to be appropriated to the Secretary to carry out  
11          activities under this subsection \$10,000,000 for each  
12          of fiscal years 2023 through 2027.

13          “(j) AUTHORIZATION OF APPROPRIATIONS.—Out of  
14          funds authorized to be appropriated to the Office of  
15          Science in a fiscal year, there are authorized to be appro-  
16          priated to the Secretary to carry out the activities de-  
17          scribed in this section—

18               “(1) \$2,685,414,000 for fiscal year 2023;

19               “(2) \$2,866,890,840 for fiscal year 2024;

20               “(3) \$2,987,727,170 for fiscal year 2025;

21               “(4) \$3,062,732,781 for fiscal year 2026; and

22               “(5) \$3,080,067,167 for fiscal year 2027.”.

23          (b) ARTIFICIAL PHOTOSYNTHESIS.—Section 973 of  
24          the Energy Policy Act of 2005 (42 U.S.C. 16313) is  
25          amended—

1           (1) in subsection (b), by striking paragraph (4)  
2           and inserting the following:

3           “(4) FUNDS.—Of the funds authorized to be  
4           appropriated for basic energy sciences in a fiscal  
5           year, there is authorized to be appropriated to the  
6           Secretary to carry out activities under this sub-  
7           section \$50,000,000 for each of fiscal years 2023  
8           through 2027.”; and

9           (2) in subsection (c), by striking paragraph (4)  
10          and inserting the following:

11          “(4) FUNDS.—Of the funds authorized to be  
12          appropriated for basic energy sciences in a fiscal  
13          year, there is authorized to be appropriated to the  
14          Secretary to carry out activities under this sub-  
15          section \$50,000,000 for each of fiscal years 2023  
16          through 2027.”.

17          (c) ELECTRICITY STORAGE RESEARCH INITIATIVE.—  
18          Section 975 of the Energy Policy Act of 2005 (42 U.S.C.  
19          16315) is amended—

20                 (1) in subsection (a)—

21                         (A) in paragraph (1)—

22                                 (i) in subparagraph (A)(ii), by strik-  
23                                 ing “and” after the semicolon at the end;

1 (ii) in subparagraph (B), by striking  
2 the period at the end and inserting “;  
3 and”; and

4 (iii) by adding at the end the fol-  
5 lowing:

6 “(C) to ensure the competitiveness of the  
7 United States in energy storage by fostering an  
8 ecosystem linking fundamental research and de-  
9 velopment to deployment of storage solutions  
10 while minimizing the environmental impacts of  
11 energy storage technologies.”; and

12 (B) in paragraph (2)—

13 (i) in subparagraph (A), by striking  
14 “and” after the semicolon at the end;

15 (ii) in subparagraph (B), by striking  
16 the period at the end and inserting “;  
17 and”; and

18 (iii) by adding at the end the fol-  
19 lowing:

20 “(C) any other relevant office of the De-  
21 partment.”;

22 (2) in subsection (b), by striking paragraph (4)  
23 and inserting the following:

24 “(4) FUNDING.—Of the funds authorized to be  
25 appropriated for basic energy sciences in a fiscal

1 year, there is authorized to be appropriated to the  
2 Secretary to carry out activities under this sub-  
3 section \$50,000,000 for each of fiscal years 2023  
4 through 2027.”;

5 (3) in subsection (c), by striking paragraph (4)  
6 and inserting the following:

7 “(4) FUNDING.—Of the funds authorized to be  
8 appropriated for basic energy sciences in a fiscal  
9 year, there is authorized to be appropriated to the  
10 Secretary to carry out activities under this sub-  
11 section \$50,000,000 for each of fiscal years 2023  
12 through 2027.”; and

13 (4) in subsection (d), by striking paragraph (4)  
14 and inserting the following:

15 “(4) FUNDING.—Of the funds authorized to be  
16 appropriated for basic energy sciences in a fiscal  
17 year, there is authorized to be appropriated to the  
18 Secretary to carry out activities under this sub-  
19 section \$20,000,000 for each of fiscal years 2023  
20 through 2027.”.

21 (d) FOUNDATIONAL NUCLEAR SCIENCE.—

22 (1) IN GENERAL.—The Director of the Office of  
23 Science shall support a program of research and de-  
24 velopment to bridge scientific barriers to, and ex-  
25 pand theoretical and fundamental knowledge rel-

1       evant to, understanding nuclear materials and mat-  
2       ter for the benefit of commerce, medicine, and na-  
3       tional security.

4               (2) ACTIVITIES.—As part of the program de-  
5       scribed in paragraph (1)—

6                       (A) the Director of the Office of Science  
7       shall support basic research to pursue distinct  
8       lines of scientific inquiry, including—

9                               (i) research in nuclear materials  
10       science, including the application of ad-  
11       vanced computing practices to foundational  
12       and emerging research areas in nuclear  
13       materials science and discovery, such as—

14                                       (I) the advanced characterization  
15       of materials;

16                                       (II) materials synthesis;

17                                       (III) processing;

18                                       (IV) the innovative use of experi-  
19       mental and theoretical data; and

20                                       (V) mechanical behavior in  
21       unique environments, including the ef-  
22       fects of radiation;

23                               (ii) electrochemistry research and as-  
24       sociated techniques for processing nuclear  
25       materials;

1 (iii) the development of advanced in-  
2 strumentation and nuclear data collection  
3 to inform the activities described in clauses  
4 (i) and (ii); and

5 (iv) any other area of research, as de-  
6 termined by the Director of the Office of  
7 Science; and

8 (B) the Assistant Secretary for Nuclear  
9 Energy shall consult with the Director of the  
10 Office of Science to support the direction of  
11 translational research, development, and valida-  
12 tion of physical concepts developed under the  
13 program.

14 (3) FUNDING.—Of the funds authorized to be  
15 appropriated for basic energy sciences in a fiscal  
16 year, there is authorized to be appropriated to the  
17 Secretary of Energy to carry out activities under  
18 this subsection \$50,000,000 for each of fiscal years  
19 2023 through 2027.

20 (e) CARBON MATERIALS SCIENCE INITIATIVE.—

21 (1) INITIATIVE.—

22 (A) IN GENERAL.—The Director of the Of-  
23 fice of Science (referred to in this subsection as  
24 the “Director”) shall establish a research initia-  
25 tive, to be known as the “Carbon Materials

1 Science Initiative” (referred to in this sub-  
2 section as the “Initiative”), to expand the fun-  
3 damental knowledge of coal, coal-wastes, and  
4 carbon ore chemistry useful for understanding  
5 the conversion of carbon to material products.

6 (B) COORDINATION.—In carrying out pro-  
7 grams and activities under the Initiative, the  
8 Director shall leverage expertise and resources  
9 from the Office of Fossil Energy and Carbon  
10 Management and the United States Geological  
11 Survey.

12 (C) TEAMS.—

13 (i) IN GENERAL.—In carrying out the  
14 Initiative, the Director shall establish and  
15 organize activities among multidisciplinary  
16 teams to leverage, to the maximum extent  
17 practicable, expertise from the National  
18 Laboratories, institutions of higher edu-  
19 cation, and the private sector.

20 (ii) GOALS.—The multidisciplinary  
21 teams described in clause (i) shall pursue  
22 expedient, milestone-driven research goals  
23 established by the Director.

24 (2) RESEARCH PROGRAM.—



1           (A) IN GENERAL.—The Director shall  
2 carry out under the Initiative a program to sup-  
3 port, and discover fundamental knowledge rel-  
4 evant to, carbon materials and carbon ore proc-  
5 essing research.

6           (B) ACTIVITIES.—As part of the program  
7 described in subparagraph (A), the Director  
8 shall, in coordination with the Assistant Sec-  
9 retary of Energy for Fossil Energy and Carbon  
10 Management, as appropriate, support research  
11 to pursue distinct lines of scientific inquiry, in-  
12 cluding—

13           (i) methods of extraction, processing,  
14 recycling, and utilization of the materials  
15 and valuable minerals contained in raw  
16 coal and coal-waste;

17           (ii) methods of improving perform-  
18 ance, cost, and availability of materials for  
19 use in carbon capture systems; and

20           (iii) unconventional pathways and ma-  
21 terials for conversion of carbon dioxide  
22 molecules, minerals, and materials.

23           (C) REVIEW.—The Director shall periodi-  
24 cally review activities carried out under the pro-  
25 gram described in subparagraph (A) to evaluate

1 the achievement of scientific objectives and re-  
2 search milestones.

3 (D) COORDINATION WITH EXISTING PRO-  
4 GRAMS AND CENTERS.—In carrying out the  
5 program described in subparagraph (A), the Di-  
6 rector shall—

7 (i) ensure coordination and knowledge  
8 sharing with—

9 (I) the United States Geological  
10 Survey; and

11 (II) the programs and the Car-  
12 bon Utilization Research Center es-  
13 tablished under section 969A of the  
14 Energy Policy Act of 2005 (42 U.S.C.  
15 16298a); and

16 (ii) avoid duplication of efforts to the  
17 maximum extent practicable.

18 (3) CARBON MATERIALS RESEARCH CEN-  
19 TERS.—

20 (A) IN GENERAL.—In carrying out the ac-  
21 tivities authorized under paragraph (2), the Di-  
22 rector shall establish 1 center in each of the 2  
23 major coal-producing regions of the United  
24 States, each of which shall—

1 (i) be known as a “Carbon Materials  
2 Research Center” (referred to in this para-  
3 graph as a “Center”); and

4 (ii) focus on early stage research and  
5 development activities, including—

6 (I) developing and advancing  
7 methods of extracting, processing, or  
8 recycling carbon or other valuable ma-  
9 terials or minerals from raw coal,  
10 coal-waste, or other solid carbon ma-  
11 terials, for the development of new  
12 carbon-based materials;

13 (II) methods of improving the  
14 structural, physical, and chemical  
15 properties of carbon-based materials  
16 or other valuable materials from raw  
17 coal, coal-waste, or other solid carbon  
18 materials and their recyclability;

19 (III) overcoming the challenges  
20 and maximizing the benefits of com-  
21 mercially extracting, producing, or im-  
22 proving coal-derived carbon and re-  
23 sulting products; and

1 (IV) identifying novel pathways  
2 and materials for carbon storage and  
3 conversion into useful products.

4 (B) SELECTION.—The Director shall—

5 (i) select Centers under subparagraph

6 (A) on a competitive, merit-reviewed basis;

7 and

8 (ii) consider applications from the Na-

9 tional Laboratories, institutions of higher

10 education, multi-institutional collabora-

11 tions, and other appropriate entities.

12 (C) DURATION.—A Center shall receive

13 support for a period of not more than 5 years

14 beginning on the date of establishment of that

15 Center, subject to the availability of appropria-

16 tions.

17 (D) RENEWAL.—On the expiration of any

18 period of support of a Center, the Director may

19 renew support for that Center, on a merit-re-

20 viewed basis, for a period of not more than 5

21 years.

22 (E) EXISTING FACILITIES.—The Director

23 shall—

1 (i) ensure that the research activities  
2 carried out by the Centers are not duplica-  
3 tive of existing efforts; and

4 (ii) if practicable, leverage existing  
5 user facilities and other capabilities of the  
6 Department of Energy to carry out the re-  
7 search objectives of the Centers.

8 (f) CARBON SEQUESTRATION RESEARCH AND GEO-  
9 LOGIC COMPUTATIONAL SCIENCE INITIATIVE.—

10 (1) INITIATIVE.—

11 (A) IN GENERAL.—The Secretary of En-  
12 ergy (referred to in this subsection as the “Sec-  
13 retary”) shall establish a research initiative, to  
14 be known as the “Carbon Sequestration Re-  
15 search and Geologic Computational Science Ini-  
16 tiative” (referred to in this subsection as the  
17 “Initiative”), to expand the fundamental knowl-  
18 edge, data collection, data analysis, and mod-  
19 eling of subsurface geology for the purpose of  
20 advancing carbon sequestration in geologic for-  
21 mations.

22 (B) LEVERAGING.—In carrying out pro-  
23 grams and activities under the Initiative, the  
24 Secretary shall leverage expertise and resources  
25 from the Office of Fossil Energy and Carbon

1 Management and the United States Geological  
2 Survey.

3 (C) TEAMS.—

4 (i) IN GENERAL.—In carrying out the  
5 Initiative, the Secretary shall establish and  
6 organize activities among multidisciplinary  
7 teams to leverage, to the maximum extent  
8 practicable, expertise from the National  
9 Laboratories, institutions of higher edu-  
10 cation, and the private sector.

11 (ii) GOALS.—The multidisciplinary  
12 teams described in clause (i) shall pursue  
13 aggressive, milestone-driven research goals  
14 established by the Secretary.

15 (D) ADDITIONAL ACTIVITIES.—The Sec-  
16 retary may organize additional activities under  
17 this subsection through other organizational  
18 structures.

19 (2) RESEARCH PROGRAM.—

20 (A) IN GENERAL.—The Secretary shall  
21 carry out under the Initiative a program to sup-  
22 port research needed for, and discover knowl-  
23 edge relevant to, the sequestration of carbon in  
24 geologic formations.

1 (B) ACTIVITIES.—As part of the program  
2 described in subparagraph (A), the Director of  
3 the Office of Science shall support fundamental  
4 research to pursue distinct lines of scientific in-  
5 quiry, including—

6 (i) gathering geologic data for pore  
7 space characterization, including improve-  
8 ments to geologic seismic imaging;

9 (ii) evaluating pore space quality, in-  
10 cluding evaluation of geologic samples, to  
11 determine appropriate sequestration zones  
12 for carbon;

13 (iii) testing carbon sequestration;

14 (iv) monitoring carbon migration in  
15 geologic formations;

16 (v) advancements in data analytics,  
17 including the analysis of seismic data, and  
18 computational science to improve the ad-  
19 vanced computing, visualization, and imag-  
20 ing of geologic formations for the seques-  
21 tration of carbon; and

22 (vi) predictive understanding of cou-  
23 pled processes in complex subsurface geo-  
24 logic systems for secure carbon storage.

1 (C) REVIEW.—The Secretary shall periodi-  
2 cally review activities carried out under the pro-  
3 gram described in subparagraph (A) to evaluate  
4 achievement of scientific objectives and research  
5 milestones.

6 (3) CARBON STORAGE RESEARCH AND GEO-  
7 LOGIC COMPUTATIONAL SCIENCE CENTERS.—

8 (A) IN GENERAL.—In carrying out the ac-  
9 tivities authorized under paragraph (2), the  
10 Secretary shall select and establish not more  
11 than 2 carbon storage research and geologic  
12 computational science centers (referred to in  
13 this paragraph as a “Center”) to develop and  
14 advance improvements to data collection, anal-  
15 ysis, and modeling of subsurface geology for the  
16 purpose of advancing carbon sequestration in  
17 geologic formations.

18 (B) SELECTION.—

19 (i) IN GENERAL.—The Secretary  
20 shall—

21 (I) select Centers under subpara-  
22 graph (A) on a competitive, merit-re-  
23 viewed basis; and

24 (II) to the maximum extent prac-  
25 ticable, locate each Center in a geo-



1 graphically diverse region with estab-  
2 lished and ongoing geologic carbon se-  
3 questration research and demonstra-  
4 tion.

5 (ii) APPLICATIONS.—In selecting Cen-  
6 ters under subparagraph (A), the Sec-  
7 retary shall consider applications from in-  
8 stitutions of higher education, multi-insti-  
9 tutional collaborations, and other appro-  
10 priate entities.

11 (C) DURATION.—

12 (i) NEW CENTERS.—A Center estab-  
13 lished after the date of enactment of this  
14 Act shall receive support for a period of  
15 not more than 5 years beginning on the  
16 date of establishment of that Center, sub-  
17 ject to the availability of appropriations.

18 (ii) EXISTING CENTERS.—A Center  
19 already in existence on the date of enact-  
20 ment of this Act may continue to receive  
21 support for a period of not more than 5  
22 years beginning on that date of enactment.

23 (iii) RENEWAL.—On expiration of a  
24 period of support described in clause (i) or  
25 (ii), the Secretary may renew support for

1                   the Center, on a merit-reviewed basis, for  
2                   a period of not more than 5 years.

3                   (4) COORDINATION WITH EXISTING PROGRAMS  
4           AND CENTERS.—In carrying out this subsection, the  
5           Secretary shall—

6                   (A) ensure coordination with—

7                           (i) the United States Geological Sur-  
8                           vey; and

9                           (ii) the programs established under  
10                           section 963 of the Energy Policy Act of  
11                           2005 (42 U.S.C. 16293); and

12                   (B) avoid duplication of efforts to the max-  
13                   imum extent practicable.

14           (g) FUNDING FOR CARBON INITIATIVES.—Of the  
15           funds authorized to be appropriated for basic energy  
16           sciences in a fiscal year, there is authorized to be appro-  
17           priated to the Secretary to carry out activities under sub-  
18           sections (e) and (f) \$50,000,000 for each of fiscal years  
19           2023 through 2027.

20   **SEC. 10103. BIOLOGICAL AND ENVIRONMENTAL RESEARCH.**

21           (a) PROGRAM; BIOLOGICAL SYSTEMS; BIOMOLEC-  
22           ULAR CHARACTERIZATION AND IMAGING SCIENCE.—Sec-  
23           tion 306 of the Department of Energy Research and Inno-  
24           vation Act (42 U.S.C. 18644) is amended—

1           (1) in subsection (c), by redesignating para-  
2           graphs (6) through (8) as paragraphs (5) through  
3           (7), respectively;

4           (2) by redesignating subsections (b) through (d)  
5           as subsections (d) through (f), respectively;

6           (3) by striking subsection (a) and inserting the  
7           following:

8           “(a) PROGRAM.—As part of the duties of the Director  
9           authorized under section 209 of the Department of En-  
10          ergy Organization Act (42 U.S.C. 7139), and coordinated  
11          with the activities authorized under sections 303 and 304,  
12          the Director shall carry out a program of research and  
13          development in the areas of biological systems science and  
14          climate and environmental science, including subsurface  
15          science, relevant to the development of new energy tech-  
16          nologies and to support the energy, environmental, and  
17          national security missions of the Department.

18          “(b) BIOLOGICAL SYSTEMS.—The Director shall  
19          carry out research and development activities in genomic  
20          science including fundamental research on plants and mi-  
21          crobes to increase systems-level understanding of the com-  
22          plex biological systems, which may include activities—

23                 “(1) to provide a fundamental understanding of  
24                 the biology of plants, fungi, and microbes as a basis  
25                 for developing innovative processes for bioenergy and

1 bioproducts and accelerate breakthroughs and new  
2 knowledge that would enable the cost-effective, sus-  
3 tainable production of—

4 “(A) advanced biofuels;

5 “(B) bioenergy; and

6 “(C) biobased materials;

7 “(2) to conduct foundational functional systems  
8 biology research—

9 “(A) to support expanded biosystems de-  
10 sign research; and

11 “(B) to understand—

12 “(i) fundamental genome structure;

13 and

14 “(ii) phenomes, including functional  
15 genomics of gene products at genome

16 scale;

17 “(3) to develop biosystems designs and syn-  
18 thetic biology approaches for new nonfood plant-de-  
19 rived and microbially derived bioproducts as a basis  
20 for new bioeconomy and biotechnology applications  
21 in bioproducts production, resource recovery, recy-  
22 cling, and upcycling ventures;

23 “(4) to better understand the behavior of  
24 microbiomes in the environment and the inter-

1 dependencies between plants and microbes in a sus-  
2 tainable ecosystem;

3 “(5) to improve fundamental understanding of  
4 plant and microbial processes impacting the global  
5 carbon cycle, including processes for removing car-  
6 bon dioxide from the atmosphere, through photosyn-  
7 thesis and other biological processes, for sequestra-  
8 tion, storage, and utilization;

9 “(6) to understand the microbiome mechanisms  
10 and microbiota used to transform, immobilize, or re-  
11 move contaminants from subsurface environments  
12 and that affect the cycling and disposition of carbon,  
13 nutrients, and contaminants in the environment;

14 “(7) to develop the computational approaches  
15 and integrated platforms for open access collabo-  
16 rative science;

17 “(8) to leverage tools and approaches across the  
18 Office of Science to expand research to include novel  
19 processes, methods, and science to develop bio-based  
20 chemicals, polymers, inorganic materials, including  
21 research—

22 “(A) to advance fungal, microbial, and  
23 plant biosystems design research to advance the  
24 understanding of how CRISPR tools and other

1 gene editing tools and technologies work in na-  
2 ture, in the laboratory, and in practice;

3 “(B) to deepen genome-enabled knowledge  
4 of the roles of microbes and microbial commu-  
5 nities, including fungi, in—

6 “(i) supporting plant and tree growth,  
7 productivity, performance, adaptation, and  
8 resilience in changing environmental condi-  
9 tions; and

10 “(ii) optimizing end uses of biomass;

11 “(C) to develop biosystems design methods  
12 and tools to increase the efficiency of photosyn-  
13 thesis in plants; and

14 “(D) to increase the scale and pace of  
15 characterizing the functions and physical char-  
16 acteristics of microbes and microbial commu-  
17 nities to improve biosystems design;

18 “(9) to conduct research focused on developing  
19 analysis techniques and simulation capabilities, in-  
20 cluding artificial intelligence and machine learning,  
21 on high-performance computing platforms to accel-  
22 erate collaborative and reproducible systems biology  
23 research;

24 “(10) to develop and improve new technologies  
25 for bioimaging, measurement, and characterization

1 purposes to understand the structural, spatial, and  
2 temporal relationships of metabolic processes gov-  
3 erning phenotypic expression in plants and microbes;

4 “(11) to conduct research focused on genotype-  
5 to-phenotype translations to develop a predictive un-  
6 derstanding of cellular function under a variety of  
7 relevant environmental and bioenergy-related condi-  
8 tions;

9 “(12) to conduct metagenomic and metadata  
10 assembly research sequencing and analysis; and

11 “(13) to develop other relevant methods and  
12 processes as determined by the Director.

13 “(c) BIOMOLECULAR CHARACTERIZATION AND IMAG-  
14 ING SCIENCE.—The Director shall carry out research and  
15 development activities in biomolecular characterization  
16 and imaging science, including development of new and  
17 integrative imaging and analysis platforms and biosensors  
18 to understand the expression, structure, and function of  
19 genome information encoded within cells and for real-time  
20 measurements in ecosystems and field sites of relevance  
21 to the mission of the Department.”; and

22 (4) by adding at the end the following:

23 “(1) DEFINITIONS.—In this section:

24 “(1) ADVANCED BIOFUEL.—The term ‘ad-  
25 vanced biofuel’ has the meaning given the term in

1 section 9001 of the Farm Security and Rural Invest-  
2 ment Act of 2002 (7 U.S.C. 8101).

3 “(2) BIOENERGY.—The term ‘bioenergy’ means  
4 energy derived from biofuels.

5 “(3) BIOMASS.—The term ‘biomass’ has the  
6 meaning given the term in section 203(b) of the En-  
7 ergy Policy Act of 2005 (42 U.S.C. 15852(b)).

8 “(4) BIOPRODUCT.—The term ‘bioproduct’ has  
9 the meaning given the term ‘biobased product’ in  
10 section 9001 of the Farm Security and Rural Invest-  
11 ment Act of 2002 (7 U.S.C. 8101).”.

12 (b) LOW-DOSE RADIATION RESEARCH PROGRAM.—  
13 Paragraph (8) of subsection (e) of section 306 of the De-  
14 partment of Energy Research and Innovation Act (42  
15 U.S.C. 18644), as redesignated by subsection (a)(2), is  
16 amended—

17 (1) in subparagraph (C), by striking “and”;

18 (2) in subparagraph (D), by striking the period  
19 at the end and inserting a semicolon; and

20 (3) by adding at the end the following:

21 “(E) \$40,000,000 for fiscal year 2025;

22 “(F) \$50,000,000 for fiscal year 2026; and

23 “(G) \$50,000,000 for fiscal year 2027.”.

24 (c) LOW-DOSE RADIATION AND SPACE RADIATION  
25 RESEARCH PROGRAM.—Subsection (f) of section 306 of



1 the Department of Energy Research and Innovation Act  
2 (42 U.S.C. 18644), as redesignated by subsection (a)(2),  
3 is amended to read as follows:

4 “(f) LOW-DOSE RADIATION AND SPACE RADIATION  
5 RESEARCH PROGRAM.—

6 “(1) IN GENERAL.—The Secretary, in consulta-  
7 tion with the Administrator of the National Aero-  
8 nautics and Space Administration, shall carry out a  
9 basic research program on the similarities and dif-  
10 ferences between the effects of exposure to low-dose  
11 radiation on Earth, in low Earth orbit, and in the  
12 space environment.

13 “(2) PURPOSE.—The purpose of the program  
14 described in paragraph (1) is to accelerate break-  
15 throughs in low-dose and low dose-rate radiation re-  
16 search and development as described in subsection  
17 (e) and to inform the advancement of new tools,  
18 technologies, and advanced materials needed to fa-  
19 cilitate long-duration space exploration.”.

20 (d) CLIMATE, ENVIRONMENTAL SCIENCE, AND  
21 OTHER ACTIVITIES.—Section 306 of the Department of  
22 Energy Research and Innovation Act (42 U.S.C. 18644)  
23 (as amended by subsection (a)) is amended by inserting  
24 after subsection (f) the following:

1           “(g) EARTH AND ENVIRONMENTAL SYSTEMS  
2 SCIENCES ACTIVITIES.—

3           “(1) IN GENERAL.—As part of the activities au-  
4 thORIZED under subsection (a), and in coordination  
5 with activities carried out under subsection (b), the  
6 Director shall coordinate with the National Oceanic  
7 and Atmospheric Administration, the National  
8 Science Foundation, the Environmental Protection  
9 Agency, the National Aeronautics and Space Admin-  
10 istration, the Department of Agriculture, the De-  
11 partment of the Interior, and any other relevant  
12 agencies to carry out activities relating to Earth and  
13 environmental systems science research, which may  
14 include activities—

15           “(A) to understand, observe, measure, and  
16 model the response of Earth’s atmosphere and  
17 biosphere to changing concentrations of green-  
18 house gas emissions and any associated changes  
19 in climate, including frequency and intensity of  
20 extreme weather events;

21           “(B) to understand the coupled physical,  
22 chemical, and biological processes to transform,  
23 immobilize, remove, or move carbon, nitrogen,  
24 and other energy production-derived contami-  
25 nants such as radionuclides and heavy metals,

1 and understand the process of sequestration  
2 and transformation of these, carbon dioxide,  
3 and other relevant molecules in subsurface envi-  
4 ronments;

5 “(C) to understand, observe, and model the  
6 cycling of water, carbon, and nutrients in ter-  
7 restrial systems across spatiotemporal scales;

8 “(D) to understand the biological, biogeo-  
9 chemical, and physical processes across the  
10 multiple scales that control the flux of environ-  
11 mentally relevant compounds between the ter-  
12 restrial surface and the atmosphere; and

13 “(E) to understand and predict inter-  
14 actions among natural and human systems to  
15 inform potential mitigation and adaptation op-  
16 tions for increased concentrations of greenhouse  
17 gas emissions and any associated changes in cli-  
18 mate.

19 “(2) PRIORITIZATION.—In carrying out the  
20 program authorized under paragraph (1), the Direc-  
21 tor shall prioritize—

22 “(A) the development of software and algo-  
23 rithms to enable the productive application of  
24 environmental systems and extreme weather in

1 climate and Earth system prediction models in  
2 high-performance computing systems; and

3 “(B) capabilities that support the Depart-  
4 ment’s mission needs for energy and infrastruc-  
5 ture security, resilience, and reliability.

6 “(3) ENVIRONMENTAL SYSTEMS SCIENCE RE-  
7 SEARCH.—

8 “(A) IN GENERAL.—As part of the activi-  
9 ties described in paragraph (1), the Director  
10 shall carry out research to advance an inte-  
11 grated, robust, and scale-aware predictive un-  
12 derstanding of environmental systems, including  
13 the role of hydrobiogeochemistry, from the sub-  
14 surface to the top of the vegetative canopy that  
15 considers effects of seasonal to interannual vari-  
16 ability and change.

17 “(B) CLEAN WATER AND WATERSHED RE-  
18 SEARCH.—As part of the activities described in  
19 subparagraph (A), the Director shall—

20 “(i) support interdisciplinary research  
21 to significantly advance our understanding  
22 of water availability, quality, and the im-  
23 pact of human activity and a changing cli-  
24 mate on urban and rural watershed sys-

1           tems, including in freshwater environ-  
2           ments;

3                   “(ii) consult with the Interagency Re-  
4           search, Development, and Demonstration  
5           Coordination Committee on the Nexus of  
6           Energy and Water for Sustainability estab-  
7           lished under section 1010 of the Energy  
8           Act of 2020 (Public Law 116–260) on en-  
9           ergy-water nexus research activities;

10                   “(iii) engage with representatives of  
11           research and academic institutions, non-  
12           profit organizations, State, territorial,  
13           local, and Tribal governments, and indus-  
14           try, who have expertise in technologies,  
15           technological innovations, or practices re-  
16           lating to the energy-water nexus, as appli-  
17           cable; and

18                   “(iv) coordinate with the National  
19           Oceanic and Atmospheric Administration,  
20           the National Science Foundation, the En-  
21           vironmental Protection Agency, the Na-  
22           tional Aeronautics and Space Administra-  
23           tion, the Department of Agriculture, the  
24           Department of the Interior, and any other  
25           relevant agency.

1 “(C) COORDINATION.—

2 “(i) DIRECTOR.—The Director shall  
3 carry out activities under this paragraph in  
4 accordance with priorities established by  
5 the Secretary to support and accelerate the  
6 decontamination of relevant facilities man-  
7 aged by the Department.

8 “(ii) SECRETARY.—The Secretary  
9 shall ensure the coordination of activities  
10 of the Department, including activities  
11 under this paragraph, to support and ac-  
12 celerate the decontamination of relevant fa-  
13 cilities managed by the Department.

14 “(4) CLIMATE AND EARTH MODELING.—As  
15 part of the activities described in paragraph (1), the  
16 Director, in collaboration with the Advanced Sci-  
17 entific Computing Research program described in  
18 section 304 and other programs carried out by the  
19 Department, as applicable, and in coordination with  
20 the National Oceanic and Atmospheric Administra-  
21 tion, the National Science Foundation, the National  
22 Aeronautics and Space Administration, and other  
23 relevant agencies, shall carry out research to de-  
24 velop, evaluate, and use high-resolution regional cli-  
25 mate, global climate, Earth system, and other rel-

1       evant models to inform decisions on reducing green-  
2       house gas emissions and the resulting impacts of a  
3       changing global climate. Such modeling shall in-  
4       clude—

5               “(A) integrated capabilities for modeling  
6       multisectoral interactions, including the impacts  
7       of climate policies on human systems and the  
8       interdependencies and risks at the energy-  
9       water-land nexus;

10              “(B) greenhouse gas emissions, air quality,  
11       energy supply and demand, and other critical  
12       elements; and

13              “(C) interaction among human and Earth  
14       systems informed by interdisciplinary research,  
15       including the economic and social sciences.

16       “(5) MIDSCALE FUNDING MECHANISM.—

17              “(A) IN GENERAL.—Any of the activities  
18       authorized in this subsection may be carried  
19       out, in lieu of individual research grants—

20                   “(i) by competitively selected  
21       midscale, multi-institutional research cen-  
22       ters;

23                   “(ii) by large-scale experiments or  
24       user facilities; or

1                   “(iii) through existing facilities and  
2                   systems of the Department or the National  
3                   Oceanic and Atmospheric Administration.

4                   “(B) CONSIDERATION.—The Biological  
5                   and Environmental Research Advisory Com-  
6                   mittee shall provide recommendations to the Di-  
7                   rector on projects most suitable for the research  
8                   centers described in subparagraph (A).

9                   “(6) ATMOSPHERIC SYSTEMS AND SCIENCES  
10                  RESEARCH PROGRAM.—

11                   “(A) IN GENERAL.—As part of the activi-  
12                   ties carried out under paragraph (1), the Direc-  
13                   tor shall carry out a program, to be known as  
14                   the ‘Atmospheric Systems and Sciences Re-  
15                   search Program’, to use observations to improve  
16                   understanding of atmospheric processes, under  
17                   which the Director, in coordination, and as ap-  
18                   propriate, collaboration, with the National Oce-  
19                   anic and Atmospheric Administration and other  
20                   relevant Federal agencies conducting research  
21                   under the topics described in this subpara-  
22                   graph, shall conduct research relating to—

23                   “(i) better understanding the atmos-  
24                   phere and the interaction of the atmos-  
25                   phere with the surface of the Earth;





1           “(B) ACTIVITIES.—In carrying out the At-  
2           mospheric Systems and Sciences Research Pro-  
3           gram, the Director shall, in coordination, and  
4           as appropriate, in collaboration, with other rel-  
5           evant Federal agencies—

6                   “(i) collect data and conduct research  
7                   to advance atmospheric and Earth system  
8                   modeling capabilities;

9                   “(ii) develop or participate in existing  
10                  or future integrated, scalable test-beds  
11                  that—

12                           “(I) incorporate process-level un-  
13                           derstanding of the life cycles of  
14                           aerosols, clouds, and precipitation;  
15                           and

16                           “(II) can be incorporated into  
17                           other models;

18                           “(iii) improve data, analysis, and pre-  
19                           diction systems in marine, littoral, terres-  
20                           trial, and arctic environments, including  
21                           those environments sensitive to changes in  
22                           the climate, relating to the energy and  
23                           science mission of the Department; and

24                           “(iv) support the development of tech-  
25                           nologies relating to—

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1                   “(I) more accurate cloud, aerosol,  
2                   and other atmospheric sensors;  
3                   “(II) observing sensor networks;  
4                   and  
5                   “(III) computational predictive  
6                   modeling.

7                   “(C) USE OF ATMOSPHERIC RADIATION  
8                   MEASUREMENT PROGRAM FACILITIES AND IN-  
9                   FRASTRUCTURE.—To support the Atmospheric  
10                  Systems and Sciences Research Program and,  
11                  in coordination, and as appropriate, in collabo-  
12                  ration, with the National Oceanic and Atmos-  
13                  pheric Administration and other relevant Fed-  
14                  eral agencies, to improve fundamental under-  
15                  standing of the physical and chemical processes  
16                  that impact the formation, life cycle, and radi-  
17                  ative impacts of cloud and aerosol particles, at-  
18                  mospheric processes, and surface or subsurface  
19                  phenomena, the Director shall use the facilities  
20                  and infrastructure of the Atmospheric Radi-  
21                  ation Measurement User Facility, the Global  
22                  Monitoring Laboratory of the National Oceanic  
23                  and Atmospheric Administration, or other  
24                  Earth and Environmental Systems Sciences  
25                  User Facilities—

1                   “(i) to provide support to environ-  
2                   mental scientists by collecting high-quality  
3                   and well-characterized in-situ, remote-sens-  
4                   ing, and aircraft observations of—

5                   “(I) the microphysical properties  
6                   of clouds and atmospheric aerosols;

7                   “(II) the coincident and highly  
8                   detailed dynamical and thermo-  
9                   dynamic properties of the atmospheric  
10                  environment that contains those  
11                  clouds and aerosols;

12                  “(III) the properties of precipita-  
13                  tion;

14                  “(IV) the properties of radiation  
15                  and the background environment; and

16                  “(V) the properties of surface or  
17                  subsurface phenomena;

18                  “(ii) to carry out laboratory studies  
19                  and ground-based and airborne field cam-  
20                  paigns to target specific atmospheric and  
21                  surface or subsurface processes relating to  
22                  the energy and science mission of the De-  
23                  partment in different locations and across  
24                  a range of environments, including by de-

1                   veloping technologies to assist in advancing  
2                   predictive capabilities;

3                   “(iii) to build data sets that can be in-  
4                   corporated into atmospheric models; and

5                   “(iv) to enhance observations by using  
6                   modeling and simulations that test the ac-  
7                   curacy of climate model parameterizations.

8                   “(h) BIOLOGICAL AND ENVIRONMENTAL RESEARCH  
9                   USER FACILITIES.—

10                   “(1) IN GENERAL.—The Director shall carry  
11                   out a program for the development, construction, op-  
12                   eration, and maintenance of user facilities to en-  
13                   hance the collection and analysis of observational  
14                   data related to complex biological, climate, and envi-  
15                   ronmental systems.

16                   “(2) SELECTION.—

17                   “(A) IN GENERAL.—The Director shall se-  
18                   lect user facilities under paragraph (1) on a  
19                   competitive, merit-reviewed basis.

20                   “(B) APPLICANTS.—In selecting user fa-  
21                   cilities under paragraph (1), the Director shall  
22                   consider applications from the National Labora-  
23                   tories, institutions of higher education, multi-in-  
24                   stitutional collaborations, and other appropriate  
25                   entities.

1           “(3) FACILITY REQUIREMENTS.—To the max-  
2           imum extent practicable, the user facilities devel-  
3           oped, constructed, operated, or maintained under  
4           paragraph (1) shall include—

5                   “(A) distributed field research and obser-  
6                   vation platforms for understanding earth sys-  
7                   tem processes;

8                   “(B) analytical techniques, instruments,  
9                   and modeling resources, including high-through-  
10                  put molecular phenotyping, for understanding  
11                  and predicting the functional processes of bio-  
12                  logical and environmental systems;

13                  “(C) integrated high-throughput sequenc-  
14                  ing, advanced bioanalytic techniques, DNA de-  
15                  sign and synthesis, metabolomics, and computa-  
16                  tional analysis; and

17                  “(D) such other facilities as the Director  
18                  considers appropriate, consistent with section  
19                  209 of the Department of Energy Organization  
20                  Act (42 U.S.C. 7139).

21           “(4) EXISTING FACILITIES.—In carrying out  
22           the program established under paragraph (1), the  
23           Director is encouraged to evaluate the capabilities of  
24           existing user facilities and, to the maximum extent

1       practicable, invest in modernization of those capa-  
2       bilities to address emerging research priorities.

3           “(5) EARTH AND ENVIRONMENTAL SYSTEMS  
4       SCIENCES USER FACILITIES.—In carrying out the  
5       program established under paragraph (1), the Direc-  
6       tor shall operate at least 1 user facility to advance  
7       the collection, validation, and analysis of atmos-  
8       pheric data, including through activities—

9           “(A) to advance knowledge of the Earth  
10       and environmental systems and improve model  
11       representations; and

12          “(B) to measure the impact of atmospheric  
13       gases, aerosols, and clouds on the Earth and  
14       environmental systems.

15          “(6) MICROBIAL MOLECULAR PHENOTYPING CA-  
16       PABILITY PROJECT.—

17          “(A) IN GENERAL.—The Secretary shall  
18       provide for the expansion of the Environmental  
19       Molecular Sciences Laboratory, or subsequent  
20       facility successor, to advance high-throughput  
21       microbial plant and molecular phenotyping ca-  
22       pability to accelerate discovery of new protein  
23       functions and metabolic pathways in microbial  
24       systems.

1                   “(B) CAPABILITIES.—In carrying out sub-  
2                   paragraph (A), the Secretary shall ensure the  
3                   following capabilities:

4                   “(i) Coupled high-throughput autono-  
5                   mous experimental and multimodal analyt-  
6                   ical capabilities.

7                   “(ii) Direct integration of automated  
8                   multiomics analyses, biomolecular and cel-  
9                   lular imaging, and functional biological as-  
10                  says with high-throughput microbial cul-  
11                  turing and cultivation capabilities at  
12                  timescales relevant to biological processes  
13                  under natural and perturbed environmental  
14                  conditions.

15                  “(C) DATA COORDINATION.—In carrying  
16                  out subparagraph (A), the Secretary shall en-  
17                  sure integration and coordination with existing  
18                  data platforms and user facilities of the Depart-  
19                  ment.

20                  “(D) START OF OPERATIONS.—Subject to  
21                  the availability of appropriations, the Secretary  
22                  shall begin carrying out subparagraph (A) not  
23                  later than September 29, 2027.

24                  “(E) FUNDING.—Of the funds authorized  
25                  to be appropriated under subsection (k) for a



1 fiscal year, there are authorized to be appro-  
2 priated to the Secretary to carry out this para-  
3 graph—

4 “(i) \$550,000 for fiscal year 2023;

5 “(ii) \$29,000,000 for fiscal year 2024;

6 “(iii) \$32,000,000 for fiscal year  
7 2025;

8 “(iv) \$30,500,000 for fiscal year  
9 2026; and

10 “(v) \$27,500,000 for fiscal year 2027.

11 “(7) USER FACILITIES INTEGRATION AND COL-  
12 LABORATION PROGRAM.—

13 “(A) IN GENERAL.—The Director shall  
14 support a program of collaboration between  
15 user facilities to encourage and enable research-  
16 ers to more readily integrate the tools, exper-  
17 tise, resources, and capabilities of multiple Of-  
18 fice of Science user facilities (as described in  
19 subsection (d) of section 209 of the Department  
20 of Energy Organization Act (42 U.S.C. 7139))  
21 to further research and advance emerging tech-  
22 nologies.

23 “(B) ACTIVITIES.—The program shall ad-  
24 vance the integration of automation, robotics,  
25 computational biology, bioinformatics, bio-

1           sensing, cellular platforms and other relevant  
2           emerging technologies as determined by the Di-  
3           rector to enhance productivity and scientific im-  
4           pact of user facilities.

5           “(8) COORDINATION.—In carrying out the pro-  
6           gram authorized under paragraph (1), the Director  
7           shall ensure that the Office of Science coordinates  
8           with—

9                   “(A) the National Oceanic Atmospheric  
10                  Administration, the Environmental Protection  
11                  Agency, the National Aeronautics and Space  
12                  Administration, the Department of Agriculture,  
13                  the Department of the Interior, and any other  
14                  relevant Federal agency on the collection, vali-  
15                  dation, and analysis of atmospheric data; and

16                   “(B) relevant stakeholders, including insti-  
17                  tutions of higher education, nonprofit research  
18                  institutions, industry, State, territorial, local,  
19                  and Tribal governments, and other appropriate  
20                  entities to ensure access to the best available  
21                  relevant atmospheric and historical weather  
22                  data.

23           “(i) TERRESTRIAL-AQUATIC INTERFACE RESEARCH  
24           INITIATIVE.—

1           “(1) IN GENERAL.—The Director shall carry  
2 out a research program to enhance the under-  
3 standing of terrestrial-aquatic interface. In carrying  
4 out the program, the Director shall prioritize efforts  
5 to enhance the collection of observational data, and  
6 shall develop models to analyze the natural and  
7 human processes that interact in littoral zones.

8           “(2) LITTORAL DATA COLLECTION SYSTEM.—  
9 The Director shall establish an integrated system of  
10 geographically diverse field research sites in order to  
11 improve the scientific understanding and predict-  
12 ability of the major land water interfaces of the  
13 United States through improved data quantity and  
14 quality, including in—

15                   “(A) the Great Lakes region;

16                   “(B) the Pacific coast;

17                   “(C) the Atlantic coast;

18                   “(D) the Arctic;

19                   “(E) the Gulf coast; and

20                   “(F) the coasts of United States territories  
21 and freely associated States.

22           “(3) EXISTING INFRASTRUCTURE.—In carrying  
23 out the programs and establishing the field research  
24 sites under paragraphs (1) and (2), the Secretary  
25 shall leverage existing research and development in-

1       frastructure supported by the Department, including  
2       the Department’s existing marine and coastal re-  
3       search lab.

4               “(4) COORDINATION.—For the purposes of car-  
5       rying out the programs and establishing the field re-  
6       search sites under paragraphs (1) and (2), the Sec-  
7       retary may enter into agreements with Federal de-  
8       partments and agencies with complementary capa-  
9       bilities, including the National Oceanic and Atmos-  
10      pheric Administration and any other relevant Fed-  
11      eral agency as appropriate.

12              “(5) REPORT.—Not earlier than 2 years after  
13      the date of enactment of the Research and Develop-  
14      ment, Competition, and Innovation Act, the Director  
15      shall provide to the Committee on Science, Space,  
16      and Technology, the Committee on Natural Re-  
17      sources, and the Committee on Appropriations of the  
18      House of Representatives, and the Committee on  
19      Energy and Natural Resources and the Committee  
20      on Appropriations of the Senate, a report examining  
21      whether the system described in paragraph (2)  
22      should be established as a National User Facility  
23      within the Department or as a research facility with-  
24      in another Federal agency.

25              “(6) INTEROPERABILITY.—

1           “(A) IN GENERAL.—The Director shall en-  
2           sure that activities carried out under para-  
3           graphs (1) and (2), including observation, data  
4           collection, monitoring, and model development  
5           and enhancements, are interoperable and may  
6           be integrated with existing related systems at  
7           the National Oceanic and Atmospheric Admin-  
8           istration and other relevant Federal agencies,  
9           as practicable.

10           “(B) RESOURCES.—In carrying out sub-  
11           paragraph (A), in support of interoperability, as  
12           practicable, the Director may make available to  
13           other Federal agencies high performance com-  
14           puting resources.

15           “(C) NOAA.—The National Oceanic and  
16           Atmospheric Administration shall integrate the  
17           data collected under the programs carried out  
18           under paragraphs (1) and (2) into relevant data  
19           systems and models, as practicable.

20           “(j) ENGINEERED ECOSYSTEMS INITIATIVE.—

21           “(1) IN GENERAL.—The Secretary shall estab-  
22           lish within the Biological and Environmental Re-  
23           search program an initiative focused on the develop-  
24           ment of engineered ecosystems through the applica-

1       tion of artificial intelligence, novel sensing capabili-  
2       ties, and other emerging technologies.

3           “(2) INTERAGENCY COORDINATION.—The Sec-  
4       retary shall coordinate with the Director of the Na-  
5       tional Science Foundation, the Administrator of the  
6       National Oceanic and Atmospheric Administration,  
7       the Director of the U.S. Geological Survey, the Sec-  
8       retary of Agriculture, and other relevant officials to  
9       avoid duplication of research and observational ac-  
10      tivities and to ensure that activities carried out  
11      under the initiative established under paragraph (1)  
12      are complimentary to activities being undertaken by  
13      other agencies.

14           “(3) REPORT.—Not later than 180 days after  
15      the date of enactment of the Research and Develop-  
16      ment, Competition, and Innovation Act, the Sec-  
17      retary shall submit to the Committee on Science,  
18      Space, and Technology of the House of Representa-  
19      tives and the Committee on Energy and Natural Re-  
20      sources of the Senate a report on the activity au-  
21      thorized under this subsection.

22           “(k) AUTHORIZATION OF APPROPRIATIONS.—Out of  
23      funds authorized to be appropriated for the Office of  
24      Science in a fiscal year, there are authorized to be appro-

1 priated to the Secretary to carry out the activities de-  
2 scribed in this section—

3 “(1) \$885,420,000 for fiscal year 2023;

4 “(2) \$946,745,200 for fiscal year 2024;

5 “(3) \$1,001,149,912 for fiscal year 2025;

6 “(4) \$1,068,818,907 for fiscal year 2026; and

7 “(5) \$1,129,948,041 for fiscal year 2027.”.

8 (e) BIOENERGY RESEARCH CENTERS.—Section 977  
9 of the Energy Policy Act of 2005 (42 U.S.C. 16317) is  
10 amended by striking subsection (f) and inserting the fol-  
11 lowing:

12 “(f) BIOENERGY RESEARCH CENTERS.—

13 “(1) IN GENERAL.—In carrying out the pro-  
14 gram under section 306(a) of the Department of  
15 Energy Research and Innovation Act (42 U.S.C.  
16 18644(a)), the Director shall support up to 6 bio-  
17 energy research centers to conduct fundamental re-  
18 search in plant and microbial systems biology, bio-  
19 logical imaging and analysis, and genomics, and to  
20 accelerate advanced research and development of ad-  
21 vanced biofuels, bioenergy or biobased materials,  
22 chemicals, and products that are produced from a  
23 variety of regionally diverse feedstocks, and to facili-  
24 tate the translation of research results to industry.

1       The activities of the centers authorized under this  
2       subsection may include—

3               “(A) accelerating the domestication of bio-  
4               energy-relevant plants, microbes, and associated  
5               microbial communities to enable high-impact,  
6               value-added coproduct development at multiple  
7               points in the bioenergy supply chain;

8               “(B) developing the science and techno-  
9               logical advances to ensure process sustainability  
10              is considered in the creation of advanced  
11              biofuels and bioproducts from lignocellulosic  
12              biomass; and

13              “(C) using the latest tools in genomics,  
14              molecular biology, catalysis science, chemical  
15              engineering, systems biology, and computational  
16              and robotics technologies to sustainably produce  
17              and transform biomass into advanced biofuels  
18              and bioproducts.

19       “(2) SELECTION AND DURATION.—

20              “(A) IN GENERAL.—A center established  
21              under paragraph (1) shall be selected on a com-  
22              petitive, merit-reviewed basis for a period of not  
23              more than 5 years, subject to the availability of  
24              appropriations, beginning on the date of estab-  
25              lishment of that center.



1           “(B) APPLICATIONS.—The Director shall  
2           consider applications from National Labora-  
3           tories, multi-institutional collaborations, and  
4           other appropriate entities.

5           “(C) EXISTING CENTERS.—A center al-  
6           ready in existence on the date of enactment of  
7           the Research and Development, Competition,  
8           and Innovation Act may continue to receive  
9           support for a period of not more than 5 years  
10          beginning on the date of establishment of that  
11          center.

12          “(D) NEW CENTERS.—The Director shall  
13          select any new center pursuant to paragraph  
14          (1) on a competitive, merit-reviewed basis, with  
15          special consideration for applications from an  
16          institution of higher education (as defined in  
17          section 101 of the Higher Education Act of  
18          1965 (20 U.S.C. 1001)) that is located in an el-  
19          igible jurisdiction (as defined in section  
20          2203(b)(3)(A) of the Energy Policy Act of 1992  
21          (42 U.S.C. 13503(b)(3)(A))).

22          “(3) RENEWAL.—After the end of the applica-  
23          ble period described in paragraph (2), the Director  
24          may renew support for a center for a period of not  
25          more than 5 years on a merit-reviewed basis. For a

1 center in operation for 10 years after its previous se-  
2 lection on a competitive, merit-reviewed basis, the  
3 Director may renew support for the center on a com-  
4 petitive, merit-reviewed basis for a period of not  
5 more than 5 years, and may subsequently provide an  
6 additional renewal on a merit-reviewed basis for a  
7 period of not more than 5 years.

8 “(4) ACTIVITIES.—Centers shall undertake re-  
9 search activities to accelerate the production of ad-  
10 vanced biofuels and bioproducts from biomass re-  
11 sources by identifying the most suitable species of  
12 plants for use as energy crops; and improving meth-  
13 ods of breeding, propagation, planting, producing,  
14 harvesting, storage and processing. Activities may  
15 include the following:

16 “(A) Research activities to increase sus-  
17 tainability, including—

18 “(i) advancing knowledge of how bio-  
19 energy crop interactions with biotic and  
20 abiotic environmental factors influence  
21 crop growth, yield, and quality;

22 “(ii) identifying the most impactful  
23 research areas that address the economics  
24 of advanced biofuels and bioproducts pro-  
25 duction; and

1                   “(iii) utilizing multiscale modeling to  
2                   advance predictive understanding of ad-  
3                   vanced biofuel cropping ecosystems.

4                   “(B) Research activities to further feed-  
5                   stock development, including lignocellulosic,  
6                   algal, gaseous wastes including carbon oxides  
7                   and methane, and direct air capture of single  
8                   carbon gases via plants and microbes, includ-  
9                   ing—

10                   “(i) developing genetic and genomic  
11                   tools, high-throughput analytical tools, and  
12                   biosystems design approaches to enhance  
13                   bioenergy feedstocks and their associated  
14                   microbiomes;

15                   “(ii) conducting field testing of new  
16                   potential bioenergy feedstock crops under  
17                   environmentally benign and geographically  
18                   diverse conditions to assess viability and  
19                   robustness; and

20                   “(iii) developing quantitative models  
21                   informed by experimentation to predict  
22                   how bioenergy feedstocks perform under  
23                   diverse conditions.

1           “(C) Research activities to improve  
2 lignocellulosic deconstruction and separation  
3 methods, including—

4           “(i) developing feedstock-agnostic  
5 deconstruction processes capable of effi-  
6 ciently fractionating biomass into targeted  
7 output streams;

8           “(ii) gaining a detailed understanding  
9 of plant cell wall biosynthesis, composition,  
10 structure, and properties during  
11 deconstruction; and

12           “(iii) improving enzymes and ap-  
13 proaches for biomass breakdown and cel-  
14 lulose, hemicellulose, and lignin processing.

15           “(D) Research activities to improve the  
16 feedstock conversion process for advanced  
17 biofuels and bioproducts, including—

18           “(i) developing high-throughput meth-  
19 ods to screen or select high-performance  
20 microbial strains and communities to im-  
21 prove product formation rates, yields, and  
22 selectivity;

23           “(ii) establishing a broad set of plat-  
24 form microorganisms and microbial com-  
25 munities suitable for metabolic engineering

1 to produce advanced biofuels and bioproducts and high-throughput methods for experimental validation of gene function;

2  
3  
4 “(iii) developing techniques to enhance microbial robustness for tolerating toxins to improve advanced biofuel and bioproduct yields and to gain a better understanding of the cellular and molecular bases of tolerance for major chemical classes of inhibitors found in these processes;

5  
6  
7  
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9  
10 “(iv) advancing technologies for the use of batch, continuous, and consolidated bioprocessing;

11  
12  
13  
14 “(v) identifying, creating, and optimizing microbial and chemical pathways to produce promising, atom-economical intermediates and final bioproducts from biomass with considerations given to environmentally benign processes;

15  
16  
17  
18  
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20 “(vi) developing high-throughput, real-time, in situ analytical techniques to understand and characterize the pre- and post-bioproduct separation streams in detail;

21  
22  
23  
24

1                   “(vii) creating methodologies for effi-  
2                   ciently identifying viable target molecules,  
3                   identifying high-value bioproducts in exist-  
4                   ing biomass streams, and utilizing current  
5                   byproduct streams;

6                   “(viii) identifying and improving plant  
7                   feedstocks with enhanced extractable levels  
8                   of desired bioproducts or bioproduct pre-  
9                   cursors, including lignin streams; and

10                   “(ix) developing integrated biological  
11                   and chemical catalytic approaches to  
12                   valorize and produce a diverse portfolio of  
13                   advanced biofuels and bioproducts.

14                   “(5) INDUSTRY PARTNERSHIPS.—Centers shall  
15                   establish industry partnerships to translate research  
16                   results to commercial applications.

17                   “(6) COORDINATION.—In coordination with the  
18                   Bioenergy Technologies Office of the Department,  
19                   the Secretary shall support interdisciplinary research  
20                   activities to improve the capacity, efficiency, resil-  
21                   ience, security, reliability, and affordability, of the  
22                   production and use of advanced biofuels and bio-  
23                   products, as well as activities to enable positive im-  
24                   pacts and avoid the potential negative impacts that  
25                   the production and use of advanced biofuels and bio-

1 products may have on ecosystems, people, and his-  
2 torically marginalized communities.

3 “(7) FUNDING.—Of the funds authorized to be  
4 appropriated under subsection (k) of section 306 of  
5 the Department of Energy Research and Innovation  
6 Act (42 U.S.C. 18644) for a fiscal year, there is au-  
7 thorized to be appropriated to the Secretary to carry  
8 out this subsection \$30,000,000 per center estab-  
9 lished under paragraph (1) for each of fiscal years  
10 2023 through 2027.

11 “(8) DEFINITIONS.—In this subsection:

12 “(A) ADVANCED BIOFUEL.—The term ‘ad-  
13 vanced biofuel’ has the meaning given the term  
14 in section 9001 of the Farm Security and Rural  
15 Investment Act of 2002 (7 U.S.C. 8101).

16 “(B) BIOENERGY.—The term ‘bioenergy’  
17 means energy derived from biofuels.

18 “(C) BIOMASS.—The term ‘biomass’ has  
19 the meaning given the term in section 203(b) of  
20 the Energy Policy Act of 2005 (42 U.S.C.  
21 15852(b)).

22 “(D) BIOPRODUCT.—The term ‘bio-  
23 product’ has the meaning given the term  
24 ‘biobased product’ in section 9001 of the Farm

1 Security and Rural Investment Act of 2002 (7  
2 U.S.C. 8101).”.

3 **SEC. 10104. ADVANCED SCIENTIFIC COMPUTING RESEARCH**  
4 **PROGRAM.**

5 (a) ADVANCED SCIENTIFIC COMPUTING RE-  
6 SEARCH.—Section 304 of the Department of Energy Re-  
7 search and Innovation Act (42 U.S.C. 18642) is amend-  
8 ed—

9 (1) by redesignating subsections (a) through (c)  
10 as subsections (b) through (d), respectively;

11 (2) by inserting before subsection (b), as so re-  
12 designated, the following:

13 “(a) IN GENERAL.—As part of the activities author-  
14 ized under section 209 of the Department of Energy Orga-  
15 nization Act (42 U.S.C. 7139), the Director shall carry  
16 out, in coordination with academia and relevant public and  
17 private sector entities, a research, development, and dem-  
18 onstration program—

19 “(1) to steward applied mathematics, computa-  
20 tional science, and computer science research rel-  
21 evant to the missions of the Department and the  
22 competitiveness of the United States;

23 “(2) to develop modeling, simulation, and other  
24 computational tools relevant to other scientific dis-



1       ciplines and to the development of new energy tech-  
2       nologies and other technologies;

3             “(3) to advance computing and networking ca-  
4       pabilities for data-driven discovery; and

5             “(4) to develop advanced scientific computing  
6       hardware and software tools for science and engi-  
7       neering.”;

8             (3) in subsection (c), as so redesignated—

9                     (A) by striking “The Director” and insert-  
10       ing the following:

11                     “(1) DIRECTOR.—The Director”; and

12                     (B) by adding at the end the following:

13                     “(2) COORDINATION.—The Under Secretary for  
14       Science shall ensure the coordination of the activities  
15       of the Department, including activities under this  
16       section, to determine and meet the computational  
17       and networking research and facility needs of the  
18       Office of Science and all other relevant energy tech-  
19       nology and energy efficiency programs within the  
20       Department and with other Federal agencies as ap-  
21       propriate.”;

22             (4) by amending subsection (d), as so redesign-  
23       ated, to read as follows:

1       “(d) APPLIED MATHEMATICS AND SOFTWARE DE-  
2 VELOPMENT FOR HIGH-END COMPUTING SYSTEMS AND  
3 COMPUTER SCIENCES RESEARCH.—

4               “(1) IN GENERAL.—The Director shall carry  
5 out activities to develop, test, and support—

6                       “(A) mathematics, statistics, and algo-  
7 rithms for modeling complex systems relevant  
8 to the missions of the Department, including on  
9 advanced computing architectures; and

10                      “(B) tools, languages, programming envi-  
11 ronments, and operations for high-end com-  
12 puting systems (as defined in section 2 of the  
13 American Super Computing Leadership Act of  
14 2017 (15 U.S.C. 5541)).

15       “(2) PORTFOLIO BALANCE.—

16               “(A) IN GENERAL.—The Director shall  
17 maintain a balanced portfolio within the ad-  
18 vanced scientific computing research and devel-  
19 opment program established under section 976  
20 of the Energy Policy Act of 2005 (42 U.S.C.  
21 16316) that supports robust investment in—

22                      “(i) applied mathematical, computa-  
23 tional, and computer sciences research  
24 needs relevant to the mission of the De-  
25 partment, including foundational areas

1 that are critical to the advancement of en-  
2 ergy sciences and technologies and new  
3 and emerging computing technologies; and

4 “(ii) associated high-performance  
5 computing hardware and facilities.

6 “(B) EXASCALE ECOSYSTEM  
7 SUSTAINMENT.—

8 “(i) SENSE OF CONGRESS.—It is the  
9 sense of Congress that the Exascale Com-  
10 puting Project has successfully created a  
11 broad ecosystem that provides shared soft-  
12 ware packages, novel evaluation systems,  
13 and applications relevant to the science  
14 and engineering requirements of the De-  
15 partment, and that such products must be  
16 maintained and improved in order that the  
17 full potential of the deployed systems can  
18 be continuously realized.

19 “(ii) SUSTAINMENT.—The Secretary  
20 shall seek to sustain and evolve the eco-  
21 system described in clause (i) to ensure  
22 that the exascale software stack and other  
23 research software will continue to be main-  
24 tained, hardened, and otherwise optimized  
25 for long-term use on exascale systems and

1                   beyond and reliable availability to the user  
2                   community.”; and

3                   (5) by adding at the end the following:

4                   “(e) ADVANCED COMPUTING PROGRAM.—

5                   “(1) IN GENERAL.—The Secretary shall estab-  
6                   lish a program to develop and implement a strategy  
7                   for achieving computing systems with capabilities be-  
8                   yond exascale computing systems. In establishing  
9                   this program, the Secretary shall—

10                   “(A) maintain foundational research pro-  
11                   grams in mathematical, computational, and  
12                   computer sciences focused on new and emerging  
13                   computing needs within the mission of the De-  
14                   partment, including post-Moore’s law computing  
15                   architectures, novel approaches to modeling and  
16                   simulation, artificial intelligence and scientific  
17                   machine learning, quantum computing, edge  
18                   computing, extreme heterogeneity, including po-  
19                   tential quantum accelerators, and distributed  
20                   high-performance computing;

21                   “(B) retain best practices and maintain  
22                   support for essential hardware, applications,  
23                   and software elements of the Exascale Com-  
24                   puting Program that are necessary for sus-

1           taining the vitality of a long-term capable soft-  
2           ware ecosystem for exascale and beyond; and

3                   “(C) develop a Department-wide strategy  
4           for balancing on-premises and cloud-based com-  
5           puting and scientific data management.

6           “(2) REPORT.—Not later than 1 year after the  
7           date of enactment of the Research and Development,  
8           Competition, and Innovation Act, the Secretary shall  
9           submit to the Committee on Science, Space, and  
10          Technology of the House of Representatives and the  
11          Committee on Energy and Natural Resources of the  
12          Senate a report on the development and implementa-  
13          tion of the strategy described in paragraph (1).

14          “(f) GUIDANCE ON MITIGATION OF BIAS IN HIGH-  
15          PERFORMANCE            COMPUTING            CAPABILITIES.—In  
16          leveraging high-performance computing systems for re-  
17          search purposes, including through the use of machine  
18          learning algorithms for data analysis and artificial intel-  
19          ligence, the Secretary shall issue, and ensure adherence  
20          to, guidance for the Department, the National Labora-  
21          tories, and users as to how those capabilities should be  
22          employed in a manner that mitigates and, to the maximum  
23          extent practicable, avoids harmful algorithmic bias.

24          “(g) ARCHITECTURAL RESEARCH IN HETERO-  
25          GENEOUS COMPUTING SYSTEMS.—

1           “(1) IN GENERAL.—The Secretary shall carry  
2           out a program of research and development in het-  
3           erogeneous and reconfigurable computing systems to  
4           expand understanding of the potential for hetero-  
5           geneous and reconfigurable computing systems to  
6           deliver high performance, high efficiency computing  
7           for Department mission challenges. The program  
8           shall include research and development that explores  
9           the convergence of big data analytics, simulations,  
10          and artificial intelligence to drive the design of het-  
11          erogeneous computing system architectures.

12          “(2) COORDINATION.—In carrying out the pro-  
13          gram described in paragraph (1), the Secretary shall  
14          ensure coordination between research activities un-  
15          dertaken by the Advanced Scientific Computing Re-  
16          search program and materials research supported by  
17          the Basic Energy Sciences program within the Office  
18          of Science.

19          “(h) ENERGY EFFICIENT COMPUTING PROGRAM.—

20          “(1) IN GENERAL.—The Secretary shall sup-  
21          port a program of fundamental research, develop-  
22          ment, and demonstration of energy efficient com-  
23          puting and data center technologies relevant to ad-  
24          vanced computing applications, including high-per-

1 performance computing, artificial intelligence, and sci-  
2 entific machine learning.

3 “(2) EXECUTION.—

4 “(A) PROGRAM.—In carrying out the pro-  
5 gram under paragraph (1), the Secretary  
6 shall—

7 “(i) establish a partnership for Na-  
8 tional Laboratories, industry partners, and  
9 institutions of higher education for co-  
10 design of energy efficient hardware, tech-  
11 nology, software, and applications across  
12 all applicable program offices of the De-  
13 partment, and provide access to energy ef-  
14 ficient computing resources to such part-  
15 ners;

16 “(ii) develop hardware and software  
17 technologies that decrease the energy needs  
18 of advanced computing practices, including  
19 through data center codesign;

20 “(iii) consider multiple heterogeneous  
21 computing architectures in collaboration  
22 with the program established under sub-  
23 section (g), including neuromorphic com-  
24 puting, persistent computing, and ultrafast  
25 networking; and





1 (A) to ensure an integrated research pro-  
2 gram across the Department.

3 “(i) ENERGY SCIENCES NETWORK.—

4 “(1) IN GENERAL.—The Secretary shall provide  
5 for upgrades to the Energy Sciences Network user  
6 facility in order to meet the research needs of the  
7 Department for highly reliable data transport capa-  
8 bilities optimized for the requirements of large-scale  
9 science.

10 “(2) CAPABILITIES.—In carrying out paragraph  
11 (1), the Secretary shall ensure the following capabili-  
12 ties:

13 “(A) To provide high bandwidth scientific  
14 networking across the continental United States  
15 and the Atlantic Ocean.

16 “(B) To ensure network reliability.

17 “(C) To protect the network infrastructure  
18 from cyberattacks.

19 “(D) To manage transport of exponentially  
20 increasing levels of data from the Department’s  
21 National Laboratories and sites, user facilities,  
22 experiments, and sensors.

23 “(E) To contribute to the integration of  
24 heterogeneous computing frameworks and sys-  
25 tems.

1           “(j) COMPUTATIONAL SCIENCE GRADUATE FELLOW-  
2 SHIP.—

3           “(1) IN GENERAL.—The Secretary shall sup-  
4 port the Computational Science Graduate Fellowship  
5 program in order to facilitate collaboration between  
6 graduate students and researchers at the National  
7 Laboratories, and contribute to the development of  
8 a diverse and inclusive computational workforce to  
9 help advance research in all areas of computational  
10 science relevant to the mission of the Department,  
11 including quantum computing.

12           “(2) FUNDING.—Of the funds authorized to be  
13 appropriated for the Advanced Scientific Computing  
14 Research Program, there are authorized to be appro-  
15 priated to the Secretary for carrying out activities  
16 under this subsection—

17                   “(A) \$15,750,000 for fiscal year 2023;

18                   “(B) \$16,537,500 for fiscal year 2024;

19                   “(C) \$17,364,375 for fiscal year 2025;

20                   “(D) \$18,232,594 for fiscal year 2026;

21                   and

22                   “(E) \$19,144,223 for fiscal year 2027.

23           “(k) AUTHORIZATION OF APPROPRIATIONS.—Out of  
24 funds authorized to be appropriated for the Office of  
25 Science in a fiscal year, there are authorized to be appro-

1 priated to the Secretary to carry out the activities de-  
2 scribed in this section—

3 “(1) \$1,126,950,000 for fiscal year 2023;

4 “(2) \$1,194,109,500 for fiscal year 2024;

5 “(3) \$1,265,275,695 for fiscal year 2025;

6 “(4) \$1,340,687,843 for fiscal year 2026; and

7 “(5) \$1,420,599,500 for fiscal year 2027.”.

8 (b) QUANTUM SCIENCE NETWORK.—

9 (1) DEFINITIONS.—Section 2 of the National  
10 Quantum Initiative Act (15 U.S.C. 8801) is amend-  
11 ed—

12 (A) by redesignating paragraph (7) as  
13 paragraph (8); and

14 (B) by inserting after paragraph (6) the  
15 following:

16 “(7) QUANTUM NETWORK INFRASTRUCTURE.—

17 The term ‘quantum network infrastructure’ means  
18 any facility, expertise, or capability that is necessary  
19 to enable the development and deployment of scal-  
20 able and diverse quantum network technologies.”.

21 (2) DEPARTMENT OF ENERGY QUANTUM NET-  
22 WORK INFRASTRUCTURE RESEARCH AND DEVELOP-  
23 MENT PROGRAM.—

24 (A) IN GENERAL.—Title IV of the Na-  
25 tional Quantum Initiative Act (15 U.S.C. 8851

1 et seq.) is amended by adding at the end the  
2 following:

3 **“SEC. 403. DEPARTMENT OF ENERGY QUANTUM NETWORK**  
4 **INFRASTRUCTURE RESEARCH AND DEVELOP-**  
5 **MENT PROGRAM.**

6 “(a) IN GENERAL.—The Secretary of Energy (re-  
7 ferred to in this section as the ‘Secretary’) shall carry out  
8 a research, development, and demonstration program to  
9 accelerate innovation in quantum network infrastructure  
10 in order to—

11 “(1) facilitate the advancement of distributed  
12 quantum computing systems through the internet  
13 and intranet;

14 “(2) improve the precision of measurements of  
15 scientific phenomena and physical imaging tech-  
16 nologies;

17 “(3) develop secure national quantum commu-  
18 nications technologies and strategies;

19 “(4) demonstrate quantum networking utilizing  
20 the Department of Energy’s Energy Sciences Net-  
21 work User Facility; and

22 “(5) advance the relevant domestic supply  
23 chains, manufacturing capabilities, and associated  
24 simulations or modeling capabilities.

1           “(b) PROGRAM.—In carrying out this section, the  
2 Secretary shall—

3           “(1) coordinate with—

4                   “(A) the Director of the National Science  
5 Foundation;

6                   “(B) the Director of the National Institute  
7 of Standards and Technology;

8                   “(C) the Chair of the Subcommittee on  
9 Quantum Information Science of the National  
10 Science and Technology Council established  
11 under section 103(a); and

12                   “(D) the Chair of the Subcommittee on the  
13 Economic and Security Implications of Quan-  
14 tum Science;

15           “(2) conduct cooperative research with indus-  
16 try, National Laboratories, institutions of higher  
17 education, and other research institutions to facili-  
18 tate new quantum infrastructure methods and tech-  
19 nologies, including—

20                   “(A) quantum-limited detectors, ultra-low  
21 loss optical channels, space-to-ground connec-  
22 tions, and classical networking and cybersecu-  
23 rity protocols;

1           “(B) entanglement and hyper-entangled  
2 state sources and transmission, control, and  
3 measurement of quantum states;

4           “(C) quantum interconnects that allow  
5 short range local connections between quantum  
6 processors;

7           “(D) transducers for quantum sources and  
8 signals between optical wavelength regimes, in-  
9 cluding telecommunications regimes and quan-  
10 tum computer-relevant domains, including  
11 microwaves;

12           “(E) development of quantum memory  
13 buffers and small-scale quantum computers  
14 that are compatible with photon-based quantum  
15 bits in the optical or telecommunications wave-  
16 lengths;

17           “(F) long-range entanglement distribution,  
18 including allowing entanglement-based protocols  
19 between small- and large scale quantum proc-  
20 essors, at the terrestrial and space-based level  
21 using quantum repeaters and optical or laser  
22 communications;

23           “(G) quantum routers, multiplexers, re-  
24 peaters, and related technologies necessary to

1 create secure long-distance quantum commu-  
2 nication; and

3 “(H) integration of systems across the  
4 quantum technology stack into traditional com-  
5 puting networks, including the development of  
6 remote controlled, high-performance, and reli-  
7 able implementations of key quantum network  
8 components by leveraging the expertise, infra-  
9 structure and supplemental investments at the  
10 National Laboratories in the Energy Sciences  
11 Network User Facility;

12 “(3) engage with the Quantum Economic De-  
13 velopment Consortium and other organizations, as  
14 applicable, to transition component technologies to  
15 help facilitate as appropriate the development of a  
16 quantum supply chain for quantum network tech-  
17 nologies;

18 “(4) advance basic research in advanced sci-  
19 entific computing, particle and nuclear physics, and  
20 material science to enhance the understanding, pre-  
21 diction, and manipulation of materials, processes,  
22 and physical phenomena relevant to quantum net-  
23 work infrastructure;

24 “(5) develop experimental tools and testbeds in  
25 collaboration with the Energy Sciences Network

1 User Facility necessary to support cross-cutting fun-  
2 damental research and development activities with  
3 diverse stakeholders from industry, National Labora-  
4 tories, and institutions of higher education; and

5 “(6) consider quantum network infrastructure  
6 applications that span the Department of Energy’s  
7 missions in energy, environment, and national secu-  
8 rity.

9 “(c) LEVERAGING.—In carrying out this section, the  
10 Secretary shall leverage resources, infrastructure, and ex-  
11 pertise across the Department of Energy and from—

12 “(1) the National Institute of Standards and  
13 Technology;

14 “(2) the National Science Foundation;

15 “(3) the National Aeronautics and Space Ad-  
16 ministration;

17 “(4) other relevant Federal agencies;

18 “(5) the National Laboratories;

19 “(6) industry stakeholders;

20 “(7) institutions of higher education; and

21 “(8) the National Quantum Information  
22 Science Research Centers.

23 “(d) RESEARCH PLAN.—Not later than 180 days  
24 after the date of enactment of the Research and Develop-  
25 ment, Competition, and Innovation Act, the Secretary



1 shall submit to the Committee on Science, Space, and  
2 Technology of the House of Representatives and the Com-  
3 mittee on Energy and Natural Resources of the Senate  
4 a 4-year research plan that identifies and prioritizes basic  
5 research needs relating to quantum network infrastruc-  
6 ture.

7 “(e) STANDARD OF REVIEW.—The Secretary shall  
8 review activities carried out under this section to deter-  
9 mine the achievement of technical milestones.

10 “(f) FUNDING.—Of the funds authorized to be appro-  
11 priated for the Department of Energy’s Office of Science,  
12 there is authorized to be appropriated to the Secretary to  
13 carry out the activities under this section \$100,000,000  
14 for each of fiscal years 2023 through 2027.

15 **“SEC. 404. DEPARTMENT OF ENERGY QUANTUM USER EX-**  
16 **PANSION FOR SCIENCE AND TECHNOLOGY**  
17 **PROGRAM.**

18 “(a) IN GENERAL.—The Secretary of Energy (re-  
19 ferred to in this section as the ‘Secretary’) shall establish  
20 and carry out a program, to be known as the ‘Quantum  
21 User Expansion for Science and Technology program’ or  
22 ‘QUEST program’, to encourage and facilitate access to  
23 United States quantum computing hardware and quantum  
24 computing clouds for research purposes—

1           “(1) to enhance the United States quantum re-  
2 search enterprise;

3           “(2) to educate the future quantum computing  
4 workforce;

5           “(3) to accelerate the advancement of United  
6 States quantum computing capabilities; and

7           “(4) to advance the relevant domestic supply  
8 chains, manufacturing processes, and associated  
9 simulations or modeling capabilities.

10          “(b) PROGRAM.—In carrying out this section, the  
11 Secretary shall—

12           “(1) coordinate with—

13           “(A) the Director of the National Science  
14 Foundation;

15           “(B) the Director of the National Institute  
16 of Standards and Technology;

17           “(C) the Chair of the Subcommittee on  
18 Quantum Information Science of the National  
19 Science and Technology Council established  
20 under section 103(a); and

21           “(D) the Chair of the Subcommittee on the  
22 Economic and Security Implications of Quan-  
23 tum Science;

24           “(2) provide researchers based within the  
25 United States with access to, and use of, United

1 States quantum computing resources through a com-  
2 petitive, merit-reviewed process;

3 “(3) consider applications from the National  
4 Laboratories, multi-institutional collaborations, insti-  
5 tutions of higher education, industry stakeholders,  
6 and any other entities that the Secretary determines  
7 are appropriate to provide national leadership on  
8 quantum computing related issues;

9 “(4) coordinate with private sector stake-  
10 holders, the user community, and interagency part-  
11 ners on program development and best management  
12 practices; and

13 “(5) to the extent practicable, balance user ac-  
14 cess to commercial prototypes available for use  
15 across a broad class of applications and Federal re-  
16 search prototypes that enable benchmarking a wider  
17 variety of early-stage devices.

18 “(c) LEVERAGING.—In carrying out this section, the  
19 Secretary shall leverage resources and expertise across the  
20 Department of Energy and from—

21 “(1) the National Institute of Standards and  
22 Technology;

23 “(2) the National Science Foundation;

24 “(3) the National Aeronautics and Space Ad-  
25 ministration;

1           “(4) other relevant Federal agencies;  
2           “(5) the National Laboratories;  
3           “(6) industry stakeholders;  
4           “(7) institutions of higher education; and  
5           “(8) the National Quantum Information  
6           Science Research Centers.

7           “(d) SECURITY.—In carrying out the activities au-  
8           thorized by this section, the Secretary, in consultation  
9           with the Director of the National Science Foundation and  
10          the Director of the National Institute of Standards and  
11          Technology, shall ensure proper security controls are in  
12          place to protect sensitive information, as appropriate.

13          “(e) FUNDING.—Of the funds authorized to be ap-  
14          propriated for the Department of Energy’s Office of  
15          Science, there are authorized to be appropriated to the  
16          Secretary to carry out the activities under this section—

17               “(1) \$30,000,000 for fiscal year 2023;  
18               “(2) \$31,500,000 for fiscal year 2024;  
19               “(3) \$33,075,000 for fiscal year 2025;  
20               “(4) \$34,728,750 for fiscal year 2026; and  
21               “(5) \$36,465,188 for fiscal year 2027.”.

22               (B) CLERICAL AMENDMENT.—The table of  
23          contents in section 1(b) of the National Quan-  
24          tum Initiative Act (Public Law 115–368; 132

1 Stat. 5092) is amended by inserting after the  
2 item relating to section 402 the following:

“Sec. 403. Department of Energy quantum network infrastructure research  
and development program.

“Sec. 404. Department of Energy quantum user expansion for science and  
technology program.”.

3 **SEC. 10105. FUSION ENERGY RESEARCH.**

4 (a) FUSION ENERGY RESEARCH.—Section 307 of the  
5 Department of Energy Research and Innovation Act (42  
6 U.S.C. 18645) is amended—

7 (1) in subsection (b)—

8 (A) in paragraph (2), by redesignating  
9 subparagraphs (A) and (B) as clauses (i) and  
10 (ii), respectively, and indenting appropriately;

11 (B) by redesignating paragraphs (1) and  
12 (2) as subparagraphs (A) and (B), respectively,  
13 and indenting appropriately;

14 (C) in the matter preceding subparagraph  
15 (A) (as so redesignated), by striking “As part  
16 of” and inserting the following:

17 “(1) IN GENERAL.—As part of”; and

18 (D) by adding at the end the following:

19 “(2) AUTHORIZATION OF APPROPRIATIONS.—

20 Out of funds authorized to be appropriated under  
21 subsection (q), there is authorized to be appro-  
22 priated to the Secretary to carry out activities de-

1 scribed in paragraph (1) \$50,000,000 for each of  
2 fiscal years 2023 through 2027.”;

3 (2) in subsection (d)(3)—

4 (A) by striking “(o)” and inserting “(q)”;

5 (B) by striking “subsection (d)” and in-  
6 sserting “this subsection”; and

7 (C) by striking “2025” and inserting  
8 “2027”;

9 (3) in subsection (e)(4)—

10 (A) by striking “(o)” and inserting “(q)”;

11 (B) by striking “subsection (e)” and in-  
12 sserting “this subsection”; and

13 (C) by striking “2025” and inserting  
14 “2027”;

15 (4) in subsection (i)(10)—

16 (A) in the matter preceding subparagraph

17 (A)—

18 (i) by striking “(o)” and inserting  
19 “(q)”;

20 (ii) by striking “subsection (i)” and  
21 inserting “this subsection”;

22 (B) in subparagraph (D), by striking  
23 “and” at the end;

1 (C) in subparagraph (E), by striking the  
2 period at the end and inserting a semicolon;  
3 and

4 (D) by adding at the end the following:

5 “(F) \$45,000,000 for fiscal year 2026; and

6 “(G) \$45,000,000 for fiscal year 2027.”;

7 (5) by striking subsection (j) and inserting the  
8 following:

9 “(j) FUSION REACTOR SYSTEM DESIGN.—

10 “(1) IN GENERAL.—Not later than 180 days  
11 after the date of enactment of the Research and De-  
12 velopment, Competition, and Innovation Act, the Di-  
13 rector shall establish not less than 2 national teams  
14 described in paragraph (2) that shall—

15 “(A) develop conceptual pilot plant designs  
16 and technology roadmaps; and

17 “(B) create an engineering design of a  
18 pilot plant that will bring fusion to commercial  
19 viability.

20 “(2) NATIONAL TEAMS.—A national team re-  
21 ferred to in paragraph (1) shall—

22 “(A) be composed of developers, manufac-  
23 turers, universities, National Laboratories, and  
24 representatives of the engineering, procurement,  
25 and construction industries; and

1 “(B) include public-private partnerships.

2 “(3) AUTHORIZATION OF APPROPRIATIONS.—Of  
3 the funds authorized to be appropriated for Fusion  
4 Energy Sciences in a fiscal year, there are author-  
5 ized to be appropriated to the Secretary to carry out  
6 this subsection—

7 “(A) \$35,000,000 for fiscal year 2023;

8 “(B) \$50,000,000 for fiscal year 2024;

9 “(C) \$65,000,000 for fiscal year 2025;

10 “(D) \$80,000,000 for fiscal year 2026;

11 and

12 “(E) \$80,000,000 for fiscal year 2027.”;

13 (6) by redesignating subsection (o) as sub-  
14 section (r);

15 (7) by inserting after subsection (n) the fol-  
16 lowing:

17 “(o) HIGH-PERFORMANCE COMPUTATION COLLABO-  
18 RATIVE RESEARCH PROGRAM.—

19 “(1) IN GENERAL.—The Secretary shall carry  
20 out a program to conduct and support collaborative  
21 research, development, and demonstration of fusion  
22 energy technologies, through high-performance com-  
23 putation modeling and simulation techniques, in  
24 order—



1           “(A) to support fundamental research in  
2           plasmas and matter at very high temperatures  
3           and densities;

4           “(B) to inform the development of a broad  
5           range of fusion energy systems; and

6           “(C) to facilitate the translation of re-  
7           search results in fusion energy science to indus-  
8           try.

9           “(2) COORDINATION.—In carrying out the pro-  
10          gram under paragraph (1), the Secretary shall co-  
11          ordinate with relevant Federal agencies, and  
12          prioritize the following objectives:

13           “(A) To use expertise from the private sec-  
14           tor, institutions of higher education, and the  
15           National Laboratories to leverage existing, and  
16           develop new, computational software and capa-  
17           bilities that prospective users may use to accel-  
18           erate research and development of fusion energy  
19           systems.

20           “(B) To develop computational tools to  
21           simulate and predict fusion energy science phe-  
22           nomena that may be validated through physical  
23           experimentation.

24           “(C) To increase the utility of the research  
25           infrastructure of the Department by coordi-

1 nating with the Advanced Scientific Computing  
2 Research program within the Office of Science.

3 “(D) To leverage experience from existing  
4 modeling and simulation entities sponsored by  
5 the Department.

6 “(E) To ensure that new experimental and  
7 computational tools are accessible to relevant  
8 research communities, including private sector  
9 entities engaged in fusion energy technology de-  
10 velopment.

11 “(F) To ensure that newly developed com-  
12 putational tools are compatible with modern vir-  
13 tual engineering and visualization capabilities to  
14 accelerate the realization of fusion energy tech-  
15 nologies and systems.

16 “(3) DUPLICATION.—The Secretary shall en-  
17 sure the coordination of, and avoid unnecessary du-  
18 plication of, the activities of the program under  
19 paragraph (1) with the activities of—

20 “(A) other research entities of the Depart-  
21 ment, including the National Laboratories, the  
22 Advanced Research Projects Agency—Energy,  
23 and the Advanced Scientific Computing Re-  
24 search program within the Office of Science;  
25 and

1 “(B) industry.

2 “(4) HIGH-PERFORMANCE COMPUTING FOR FU-  
3 SION INNOVATION CENTER.—

4 “(A) IN GENERAL.—In carrying out the  
5 program under paragraph (1), the Secretary  
6 shall, in coordination with the Innovation Net-  
7 work for Fusion Energy, establish and operate  
8 a national High-Performance Computing for  
9 Fusion Innovation Center (referred to in this  
10 paragraph as the ‘Center’), to support the pro-  
11 gram under paragraph (1) by providing, to the  
12 extent practicable, a centralized entity for mul-  
13 tidisciplinary, collaborative, fusion energy re-  
14 search and development through high-perform-  
15 ance computing and advanced data analytics  
16 technologies and processes.

17 “(B) ELIGIBLE ENTITIES.—An entity eligi-  
18 ble to serve as the Center shall be—

19 “(i) a National Laboratory;

20 “(ii) an institution of higher edu-  
21 cation;

22 “(iii) a multi-institutional collabora-  
23 tion; or

24 “(iv) any other entity that the Sec-  
25 retary determines to be appropriate.

1 “(C) APPLICATION; SELECTION.—

2 “(i) APPLICATION.—To be eligible to  
3 serve as the Center, an eligible entity shall  
4 submit to the Secretary an application at  
5 such time, in such manner, and containing  
6 such information as the Secretary may re-  
7 quire.

8 “(ii) SELECTION.—The Secretary  
9 shall select the Center on a competitive,  
10 merit-reviewed basis.

11 “(D) EXISTING ACTIVITIES.—The Center  
12 may incorporate existing research activities that  
13 are consistent with the program under para-  
14 graph (1).

15 “(E) PRIORITIES.—

16 “(i) IN GENERAL.—The Center shall  
17 prioritize activities that utilize expertise  
18 and infrastructure from a balance among  
19 the private sector, institutions of higher  
20 education, and the National Laboratories  
21 to enhance existing computation tools and  
22 develop new computational software and  
23 capabilities to accelerate the commercial  
24 application of fusion energy systems.

1                   “(ii) MAINTENANCE OF RESOURCE  
2                   AVAILABILITY.—The Secretary may enter  
3                   into contracts with commercial cloud com-  
4                   puting providers to ensure that resource  
5                   availability within the Department is not  
6                   reduced or disproportionately distributed  
7                   as a result of Center activities.

8                   “(F) DURATION.—Subject to subpara-  
9                   graph (G), the Center shall receive support for  
10                  a period of not more than 5 years, subject to  
11                  the availability of appropriations.

12                  “(G) RENEWAL.—On the expiration of the  
13                  period of support of the Center under subpara-  
14                  graph (F), the Secretary may renew support for  
15                  the Center, on a merit-reviewed basis, for a pe-  
16                  riod of not more than 5 years.

17                  “(p) MATERIAL PLASMA EXPOSURE EXPERIMENT.—

18                  “(1) IN GENERAL.—The Secretary shall con-  
19                  struct a Material Plasma Exposure Experiment fa-  
20                  cility as described in the 2020 publication approved  
21                  by the Fusion Energy Sciences Advisory Committee  
22                  entitled ‘Powering the Future: Fusion and Plasmas’.  
23                  The Secretary shall consult with the private sector,  
24                  institutions of higher education, National Labora-  
25                  tories, and relevant Federal agencies to ensure that

1 the facility is capable of meeting Federal research  
2 needs for steady state, high-heat-flux, and plasma-  
3 material interaction testing of fusion materials over  
4 a range of fusion energy relevant parameters.

5 “(2) FACILITY CAPABILITIES.—The Secretary  
6 shall ensure that the facility described in paragraph  
7 (1) will provide the following capabilities:

8 “(A) A magnetic field at the target of 1  
9 Tesla.

10 “(B) An energy flux at the target of 10  
11 MW/m<sup>2</sup>.

12 “(C) The ability to expose previously irra-  
13 diated plasma facing material samples to plas-  
14 ma.

15 “(3) START OF OPERATIONS.—The Secretary  
16 shall, subject to the availability of appropriations,  
17 ensure that the start of full operations of the facility  
18 described in paragraph (1) occurs before December  
19 31, 2027.

20 “(4) FUNDING.—Of the funds authorized to be  
21 appropriated for Fusion Energy Sciences, there are  
22 authorized to be appropriated to the Secretary for  
23 the Office of Fusion Energy Sciences to complete  
24 construction of the facility described in paragraph  
25 (1)—

1                   “(A) \$21,895,000 for fiscal year 2023; and

2                   “(B) \$3,800,000 for fiscal year 2024.

3           “(q) MATTER IN EXTREME CONDITIONS INSTRU-  
4 MENT UPGRADE.—

5                   “(1) IN GENERAL.—The Secretary shall provide  
6 for the upgrade to the Matter in Extreme Conditions  
7 endstation at the Linac Coherent Light Source as  
8 described in the 2020 publication approved by the  
9 Fusion Energy Sciences Advisory Committee entitled  
10 ‘Powering the Future: Fusion and Plasmas’. The  
11 Secretary shall consult with the private sector, insti-  
12 tutions of higher education, National Laboratories,  
13 and relevant Federal agencies to ensure that this fa-  
14 cility is capable of meeting Federal research needs  
15 for understanding physical and chemical changes to  
16 plasmas at fundamental timescales, and explore new  
17 regimes of dense material physics, astrophysics,  
18 planetary physics, and short-pulse laser-plasma  
19 interactions.

20                   “(2) START OF OPERATIONS.—The Secretary  
21 shall, subject to the availability of appropriations,  
22 ensure that the start of full operations of the facility  
23 described in paragraph (1) occurs before December  
24 31, 2028.”; and

25                   (8) in subsection (r) (as so redesignated)—

1 (A) by striking “There” and inserting  
2 “Out of funds authorized to be appropriated for  
3 the Office of Science in a fiscal year, there”;  
4 and

5 (B) by striking paragraphs (3) through (5)  
6 and inserting the following:

7 “(3) \$1,025,500,400 for fiscal year 2023;

8 “(4) \$1,043,489,724 for fiscal year 2024;

9 “(5) \$1,053,266,107 for fiscal year 2025;

10 “(6) \$1,047,962,074 for fiscal year 2026; and

11 “(7) \$1,114,187,798 for fiscal year 2027.”.

12 (b) ITER CONSTRUCTION.—Section 972(c)(3) of the  
13 Energy Policy Act of 2005 (42 U.S.C. 16312(c)(3)) is  
14 amended—

15 (1) in subparagraph (A), by striking “and” at  
16 the end; and

17 (2) by striking subparagraph (B) and inserting  
18 the following:

19 “(B) \$379,700,000 for fiscal year 2023;

20 “(C) \$419,250,000 for fiscal year 2024;

21 “(D) \$415,000,000 for fiscal year 2025;

22 “(E) \$370,500,000 for fiscal year 2026;

23 and

24 “(F) \$411,078,000 for fiscal year 2027.”.



1 **SEC. 10106. HIGH ENERGY PHYSICS PROGRAM.**

2 (a) PROGRAM.—Section 305 of the Department of  
3 Energy Research and Innovation Act (42 U.S.C. 18643)  
4 is amended—

5 (1) by redesignating subsections (b) through (d)  
6 as subsections (d) through (f), respectively; and

7 (2) by inserting after subsection (a) the fol-  
8 lowing:

9 “(b) PROGRAM.—As part of the activities authorized  
10 under section 209 of the Department of Energy Organiza-  
11 tion Act (42 U.S.C. 7139), the Director shall carry out  
12 a research program in elementary particle physics and ad-  
13 vanced technology research and development to improve  
14 the understanding of the fundamental properties of the  
15 universe, including constituents of matter and energy and  
16 the nature of space and time.

17 “(c) HIGH ENERGY FRONTIER RESEARCH.—As part  
18 of the program described in subsection (b), the Director  
19 shall carry out research using high energy accelerators  
20 and advanced detectors, including accelerators and detec-  
21 tors that will function as national user facilities, to create  
22 and study interactions of elementary particles and inves-  
23 tigate fundamental forces.”.

24 (b) INTERNATIONAL COLLABORATION.—Section 305  
25 of the Department of Energy Research and Innovation Act  
26 (42 U.S.C. 18643) is amended by striking subsection (d)

1 (as redesignated by subsection (a)(1)) and inserting the  
2 following:

3 “(d) INTERNATIONAL COLLABORATION.—The Direc-  
4 tor shall—

5 “(1) as practicable and in coordination with  
6 other appropriate Federal agencies as necessary, en-  
7 sure the access of United States researchers to the  
8 most advanced accelerator facilities and research ca-  
9 pabilities in the world, including the Large Hadron  
10 Collider;

11 “(2) to the maximum extent practicable, con-  
12 tinue to leverage United States participation in the  
13 Large Hadron Collider, and prioritize expanding  
14 international partnerships and investments in the  
15 Long-Baseline Neutrino Facility and Deep Under-  
16 ground Neutrino Experiment; and

17 “(3) to the maximum extent practicable,  
18 prioritize engagement in collaborative efforts in sup-  
19 port of future international facilities that would pro-  
20 vide access to the most advanced accelerator facili-  
21 ties in the world to United States researchers.”.

22 (c) COSMIC FRONTIER RESEARCH.—Section 305 of  
23 the Department of Energy Research and Innovation Act  
24 (42 U.S.C. 18645) is amended by striking subsection (f)

1 (as redesignated by subsection (a)(1)) and inserting the  
2 following:

3 “(f) COSMIC FRONTIER RESEARCH.—The Director  
4 shall carry out research activities on the nature of the pri-  
5 mary contents of the universe, including the nature of  
6 dark energy and dark matter. These activities shall, to the  
7 maximum extent practicable, be consistent with the re-  
8 search priorities identified by the High Energy Physics  
9 Advisory Panel or the National Academy of Sciences, and  
10 may include—

11 “(1) collaborations with the National Aero-  
12 nautics and Space Administration, the National  
13 Science Foundation, or international partners on rel-  
14 evant projects; and

15 “(2) the development of space-based, land-  
16 based, water-based, and underground facilities and  
17 experiments.”.

18 (d) FURTHER ACTIVITIES.—Section 305 of the De-  
19 partment of Energy Research and Innovation Act (42  
20 U.S.C. 18645) (as amended by subsection (c)), is amended  
21 by adding at the end the following:

22 “(g) FACILITY CONSTRUCTION AND MAJOR ITEMS  
23 OF EQUIPMENT.—

24 “(1) PROJECTS.—Consistent with the Office of  
25 Science’s project management practices, the Director

1 shall, to the maximum extent practicable, by incor-  
2 porating the findings and recommendations of the  
3 2014 Particle Physics Project Prioritization Panel  
4 (P5) report entitled ‘Building for Discovery’, sup-  
5 port construction or fabrication of—

6 “(A) an international Long-Baseline Neu-  
7 trino Facility based in the United States;

8 “(B) the Proton Improvement Plan II;

9 “(C) Second Generation Dark Matter ex-  
10 periments;

11 “(D) the Legacy Survey of Space and  
12 Time camera;

13 “(E) upgrades to detectors and other com-  
14 ponents of the Large Hadron Collider; and

15 “(F) the Cosmic Microwave Background  
16 Stage 4 project; and

17 “(G) other high priority projects rec-  
18 ommended in the most recent report of the Par-  
19 ticle Physics Project Prioritization Panel of the  
20 High Energy Physics Advisory Panel.

21 “(2) LONG-BASELINE NEUTRINO FACILITY.—

22 “(A) IN GENERAL.—The Secretary shall  
23 support construction of a Long-Baseline Neu-  
24 trino Facility to facilitate the international  
25 Deep Underground Neutrino Experiment to ex-

1 amine the fundamental properties of neutrinos,  
2 explore physics beyond the Standard Model,  
3 and better clarify the existence and nature of  
4 antimatter.

5 “(B) FACILITY CAPABILITIES.—The Sec-  
6 retary shall ensure that the facility described in  
7 subparagraph (A) will provide, at a minimum,  
8 the following capabilities:

9 “(i) A neutrino beam with wideband  
10 capability of 1.2 megawatts of beam power  
11 and upgradable to 2.4 megawatts of beam  
12 power.

13 “(ii) 3 caverns excavated for a 70 kil-  
14 oton fiducial detector mass and supporting  
15 surface buildings and utilities.

16 “(iii) Cryogenic systems to support  
17 neutrino detectors.

18 “(C) START OF OPERATIONS.—The Sec-  
19 retary shall, subject to the availability of appro-  
20 priations, ensure that the start of full oper-  
21 ations of the facility described in subparagraph  
22 (A) occurs before December 31, 2031.

23 “(D) FUNDING.—Out of funds authorized  
24 to be appropriated under subsection (k), there  
25 are authorized to be appropriated to the Sec-

1           retary to carry out construction of the project  
2           described in subparagraph (A)—

3                   “(i) \$180,000,000 for fiscal year  
4                   2023;

5                   “(ii) \$255,000,000 for fiscal year  
6                   2024;

7                   “(iii) \$305,000,000 for fiscal year  
8                   2025;

9                   “(iv) \$305,000,000 for fiscal year  
10                  2026; and

11                  “(v) \$305,000,000 for fiscal year  
12                  2027.

13                  “(3) PROTON IMPROVEMENT PLAN—II ACCEL-  
14                  ERATOR UPGRADE PROJECT.—

15                   “(A) IN GENERAL.—The Secretary shall  
16                   support construction of the Proton Improve-  
17                   ment Plan II, an upgrade to the Fermilab ac-  
18                   celerator complex identified in the 2014 Particle  
19                   Physics Project Prioritization Panel (P5) report  
20                   entitled ‘Building for Discovery’, to provide the  
21                   world’s most intense beam of neutrinos to the  
22                   international Long Baseline Neutrino Facility  
23                   and to carry out a broad range of future high  
24                   energy physics experiments. The Secretary shall  
25                   work with international partners to enable fur-

1           ther significant contributions to the capabilities  
2           of that project.

3           “(B) FACILITY CAPABILITIES.—The Sec-  
4           retary shall ensure that the facility described in  
5           subparagraph (A) will provide, at a minimum,  
6           the following capabilities:

7                   “(i)     A     state-of-the-art     800  
8                   megaelectron volt superconducting linear  
9                   accelerator.

10                   “(ii)  Proton beam power of 1.2  
11                   megawatts at the start of LBNF/DUNE,  
12                   upgradeable to 2.4 megawatts of beam  
13                   power.

14                   “(iii) A flexible design to enable high  
15                   power beam delivery to multiple users si-  
16                   multaneously and customized beams tai-  
17                   lored to specific scientific needs.

18                   “(iv) Sustained high reliability oper-  
19                   ation of the Fermilab accelerator complex.

20           “(C) START OF OPERATIONS.—The Sec-  
21           retary shall, subject to the availability of appro-  
22           priations, ensure that the start of full oper-  
23           ations of the facility described in subparagraph  
24           (A) occurs before December 31, 2028.

1           “(D) FUNDING.—Out of funds authorized  
2           to be appropriated under subsection (k), there  
3           are authorized to be appropriated to the Sec-  
4           retary to carry out construction of the facility  
5           described in subparagraph (A)—

6                   “(i) \$130,000,000 for fiscal year  
7                   2023;

8                   “(ii) \$120,000,000 for fiscal year  
9                   2024;

10                   “(iii) \$120,000,000 for fiscal year  
11                   2025;

12                   “(iv) \$115,000,000 for fiscal year  
13                   2026; and

14                   “(v) \$110,000,000 for fiscal year  
15                   2027.

16           “(4) COSMIC MICROWAVE BACKGROUND STAGE  
17           4.—

18                   “(A) IN GENERAL.—The Secretary, in  
19                   partnership with the Director of the National  
20                   Science Foundation, shall support construction  
21                   of the Cosmic Microwave Background Stage 4  
22                   project to survey the cosmic microwave back-  
23                   ground to test theories of cosmic inflation as  
24                   described in the 2014 Particle Physics  
25                   Prioritization Panel (P5) report entitled ‘Build-



1 ing for Discovery: Strategic Plan for U.S. Par-  
2 ticle Physics in the Global Context.’.

3 “(B) CONSULTATION.—The Secretary  
4 shall consult with the private sector, institutions  
5 of higher education, National Laboratories, and  
6 relevant Federal agencies to ensure that the  
7 project described in subparagraph (A) is capa-  
8 ble of meeting Federal research needs in access-  
9 ing the ultra-high energy physics of inflation  
10 and important neutrino properties.

11 “(C) EXPERIMENTAL CAPABILITIES.—The  
12 Secretary shall ensure to the maximum extent  
13 practicable that the facility described in sub-  
14 paragraph (A) will provide, at a minimum,  
15 500,000 superconducting detectors deployed on  
16 an array of millimeter-wave telescopes with the  
17 required range in frequency, sensitivity, and  
18 survey speed that will provide sufficient capa-  
19 bility to enable an order of magnitude advance  
20 in observations of the Cosmic Microwave Back-  
21 ground, delivering transformative discoveries in  
22 fundamental physics, cosmology, and astro-  
23 physics.

24 “(D) START OF OPERATIONS.—The Sec-  
25 retary shall, subject to the availability of appro-

1           priations, ensure that the start of full oper-  
2           ations of the facility described in subparagraph  
3           (A) occurs before December 31, 2030.

4           “(E) FUNDING.—Out of funds authorized  
5           to be appropriated under subsection (k), there  
6           are authorized to be appropriated to the Sec-  
7           retary to carry out construction of the facility  
8           described in subparagraph (A)—

9                   “(i) \$10,000,000 for fiscal year 2023;

10                   “(ii) \$25,000,000 for fiscal year 2024;

11                   “(iii) \$60,000,000 for fiscal year  
12                   2025;

13                   “(iv) \$80,000,000 for fiscal year  
14                   2026; and

15                   “(v) \$80,000,000 for fiscal year 2027.

16           “(h) ACCELERATOR AND DETECTOR UPGRADES.—

17   The Director shall upgrade accelerator facilities and detec-  
18   tors, as necessary and appropriate, to increase beam  
19   power, sustain high reliability, and improve precision  
20   measurement to advance the highest priority particle phys-  
21   ics research programs. In carrying out facility upgrades,  
22   the Director shall continue to work with international  
23   partners, when appropriate and in the United States’ in-  
24   terest, to leverage investments and expertise in critical

1 technologies to help build and upgrade accelerator and de-  
2 tector facilities in the United States.

3 “(i) ACCELERATOR AND DETECTOR RESEARCH AND  
4 DEVELOPMENT.—As part of the program described in  
5 subsection (b), the Director shall carry out research and  
6 development in particle beam physics, accelerator science  
7 and technology, and particle and radiation detection with  
8 relevance to the specific needs of the High Energy Physics  
9 program, in coordination with the Accelerator Research  
10 and Development program authorized under section 310.

11 “(j) UNDERGROUND SCIENCE.—The Director shall—

12 “(1) support an underground science program  
13 consistent with the missions of the Department and  
14 the scientific needs of the High Energy Physics pro-  
15 gram, including those articulated in the most recent  
16 report of the Particle Physics Project Prioritization  
17 Panel of the High Energy Physics Advisory Panel,  
18 that leverages the capabilities of relevant under-  
19 ground science and engineering facilities;

20 “(2) carry out a competitive grant program to  
21 award scientists and engineers at institutions of  
22 higher education, nonprofit institutions, and Na-  
23 tional Laboratories to conduct research in under-  
24 ground science and engineering; and

1           “(3) submit to the Committee on Energy and  
2           Natural Resources of the Senate and the Committee  
3           on Science, Space, and Technology of the House of  
4           Representatives a report on the inventory of under-  
5           ground mines in the United States that may be suit-  
6           able for future development of underground science  
7           and engineering facilities and any anticipated chal-  
8           lenges associated with repurposing, repair, facility  
9           siting, or construction.

10          “(k) AUTHORIZATION OF APPROPRIATIONS.—Out of  
11 funds authorized to be appropriated for the Office of  
12 Science in a fiscal year, there are authorized to be appro-  
13 priated to the Secretary to carry out the activities de-  
14 scribed in this section—

15           “(1) \$1,159,520,000 for fiscal year 2023;

16           “(2) \$1,289,891,200 for fiscal year 2024;

17           “(3) \$1,428,284,672 for fiscal year 2025;

18           “(4) \$1,499,881,752 for fiscal year 2026; and

19           “(5) \$1,554,874,657 for fiscal year 2027.”.

20 **SEC. 10107. NUCLEAR PHYSICS PROGRAM.**

21          Section 308 of the Department of Energy Research  
22 and Innovation Act (Public Law 115–246; 132 Stat.  
23 3150) is amended to read as follows:

1 **“SEC. 308. NUCLEAR PHYSICS.**

2 “(a) PROGRAM.—As part of the activities authorized  
3 under section 209 of the Department of Energy Organiza-  
4 tion Act (42 U.S.C. 7139), the Director shall carry out  
5 a research program, and support relevant facilities, to dis-  
6 cover and understand various forms of nuclear matter.

7 “(b) ELECTRON ION COLLIDER.—

8 “(1) IN GENERAL.—The Secretary shall sup-  
9 port construction of an Electron Ion Collider as de-  
10 scribed in the 2015 Long Range Plan of the Nuclear  
11 Science Advisory Committee and the report from the  
12 National Academies of Science, Engineering, and  
13 Medicine entitled ‘An Assessment of U.S.-Based  
14 Electron-Ion Collider Science’, in order to measure  
15 the internal structure of the proton and the nucleus  
16 and answer fundamental questions about the nature  
17 of visible matter.

18 “(2) FACILITY CAPABILITY.—The Secretary  
19 shall ensure that the facility described in paragraph  
20 (1) meets the requirements in the 2015 Long Range  
21 Plan described in that paragraph, including—

22 “(A) at least 70 percent polarized beams  
23 of electrons and light ions;

24 “(B) ion beams from deuterium to the  
25 heaviest stable nuclei;

1                   “(C) variable center of mass energy from  
2                   20 to 140 GeV;

3                   “(D) high collision luminosity of  
4                    $10^{33-34}\text{cm}^{-2}\text{s}^{-1}$ ; and

5                   “(E) the possibility of more than 1 inter-  
6                   action region.

7                   “(3) START OF OPERATIONS.—The Secretary  
8                   shall, subject to the availability of appropriations,  
9                   ensure that the start of full operations of the facility  
10                  under this subsection occurs before December 31,  
11                  2030.

12                  “(4) FUNDING.—Out of funds authorized to be  
13                  appropriated under subsection (c), there are author-  
14                  ized to be appropriated to the Secretary to carry out  
15                  construction of the facility under this subsection—

16                         “(A) \$90,000,000 for fiscal year 2023;

17                         “(B) \$181,000,000 for fiscal year 2024;

18                         “(C) \$219,000,000 for fiscal year 2025;

19                         “(D) \$297,000,000 for fiscal year 2026;

20                         and

21                         “(E) \$301,000,000 for fiscal year 2027.

22                  “(c) AUTHORIZATION OF APPROPRIATIONS.—Out of  
23                  funds authorized to be appropriated for the Office of  
24                  Science in a fiscal year, there are authorized to be appro-

1 priated to the Secretary to carry out the activities de-  
2 scribed in this section—

3 “(1) \$840,480,000 for fiscal year 2023;

4 “(2) \$976,508,800 for fiscal year 2024;

5 “(3) \$1,062,239,328 for fiscal year 2025;

6 “(4) \$1,190,833,688 for fiscal year 2026; and

7 “(5) \$1,248,463,709 for fiscal year 2027.”.

8 **SEC. 10108. SCIENCE LABORATORIES INFRASTRUCTURE**  
9 **PROGRAM.**

10 Section 309 of the Department of Energy Research  
11 and Innovation Act (42 U.S.C. 18647) is amended by add-  
12 ing at the end the following:

13 “(c) APPROACH.—In carrying out the program under  
14 subsection (a), the Director shall use all available ap-  
15 proaches and mechanisms, as the Secretary determines to  
16 be appropriate, including—

17 “(1) capital line items;

18 “(2) minor construction projects;

19 “(3) energy savings performance contracts;

20 “(4) utility energy service contracts;

21 “(5) alternative financing; and

22 “(6) expense funding.

23 “(d) SUBMISSION TO CONGRESS.—For each fiscal  
24 year through fiscal year 2027, at the same time as the  
25 annual budget submission of the President, the Secretary

1 shall submit to the Committee on Appropriations and the  
2 Committee on Energy and Natural Resources of the Sen-  
3 ate and the Committee on Appropriations and the Com-  
4 mittee on Science, Space, and Technology of the House  
5 of Representatives a list of projects for which the Sec-  
6 retary will provide funding under this section, including  
7 a description of each project and the funding profile for  
8 the project.

9 “(e) **AUTHORIZATION OF APPROPRIATIONS.**—Out of  
10 funds authorized to be appropriated for the Office of  
11 Science in a fiscal year, there is authorized to be appro-  
12 priated to the Secretary to carry out the activities de-  
13 scribed in this section \$550,000,000 for each of fiscal  
14 years 2023 through 2027.”.

15 **SEC. 10109. ACCELERATOR RESEARCH AND DEVELOPMENT.**

16 The Department of Energy Research and Innovation  
17 Act (42 U.S.C. 18601 et seq.) is amended by adding at  
18 the end the following:

19 **“SEC. 310. ACCELERATOR RESEARCH AND DEVELOPMENT.**

20 “(a) **PROGRAM.**—As part of the activities authorized  
21 under section 209 of the Department of Energy Organiza-  
22 tion Act (42 U.S.C. 7139), the Director shall carry out  
23 a research program—



1           “(1) to advance accelerator science and tech-  
2           nology relevant to the Department, other Federal  
3           agencies, and United States industry;

4           “(2) to foster partnerships to develop, dem-  
5           onstrate, and enable the commercial application of  
6           accelerator technologies;

7           “(3) to support the development of a skilled, di-  
8           verse, and inclusive accelerator workforce; and

9           “(4) to provide access to accelerator design and  
10          engineering resources.

11          “(b) ACCELERATOR RESEARCH.—In carrying out the  
12          program authorized under subsection (a), the Director  
13          shall support—

14                 “(1) research activities in cross-cutting accel-  
15                 erator technologies including superconducting  
16                 magnets and accelerators, beam physics, data ana-  
17                 lytics-based accelerator controls, simulation software,  
18                 new particle sources, advanced laser technology, and  
19                 transformative research; and

20                 “(2) optimal operation of the Accelerator Test  
21                 Facility.

22          “(c) ACCELERATOR DEVELOPMENT.—In carrying out  
23          the program authorized under subsection (a), the Director  
24          shall support partnerships to foster the development, dem-  
25          onstration, and commercial application of accelerator tech-

1 nologies, including advanced superconducting wire and  
2 cable, superconducting RF cavities, and high efficiency ra-  
3 diofrequency power sources for accelerators.

4 “(d) RESEARCH COLLABORATIONS.—In developing  
5 accelerator technologies under the program authorized  
6 under subsection (a), the Director shall—

7 “(1) consider the requirements necessary to  
8 support translational research and development for  
9 medical, industrial, security, and defense applica-  
10 tions; and

11 “(2) leverage investments in accelerator tech-  
12 nologies and fundamental research in particle phys-  
13 ics by partnering with institutions of higher edu-  
14 cation, industry, and other Federal agencies to en-  
15 able the commercial application of advanced accel-  
16 erator technologies.

17 “(e) AUTHORIZATION OF APPROPRIATIONS.—Out of  
18 funds authorized to be appropriated for the Office of  
19 Science in a fiscal year, there are authorized to be appro-  
20 priated to the Secretary to carry out the activities de-  
21 scribed in this section—

22 “(1) \$19,080,000 for fiscal year 2023;

23 “(2) \$20,224,800 for fiscal year 2024;

24 “(3) \$21,438,288 for fiscal year 2025;

25 “(4) \$22,724,585 for fiscal year 2026; and

1 “(5) \$24,088,060 for fiscal year 2027.”.

2 **SEC. 10110. ISOTOPE RESEARCH, DEVELOPMENT, AND PRO-**  
3 **DUCTION.**

4 (a) IN GENERAL.—The Department of Energy Re-  
5 search and Innovation Act (42 U.S.C. 18601 et seq.) is  
6 amended by adding after section 310 (as added by section  
7 10109) the following:

8 **“SEC. 311. ISOTOPE RESEARCH, DEVELOPMENT, AND PRO-**  
9 **DUCTION.**

10 “(a) DEFINITION OF CRITICAL RADIOACTIVE AND  
11 STABLE ISOTOPE.—

12 “(1) IN GENERAL.—In this section, the term  
13 ‘critical radioactive and stable isotope’ means a ra-  
14 dioactive and stable isotope—

15 “(A) the domestic commercial production  
16 of which is unavailable or inadequate to satisfy  
17 the demand of research, medical, industrial, or  
18 related industries in the United States; and

19 “(B) the supply of which is augmented  
20 through—

21 “(i) Department production; or

22 “(ii) foreign suppliers.

23 “(2) EXCLUSION.—In this section, the term  
24 ‘critical radioactive and stable isotope’ does not in-  
25 clude the medical isotope molybdenum-99, the pro-

1       duction and supply of which is addressed in the  
2       American Medical Isotopes Production Act of 2012  
3       (Public Law 112–239; 126 Stat. 2211) (including  
4       the amendments made by that Act).

5       “(b) PROGRAM.—The Director shall—

6               “(1) carry out, in coordination with other rel-  
7       evant programs across the Department, a pro-  
8       gram—

9               “(A) for the production of critical radio-  
10       active and stable isotopes, including the devel-  
11       opment of techniques to produce isotopes, that  
12       the Secretary determines are needed and of suf-  
13       ficient quality and quantity for research, med-  
14       ical, industrial, or related purposes;

15              “(B) for the production of critical radio-  
16       active and stable isotopes that are in short sup-  
17       ply or projected to be in short supply in the fu-  
18       ture, including byproducts, surplus materials,  
19       and related isotope services;

20              “(C) to maintain and enhance the infra-  
21       structure required to produce and supply crit-  
22       ical radioactive and stable isotope products and  
23       related services;

24              “(D) to conduct research and development  
25       on new and improved isotope production and

1 processing techniques that can make critical ra-  
2 dioactive and stable isotopes available for re-  
3 search and application as soon as possible while  
4 assisting in workforce development;

5 “(E) to reduce domestic dependency on the  
6 foreign supply of critical radioactive and stable  
7 isotopes to ensure national preparedness; and

8 “(F) to the maximum extent practicable,  
9 in accordance with—

10 “(i) evidence-based reports, such as  
11 the 2015 report of the Nuclear Science Ad-  
12 visory Committee entitled ‘Meeting Isotope  
13 Needs and Capturing Opportunities for the  
14 Future’; and

15 “(ii) assessments of isotope supply  
16 chains, including the assessment described  
17 in paragraph (3), any reports submitted  
18 pursuant to subsection (d), and other cur-  
19 rent and future assessments;

20 “(2) ensure that isotope production activities  
21 carried out under this subsection are consistent with  
22 the statement of policy entitled ‘Policies and Proce-  
23 dures for Transfer of Commercial Radioisotope Pro-  
24 duction and Distribution to Private Industry’ (30  
25 Fed. Reg. 3247 (March 9, 1965));

1           “(3) assess the domestic requirements of cur-  
2           rent and emerging critical radioactive and stable iso-  
3           topes and associated applications, including by con-  
4           sulting end-users, to identify areas that may require  
5           Federal investment for expedited development of do-  
6           mestic production capacity for those isotopes, includ-  
7           ing through public-private partnerships, as appro-  
8           priate;

9           “(4) ensure that actions taken by the Depart-  
10          ment do not interfere with, delay, compete with, or  
11          otherwise adversely affect efforts by the private sec-  
12          tor to make available or otherwise facilitate the sup-  
13          ply of critical radioactive and stable isotopes, includ-  
14          ing efforts under existing agreements between the  
15          Department or contractors of the Department and  
16          the private sector; and

17          “(5) in coordination with the Assistant Sec-  
18          retary for Nuclear Energy, assess options for dem-  
19          onstrating the production of critical radioactive and  
20          stable isotopes in research, test, or commercial nu-  
21          clear reactors and accelerators, including reactors  
22          and accelerators operated at universities.

23          “(c) ADVISORY COMMITTEE.—

24          “(1) IN GENERAL.—Not later than 90 days  
25          after the date of enactment of this section, the Sec-

1       retary shall establish an advisory committee (re-  
2       ferred to in this subsection as the ‘committee’) in  
3       alignment with the program established under sub-  
4       section (b)—

5               “(A) to carry out the activities previously  
6       executed as part of the Isotope Subcommittee  
7       of the Nuclear Science Advisory Committee;  
8       and

9               “(B) to provide expert advice and assist-  
10      ance to the Director in carrying out that pro-  
11      gram.

12      “(2) REPORT.—

13              “(A) IN GENERAL.—Not later than 1 year  
14      after the committee is established, the com-  
15      mittee shall—

16              “(i) update the 2015 Nuclear Science  
17      Advisory Committee Isotopes Sub-  
18      committee Report entitled ‘Meeting Isotope  
19      Needs and Capturing Opportunities for the  
20      Future’; and

21              “(ii) periodically update that report  
22      thereafter as needed.

23              “(B) INCLUSIONS.—An updated report  
24      under subparagraph (A) shall include an assess-  
25      ment of—

1                   “(i) current demand in the United  
2 States for critical radioactive and stable  
3 isotopes;

4                   “(ii) the impact of continued reliance  
5 on foreign supply of critical radioactive  
6 and stable isotopes;

7                   “(iii) proposed mitigation strategies,  
8 including increasing domestic production  
9 sources for critical radioactive and stable  
10 isotopes, that—

11                   “(I) are not commercially avail-  
12 able; or

13                   “(II) are commercially produced  
14 in quantities that are not sufficient—

15                   “(aa) to satisfy domestic de-  
16 mand; and

17                   “(bb) to minimize produc-  
18 tion constraints and supply dis-  
19 ruptions to the United States  
20 healthcare and industrial isotope  
21 industries;

22                   “(iv) current facilities, including up-  
23 grades to those facilities, and new facilities  
24 needed to meet domestic critical isotope  
25 needs; and



1 “(v) workforce development needs.

2 “(3) NONDUPLICATION.—The committee shall  
3 work in alignment with, and shall not duplicate the  
4 efforts of, preexisting advisory committees that are  
5 advising the program established under subsection  
6 (b).

7 “(4) FACA.—The committee shall be subject to  
8 the Federal Advisory Committee Act (5 U.S.C.  
9 App.).

10 “(d) REPORT.—

11 “(1) IN GENERAL.—Not later than the end of  
12 the first fiscal year beginning after the date of en-  
13 actment of this section, and biennially thereafter,  
14 the Secretary of Energy Advisory Board shall sub-  
15 mit to the Committees on Energy and Natural Re-  
16 sources and Environment and Public Works of the  
17 Senate and the Committees on Science, Space, and  
18 Technology and Energy and Commerce of the House  
19 of Representatives a report describing the progress  
20 made under the program established under sub-  
21 section (b) during the preceding 2 fiscal years.

22 “(2) INCLUSIONS.—Each report under para-  
23 graph (1) shall include—

1           “(A) an updated assessment of any critical  
2 radioactive and stable isotope shortages in the  
3 United States;

4           “(B) a description of—

5               “(i) any disruptions in the inter-  
6 national supply of critical radioactive and  
7 stable isotopes during the preceding 2 fis-  
8 cal years; and

9               “(ii) the impact of those disruptions  
10 on related activities; and

11           “(C)(i) a projection of anticipated disrup-  
12 tions in the international supply, or supply con-  
13 straints, of critical radioactive and stable iso-  
14 topes during the next 2 fiscal years; and

15               “(ii) the anticipated impact of those dis-  
16 ruptions or constraints, as applicable, on re-  
17 lated domestic activities.

18           “(e) AUTHORIZATION OF APPROPRIATIONS.—Out of  
19 funds authorized to be appropriated for the Office of  
20 Science in a fiscal year, there are authorized to be appro-  
21 priated to the Secretary to carry out this section—

22               “(1) \$175,708,000 for fiscal year 2023;

23               “(2) \$196,056,480 for fiscal year 2024;

24               “(3) \$215,759,869 for fiscal year 2025;

25               “(4) \$200,633,461 for fiscal year 2026; and

1 “(5) \$146,293,469 for fiscal year 2027.”.

2 (b) DEMONSTRATION OF ISOTOPE PRODUCTION.—

3 Section 952(a) of the Energy Policy Act of 2005 (42

4 U.S.C. 16272(a)) is amended—

5 (1) by redesignating paragraph (2) as para-

6 graph (4) and moving the paragraph so as to appear

7 after paragraph (3); and

8 (2) by inserting after paragraph (1) the fol-

9 lowing:

10 “(2) ISOTOPE DEMONSTRATION EVALUATION.—

11 “(A) IN GENERAL.—Not later than 1 year

12 after the date of enactment of the Research and

13 Development, Competition, and Innovation Act,

14 the Secretary, acting through the Assistant Sec-

15 retary for Nuclear Energy, shall evaluate the

16 technical and economic feasibility of the estab-

17 lishment of an isotope demonstration subpro-

18 gram of the program established under para-

19 graph (1) to support the development and com-

20 mercial demonstration of critical radioactive

21 and stable isotope production in existing com-

22 mercial nuclear power plants.

23 “(B) CONSULTATION.—The Secretary, act-

24 ing through the Assistant Secretary for Nuclear

25 Energy, shall consult with the Director of the

1 Office of Science in carrying out the evaluation  
2 under subparagraph (A).

3 “(C) DEFINITION OF CRITICAL RADIO-  
4 ACTIVE AND STABLE ISOTOPE.—In this para-  
5 graph, the term ‘critical radioactive and stable  
6 isotope’ has the meaning given the term in sec-  
7 tion 311(a) of the Department of Energy Re-  
8 search and Innovation Act.”.

9 (e) RADIOISOTOPE PROCESSING FACILITY.—

10 (1) IN GENERAL.—The Secretary of Energy  
11 (referred to in this subsection as “the Secretary”)  
12 shall construct a radioisotope processing facility to  
13 provide for the growing radiochemical processing ca-  
14 pability needs associated with the production of crit-  
15 ical radioactive isotopes authorized under section  
16 311 of the Department of Energy Research and In-  
17 novation Act.

18 (2) FUNDING.—Out of funds authorized to be  
19 appropriated under section 311(e) of the Depart-  
20 ment of Energy Research and Innovation Act, there  
21 are authorized to be appropriated to the Secretary  
22 to carry out this subsection—

23 (A) \$30,500,000 for fiscal year 2023;

24 (B) \$75,000,000 for fiscal year 2024;

25 (C) \$105,000,000 for fiscal year 2025;

1 (D) \$83,000,000 for fiscal year 2026; and

2 (E) \$43,000,000 for fiscal year 2027.

3 (d) STABLE ISOTOPE PRODUCTION AND RESEARCH

4 CENTER.—

5 (1) IN GENERAL.—The Secretary of Energy

6 (referred to in this subsection as “the Secretary”)

7 shall establish a stable isotope production and re-

8 search center—

9 (A) to expand the ability of the United

10 States to perform multiple stable isotope pro-

11 duction campaigns at large-scale production, as

12 authorized under section 311 of the Depart-

13 ment of Energy Research and Innovation Act;

14 (B) to mitigate the dependence of the

15 United States on foreign-produced stable iso-

16 topes;

17 (C) to promote economic resilience; and

18 (D) to conduct research and development

19 on stable isotope production and associated

20 methods and technology.

21 (2) FUNDING.—Out of funds authorized to be

22 appropriated under section 311(e) of the Depart-

23 ment of Energy Research and Innovation Act, there

24 are authorized to be appropriated to the Secretary

25 to carry out this subsection—

- 1 (A) \$74,400,000 for fiscal year 2023;  
2 (B) \$46,000,000 for fiscal year 2024;  
3 (C) \$31,200,000 for fiscal year 2025;  
4 (D) \$33,300,000 for fiscal year 2026; and  
5 (E) \$13,900,000 for fiscal year 2027.

6 **SEC. 10111. INCREASED COLLABORATION WITH TEACHERS**  
7 **AND SCIENTISTS.**

8 (a) IN GENERAL.—The Department of Energy Re-  
9 search and Innovation Act (42 U.S.C. 18601 et seq.) is  
10 amended by adding after section 311 (as added by section  
11 10110), the following:

12 **“SEC. 312. INCREASED COLLABORATION WITH TEACHERS**  
13 **AND SCIENTISTS.**

14 “The Director shall support the development of a sci-  
15 entific workforce through programs that facilitate collabo-  
16 ration between and among teachers at elementary schools  
17 and secondary schools served by local educational agen-  
18 cies, students at institutions of higher education, early-  
19 career researchers, faculty at institutions of higher edu-  
20 cation, and the National Laboratories, including through  
21 the use of proven techniques to expand the number of indi-  
22 viduals from underrepresented groups pursuing and at-  
23 taining skills or undergraduate and graduate degrees rel-  
24 evant to the mission of the Office of Science.”.

1 (b) AUTHORIZATION OF APPROPRIATIONS.—Section  
2 3169 of the Department of Energy Science Education En-  
3 hancement Act (42 U.S.C. 7381e) is amended—

4 (1) by striking “There are” and inserting “Out  
5 of funds authorized to be appropriated for the Office  
6 of Science of the Department of Energy in a fiscal  
7 year, there are”; and

8 (2) by striking “fiscal year 1991” and inserting  
9 “each of fiscal years 2023 through 2027”.

10 (c) BROADENING PARTICIPATION IN WORKFORCE  
11 DEVELOPMENT FOR TEACHERS AND SCIENTISTS.—

12 (1) IN GENERAL.—The Department of Energy  
13 Science Education Enhancement Act is amended by  
14 inserting after section 3167 (42 U.S.C. 7381e–1)  
15 the following:

16 **“SEC. 3167A. BROADENING PARTICIPATION FOR TEACHERS**  
17 **AND SCIENTISTS.**

18 “(a) IN GENERAL.—The Secretary shall—

19 “(1) expand opportunities to increase the num-  
20 ber of highly skilled science, technology, engineering,  
21 and mathematics (STEM) professionals working in  
22 disciplines relevant to the mission of the Depart-  
23 ment; and

24 “(2) broaden the recruitment pool to increase  
25 participation from Historically Black Colleges or

1 Universities (as defined in section 3167B(f)), His-  
2 panic-serving institutions (as defined in that sec-  
3 tion), Tribal Colleges or Universities (as defined in  
4 that section), minority-serving institutions (as de-  
5 fined in that section), institutions in eligible jurisdic-  
6 tions (as defined in that section), emerging research  
7 institutions, community colleges, and scientific soci-  
8 eties in those disciplines.

9 “(b) PLAN.—Not later than 1 year after the date of  
10 enactment of the Research and Development, Competition,  
11 and Innovation Act, the Secretary shall submit to the  
12 Committee on Science, Space, and Technology of the  
13 House of Representatives and the Committees on Energy  
14 and Natural Resources and Commerce, Science, and  
15 Transportation of the Senate and make available to the  
16 public a plan for broadening participation of underrep-  
17 resented groups in science, technology, engineering, and  
18 mathematics in programs supported by the Department,  
19 including—

20 “(1) a plan for supporting relevant Federal re-  
21 search award grantees and leveraging the National  
22 Science Foundation INCLUDES National Network  
23 and relevant partnerships, including partnerships  
24 maintained by other Federal research agencies;



1 “(2) metrics for assessing the participation of  
 2 underrepresented groups in programs supported by  
 3 the Department;

4 “(3) experienced and potential barriers to  
 5 broadening participation of underrepresented groups  
 6 in programs supported by the Department, including  
 7 recommended solutions; and

8 “(4) any other activities the Secretary deter-  
 9 mines appropriate.

10 “(c) AUTHORIZATION OF APPROPRIATIONS.—Of the  
 11 amounts authorized to be appropriated under section  
 12 3169, not less than \$2,000,000 is authorized to be appro-  
 13 priated each fiscal year for the activities described in this  
 14 section.

15 **“SEC. 3167B. EXPANDING OPPORTUNITIES FOR HIGHLY**  
 16 **SKILLED SCIENCE, TECHNOLOGY, ENGINEER-**  
 17 **ING, AND MATHEMATICS (STEM) PROFES-**  
 18 **SIONALS.**

19 “(a) IN GENERAL.—The Secretary shall—

20 “(1) expand opportunities and increase the  
 21 number of highly skilled science, technology, engi-  
 22 neering, and mathematics (STEM) professionals  
 23 working in disciplines relevant to the mission of the  
 24 Department; and

1           “(2) broaden the recruitment pool to increase  
2 participation from and expand partnerships with  
3 Historically Black Colleges or Universities, Hispanic  
4 serving institutions, Tribal Colleges or Universities,  
5 minority-serving institutions, institutions in eligible  
6 jurisdictions, emerging research institutions, commu-  
7 nity colleges, and scientific societies in those dis-  
8 ciplines.

9           “(b) PLAN AND OUTREACH STRATEGY.—

10           “(1) PLAN.—

11           “(A) IN GENERAL.—Not later than 180  
12 days after the date of enactment of the Re-  
13 search and Development, Competition, and In-  
14 novation Act, the Secretary shall submit to the  
15 Committee on Science, Space, and Technology  
16 of the House of Representatives and the Com-  
17 mittee on Energy and Natural Resources of the  
18 Senate a 10-year educational plan to fund and  
19 expand new or existing programs administered  
20 by the Office of Science and sited at the Na-  
21 tional Laboratories and Department user facili-  
22 ties to expand educational and workforce devel-  
23 opment opportunities for underrepresented indi-  
24 viduals, including—

1                   “(i) high school, undergraduate, and  
2                   graduate students; and

3                   “(ii) recent graduates, teachers, and  
4                   faculty in STEM fields.

5                   “(B) CONTENTS.—The plan under sub-  
6                   paragraph (A) may include paid internships,  
7                   fellowships, temporary employment, training  
8                   programs, visiting student and faculty pro-  
9                   grams, sabbaticals, and research support.

10                  “(2) OUTREACH CAPACITY.—The Secretary  
11                  shall include in the plan under paragraph (1) an  
12                  outreach strategy to improve the advertising, recruit-  
13                  ment, and promotion of educational and workforce  
14                  development programs to community colleges, His-  
15                  torically Black Colleges or Universities, Hispanic-  
16                  serving institutions, Tribal Colleges or Universities,  
17                  minority-serving institutions, institutions in eligible  
18                  jurisdictions, and emerging research institutions.

19                  “(c) BUILDING RESEARCH CAPACITY.—

20                  “(1) IN GENERAL.—The Secretary shall develop  
21                  programs that strengthen the research capacity rel-  
22                  evant to Office of Science disciplines at emerging re-  
23                  search institutions, including minority-serving insti-  
24                  tutions, Tribal Colleges or Universities, Historically  
25                  Black Colleges or Universities, institutions in eligible

1 jurisdictions (as defined in section 2203(b)(3)(A) of  
2 the Energy Policy Act of 1992 (42 U.S.C.  
3 13503(b)(3)(A))), institutions in communities with  
4 dislocated workers who were previously employed in  
5 manufacturing, energy production, including coal  
6 power plants, and mineral and material mining, and  
7 other institutions of higher education.

8 “(2) INCLUSIONS.—The programs developed  
9 under paragraph (1) may include—

10 “(A) enabling mutually beneficial and  
11 jointly managed partnerships between research-  
12 intensive institutions and emerging research in-  
13 stitutions; and

14 “(B) soliciting research proposals, fellow-  
15 ships, training programs, and research support  
16 directly from emerging research institutions.

17 “(d) TRAINEESHIPS.—

18 “(1) IN GENERAL.—The Secretary shall estab-  
19 lish a university-led Traineeship Program to address  
20 workforce development needs in STEM fields rel-  
21 evant to the Department.

22 “(2) FOCUS.—The focus of the Traineeship  
23 Program established under paragraph (1) shall be  
24 on—

1           “(A) supporting workforce development  
2           and research experiences for underrepresented  
3           undergraduate and graduate students; and

4           “(B) increasing participation from under-  
5           represented populations.

6           “(3) INCLUSION.—The traineeships under the  
7           Traineeship Program established under paragraph  
8           (1) shall include opportunities to build the next-gen-  
9           eration workforce in research areas critical to main-  
10          taining core competencies across the programs of the  
11          Office of Science.

12          “(e) EVALUATION.—

13           “(1) IN GENERAL.—The Secretary shall estab-  
14          lish key performance indicators to measure and  
15          monitor progress of education and workforce pro-  
16          grams and expand Departmental activities for data  
17          collection and analysis.

18           “(2) REPORT.—Not later than 2 years after the  
19          date of enactment of the Research and Development,  
20          Competition, and Innovation Act, and every 2 years  
21          thereafter, the Secretary shall submit to the Com-  
22          mittee on Science, Space, and Technology and the  
23          Committee on Education and Labor of the House of  
24          Representatives and the Committee on Energy and  
25          Natural Resources and the Committee on Health,

1 Education, Labor, and Pensions of the Senate a re-  
2 port summarizing progress toward meeting the key  
3 performance indicators established under paragraph  
4 (1).

5 “(f) DEFINITIONS.—In this section:

6 “(1) COMMUNITY COLLEGE.—The term ‘com-  
7 munity college’ means—

8 “(A) a public institution of higher edu-  
9 cation, including additional locations, at which  
10 the highest awarded degree, or the predomi-  
11 nantly awarded degree, is an associate degree;  
12 or

13 “(B) any Tribal college or university.

14 “(2) DISLOCATED WORKER.—The term ‘dis-  
15 located worker’ has the meaning given the term in  
16 section 3 of the Workforce Innovation and Oppor-  
17 tunity Act (29 U.S.C. 3102).

18 “(3) HISPANIC-SERVING INSTITUTION.—The  
19 term ‘Hispanic-serving institution’ has the meaning  
20 given the term in section 502(a) of the Higher Edu-  
21 cation Act of 1965 (20 U.S.C. 1101a(a)).

22 “(4) HISTORICALLY BLACK COLLEGE OR UNI-  
23 VERSITY.—The term ‘Historically Black College or  
24 University’ has the meaning given the term ‘part B

1 institution' in section 322 of the Higher Education  
2 Act of 1965 (20 U.S.C. 1061).

3 “(5) INSTITUTION IN AN ELIGIBLE JURISDIC-  
4 TION.—The term ‘institution in an eligible jurisdic-  
5 tion’ means an institution of higher education (as  
6 defined in section 101 of the Higher Education Act  
7 of 1965 (20 U.S.C. 1001)) that is located in an eli-  
8 gible jurisdiction (as defined in section  
9 2203(b)(3)(A) of the Energy Policy Act of 1992 (42  
10 U.S.C. 13503(b)(3)(A))).

11 “(6) MINORITY-SERVING INSTITUTION.—The  
12 term ‘minority-serving institution’ includes the enti-  
13 ties described in any of paragraphs (1) through (7)  
14 of section 371(a) of the Higher Education Act of  
15 1965 (20 U.S.C. 1067q(a)).

16 “(7) STEM.—The term ‘STEM’ means the  
17 subjects listed in section 2 of the STEM Education  
18 Act of 2015 (42 U.S.C. 6621 note; Public Law 114–  
19 59).

20 “(8) TRIBAL COLLEGE OR UNIVERSITY.—The  
21 term ‘Tribal College or University’ has the meaning  
22 given the term in section 316(b) of the Higher Edu-  
23 cation Act of 1965 (20 U.S.C. 1059c(b)).”.

24 (2) CLERICAL AMENDMENT.—The table of con-  
25 tents in section 2(b) of the National Defense Au-

1       thorization Act for Fiscal Year 1991 (Public Law  
 2       101–510; 104 Stat. 1497) is amended by striking  
 3       the items relating to sections 3167 and 3168 and in-  
 4       serting the following:

“Sec. 3167. Partnerships with historically Black colleges and universities, His-  
 panic-serving institutions, and tribal colleges.

“Sec. 3167A. Broadening participation for teachers and scientists.

“Sec. 3167B. Expanding opportunities for highly skilled science, technology,  
 engineering, and mathematics (STEM) professionals.

“Sec. 3168. Definitions.

“Sec. 3169. Authorization of appropriations.”.

5   **SEC. 10112. HIGH INTENSITY LASER RESEARCH INITIATIVE;**  
 6                   **HELIUM CONSERVATION PROGRAM; OFFICE**  
 7                   **OF SCIENCE EMERGING BIOLOGICAL THREAT**  
 8                   **PREPAREDNESS RESEARCH INITIATIVE;**  
 9                   **MIDSCALE INSTRUMENTATION AND RE-**  
 10                   **SEARCH EQUIPMENT PROGRAM; AUTHORIZA-**  
 11                   **TION OF APPROPRIATIONS.**

12       (a) IN GENERAL.—The Department of Energy Re-  
 13       search and Innovation Act (42 U.S.C. 18601 et seq.) (as  
 14       amended by section 10111(a)) is amended by adding at  
 15       the end the following:

16   **“SEC. 313. HIGH INTENSITY LASER RESEARCH INITIATIVE.**

17       “(a) IN GENERAL.—The Director shall establish a  
 18       high intensity laser research initiative consistent with the  
 19       recommendations of the National Academies report enti-  
 20       tled ‘Opportunities in Intense Ultrafast Lasers: Reaching  
 21       for the Brightest Light’ and the report from the Brightest  
 22       Light Initiative workshop entitled ‘The Future of Intense



1 Ultrafast Lasers in the U.S.'. The initiative should include  
2 research and development of petawatt-scale and of high  
3 average power laser technologies necessary for future facil-  
4 ity needs in discovery science and to advance energy tech-  
5 nologies, as well as support for a user network of academic  
6 and National Laboratory high intensity laser facilities.

7 “(b) LEVERAGE.—The Director shall leverage new  
8 laser technologies for more compact, less complex, and  
9 low-cost accelerator systems needed for science applica-  
10 tions.

11 “(c) COORDINATION.—

12 “(1) DIRECTOR.—The Director shall coordinate  
13 the initiative established under subsection (a) among  
14 all relevant programs within the Office of Science.

15 “(2) UNDER SECRETARY.—The Under Sec-  
16 retary for Science shall coordinate the initiative es-  
17 tablished under subsection (a) with other relevant  
18 programs within the Department and other Federal  
19 agencies.

20 “(d) AUTHORIZATION OF APPROPRIATIONS.—Out of  
21 funds authorized to be appropriated for the Office of  
22 Science in a fiscal year, there are authorized to be appro-  
23 priated to the Secretary to carry out the activities de-  
24 scribed in this section—

25 “(1) \$50,000,000 for fiscal year 2023;

1 “(2) \$100,000,000 for fiscal year 2024;

2 “(3) \$150,000,000 for fiscal year 2025;

3 “(4) \$200,000,000 for fiscal year 2026; and

4 “(5) \$250,000,000 for fiscal year 2027.

5 **“SEC. 314. HELIUM CONSERVATION PROGRAM.**

6 “(a) IN GENERAL.—The Secretary shall establish a  
7 program to reduce the consumption of helium for Depart-  
8 ment grant recipients and facilities and encourage helium  
9 recycling and reuse. The program shall competitively  
10 award grants for—

11 “(1) the purchase of equipment to capture,  
12 reuse, and recycle helium;

13 “(2) the installation, maintenance, and repair  
14 of new and existing helium capture, reuse, and recy-  
15 cling equipment; and

16 “(3) helium alternatives research and develop-  
17 ment activities.

18 “(b) REPORT.—Not later than 2 years after the date  
19 of enactment of the Research and Development, Competi-  
20 tion, and Innovation Act, and every 3 years thereafter, the  
21 Director shall submit to the Committee on Science, Space,  
22 and Technology of the House of Representatives and the  
23 Committee on Energy and Natural Resources of the Sen-  
24 ate a report on the purchase of helium as part of research

1 projects and facilities supported by the Department. The  
2 report shall include—

3 “(1) the quantity of helium purchased for  
4 projects and facilities supported by Department  
5 grants;

6 “(2) a cost-analysis for such helium;

7 “(3) to the maximum extent practicable, infor-  
8 mation on whether such helium was imported from  
9 outside the United States, and if available, the coun-  
10 try or region of the world from which the helium  
11 was imported;

12 “(4) expected or experienced impacts of helium  
13 supply shortages or prices on the research projects  
14 and facilities supported by the Department; and

15 “(5) recommendations for reducing Department  
16 grant recipients’ exposure to volatile helium prices  
17 and supply shortages.

18 “(c) COORDINATION.—In carrying out the program  
19 under this section, the Director shall coordinate with the  
20 National Science Foundation and other relevant Federal  
21 agencies on helium conservation activities.

22 “(d) DURATION.—The program established under  
23 this section shall receive support for a period of not more  
24 than 5 years, subject to the availability of appropriations.

1           “(e) RENEWAL.—Upon expiration of any period of  
2 support of the program under this section, the Director  
3 may renew support for the program for a period of not  
4 more than 5 years.

5           **“SEC. 315. OFFICE OF SCIENCE BIOLOGICAL THREAT PRE-  
6                                    PAREDNESS RESEARCH INITIATIVE.**

7           “(a) IN GENERAL.—The Secretary shall establish  
8 within the Office of Science a cross-cutting research initia-  
9 tive, to be known as the ‘Biological Threat Preparedness  
10 Research Initiative’, to leverage the innovative analytical  
11 resources and tools, user facilities, and advanced computa-  
12 tional and networking capabilities of the Department in  
13 order to support efforts that prevent, prepare for, predict,  
14 and respond to biological threats to national security, in-  
15 cluding infectious diseases.

16           “(b) COMPETITIVE, MERIT-REVIEWED PROCESS.—  
17 The Secretary shall carry out the initiative established  
18 under subsection (a) through a competitive, merit-re-  
19 viewed process, and consider applications from National  
20 Laboratories, institutions of higher education, multi-insti-  
21 tutional collaborations, industry partners and other appro-  
22 priate entities.

23           “(c) ACTIVITIES.—In carrying out the initiative es-  
24 tablished under subsection (a), the Secretary shall—

1           “(1) determine a comprehensive set of technical  
2 milestones for the research activities described in  
3 that subsection;

4           “(2) prioritize the objectives of—

5               “(A) supporting fundamental research and  
6 development in advanced analytics, experi-  
7 mental studies, materials synthesis, and high-  
8 performance computing technologies needed in  
9 order to more quickly and effectively charac-  
10 terize, model, simulate, and predict complex  
11 natural phenomena and biological materials re-  
12 lated to emerging biological threats;

13               “(B) supporting the development of tools  
14 that inform epidemiological modeling, and ap-  
15 plying artificial intelligence, machine learning,  
16 and other computing tools to accelerate such  
17 processes;

18               “(C) supporting research and capabilities  
19 that enhance understanding and modeling of  
20 the transport of pathogens in indoor and out-  
21 door air and water environments;

22               “(D) identifying priority research opportu-  
23 nities and capabilities for molecular design and  
24 modeling for medical countermeasures;

1           “(E) ensuring that new experimental and  
2           computational tools are accessible to relevant  
3           research communities, including private sector  
4           entities and other Federal research institutions;  
5           and

6           “(F) supporting activities and projects that  
7           combine computational modeling and simulation  
8           with experimental research facilities and stud-  
9           ies;

10          “(3) leverage the research infrastructure of the  
11          Department, including scientific computing user fa-  
12          cilities, x-ray light sources, neutron scattering facili-  
13          ties, nanoscale science research centers, and se-  
14          quencing and biocharacterization facilities;

15          “(4) leverage experience from existing modeling  
16          and simulation research and work sponsored by the  
17          Department and promote collaboration and data  
18          sharing between National Laboratories, research en-  
19          tities, and user facilities of the Department by pro-  
20          viding necessary access and secure data transfer ca-  
21          pabilities; and

22          “(5) ensure that new experimental and com-  
23          putational tools are accessible to relevant research  
24          communities, including private sector entities, to ad-  
25          dress emerging biological threats.

1           “(d) COORDINATION.—In carrying out the initiative  
2 established under subsection (a), the Secretary shall co-  
3 ordinate activities with—

4           “(1) other relevant offices of the Department;

5           “(2) the National Nuclear Security Administra-  
6 tion;

7           “(3) the National Laboratories;

8           “(4) the Director of the National Science Foun-  
9 dation;

10           “(5) the Director of the Centers for Disease  
11 Control and Prevention;

12           “(6) the Director of the National Institutes of  
13 Health;

14           “(7) the Assistant Secretary for Preparedness  
15 and Response;

16           “(8) the heads of other relevant Federal agen-  
17 cies;

18           “(9) institutions of higher education; and

19           “(10) the private sector.

20           “(e) INFECTIOUS DISEASES HIGH PERFORMANCE  
21 COMPUTING RESEARCH CONSORTIUM.—

22           “(1) IN GENERAL.—The Secretary, in coordina-  
23 tion with the Director of the National Science Foun-  
24 dation and the Director of the Office of Science and  
25 Technology Policy, shall establish and operate an

1 Emerging Infectious Diseases High Performance  
2 Computing Research Consortium (referred to in this  
3 section as the ‘Consortium’), to support the initiative  
4 established under subsection (a) by providing, to the  
5 extent practicable, a centralized entity for multidisci-  
6 plinary, collaborative, emerging infectious disease  
7 and biosecurity research and development through  
8 high performance computing and advanced data  
9 analytics technologies and processes, in conjunction  
10 with the experimental research facilities and studies  
11 supported by the Department.

12 “(2) MEMBERSHIP.—The members of the Con-  
13 sortium may include representatives from relevant  
14 Federal agencies, the National Laboratories, the pri-  
15 vate sector, and institutions of higher education,  
16 which can each contribute relevant compute time,  
17 capabilities, or other resources.

18 “(3) ACTIVITIES.—The Consortium shall—

19 “(A) match applicants with available Fed-  
20 eral and private sector computing resources;

21 “(B) consider supplemental awards for  
22 computing partnerships with Consortium mem-  
23 bers to qualifying entities on a competitive  
24 merit-review basis;



1           “(C) encourage collaboration and commu-  
2           nication among member representatives of the  
3           Consortium and awardees;

4           “(D) provide access to the high-perform-  
5           ance computing capabilities, expertise, and user  
6           facilities of the Department and the National  
7           Laboratories; and

8           “(E) submit an annual report to the Sec-  
9           retary summarizing the activities of the Consor-  
10          tium, including—

11                   “(i) describing each project under-  
12                   taken by the Consortium;

13                   “(ii) detailing organizational expendi-  
14                   tures; and

15                   “(iii) evaluating contributions to the  
16                   achievement of technical milestones as de-  
17                   termined in subsection (a).

18          “(4) COORDINATION.—The Secretary shall en-  
19          sure the coordination of, and avoid unnecessary du-  
20          plication of, the activities of the Consortium with the  
21          activities of other research entities of the Depart-  
22          ment, other Federal research institutions, institu-  
23          tions of higher education, and the private sector.

24          “(f) REPORT.—Not later than 2 years after the date  
25          of enactment of the Research and Development, Competi-

1 tion, and Innovation Act, the Secretary shall submit to  
2 the Committee on Science, Space, and Technology and the  
3 Committee on Energy and Commerce of the House of  
4 Representatives, and the Committee on Energy and Nat-  
5 ural Resources, the Committee on Commerce, Science, and  
6 Transportation, and the Committee on Health, Education,  
7 Labor, and Pensions of the Senate, a report detailing the  
8 effectiveness of—

9           “(1) the interagency coordination among each  
10 Federal agency involved in the initiative established  
11 under subsection (a);

12           “(2) the collaborative research achievements of  
13 that initiative, including the achievement of the tech-  
14 nical milestones determined under that subsection;  
15 and

16           “(3) potential opportunities to expand the tech-  
17 nical capabilities of the Department.

18           “(g) FUNDING.—Out of funds authorized to be ap-  
19 propriated for the Office of Science in a fiscal year, there  
20 is authorized to be appropriated to the Secretary to carry  
21 out the activities under this section \$50,000,000 for each  
22 of fiscal years 2023 through 2027.

1 **“SEC. 316. MIDSCALE INSTRUMENTATION AND RESEARCH**  
2 **EQUIPMENT PROGRAM.**

3 “(a) IN GENERAL.—The Director shall establish a  
4 midscale instrumentation and research equipment pro-  
5 gram to develop, acquire, and commercialize research in-  
6 strumentation and equipment needed to meet the missions  
7 of the Department and to provide platform technologies  
8 for the broader scientific community.

9 “(b) ACTIVITIES.—Under the program established  
10 under subsection (a), the Director shall—

11 “(1) enable the development and acquisition of  
12 novel, state-of-the-art instruments that—

13 “(A) range in cost from \$1,000,000 to  
14 \$20,000,000 each; and

15 “(B) would significantly accelerate sci-  
16 entific breakthroughs at user facilities; and

17 “(2) strongly encourage partnerships among—

18 “(A) National Laboratories;

19 “(B) user facilities; and

20 “(C)(i) institutions in a State receiving  
21 funding under the Established Program to  
22 Stimulate Competitive Research established  
23 under section 2203(b)(3) of the Energy Policy  
24 Act of 1992 (42 U.S.C. 13503(b)(3));

25 “(ii) historically Black colleges or univer-  
26 sities;

1                   “(iii) minority-serving institutions of high-  
2                   er education; or

3                   “(iv) institutions of higher education in a  
4                   rural area.

5           “(c) COORDINATION WITH OTHER PROGRAMS.—The  
6 Director shall coordinate the program established under  
7 subsection (a) with all other programs carried out by the  
8 Office of Science of the Department.

9           “(d) RESEARCH EQUIPMENT AND TECHNOLOGY DE-  
10 VELOPMENT COORDINATION.—The Director shall encour-  
11 age coordination among the Office of Science, the National  
12 Laboratories, the Office of Technology Transitions, and  
13 relevant academic and private sector entities to identify,  
14 disseminate, and commercialize research instruments,  
15 equipment, and related technologies developed to aid basic  
16 science research discoveries that meet the mission of the  
17 Department.

18           “(e) AUTHORIZATION OF APPROPRIATIONS.—Out of  
19 funds authorized to be appropriated for the Office of  
20 Science in a fiscal year, there is authorized to be appro-  
21 priated to carry out this section \$150,000,000 for each  
22 of fiscals years 2023 through 2027.

23 **“SEC. 317. AUTHORIZATION OF APPROPRIATIONS.**

24           “There are authorized to be appropriated to the Sec-  
25 retary to carry out the activities described in this title—

- 1 “(1) \$8,902,392,400 for fiscal year 2023;  
2 “(2) \$9,541,895,744 for fiscal year 2024;  
3 “(3) \$10,068,198,994 for fiscal year 2025;  
4 “(4) \$10,468,916,520 for fiscal year 2026; and  
5 “(5) \$10,831,342,317 for fiscal year 2027.”.

6 (b) TABLE OF CONTENTS.—Section 1(b) of the De-  
7 partment of Energy Research and Innovation Act is  
8 amended in the table of contents by inserting after the  
9 item relating to section 309 the following:

- “Sec. 310. Accelerator research and development.  
“Sec. 311. Isotope research, development, and production.  
“Sec. 312. Increased collaboration with teachers and scientists.  
“Sec. 313. High intensity laser research initiative.  
“Sec. 314. Helium conservation program.  
“Sec. 315. Office of Science Biological Threat Preparedness Research Initia-  
tive.  
“Sec. 316. Midscale instrumentation and research equipment program.  
“Sec. 317. Authorization of appropriations.”.

10 **SEC. 10113. ESTABLISHED PROGRAM TO STIMULATE COM-**  
11 **PETITIVE RESEARCH.**

12 (a) RESEARCH AREAS.—Section 2203(b)(3)(E) of  
13 the Energy Policy Act of 1992 (42 U.S.C.  
14 13503(b)(3)(E)) is amended—

- 15 (1) in the subparagraph heading, by striking  
16 “IN AREAS OF APPLIED ENERGY RESEARCH, ENVI-  
17 RONMENTAL MANAGEMENT, AND BASIC SCIENCE”;  
18 (2) in clause (i)—  
19 (A) in subclause (I), by inserting “nuclear  
20 energy,” before “and”; and

1 (B) by striking subclause (V) and inserting  
2 the following:

3 “(V) scientific research, includ-  
4 ing—

5 “(aa) advanced scientific  
6 computing research;

7 “(bb) basic energy sciences;

8 “(cc) biological and environ-  
9 mental research;

10 “(dd) fusion energy sciences;

11 “(ee) high energy physics;

12 “(ff) nuclear physics;

13 “(gg) isotope research, de-  
14 velopment, and production;

15 “(hh) accelerator research,  
16 development, and production; and

17 “(ii) other areas of research  
18 funded by the Office of Science,  
19 as determined by the Secretary.”;

20 and

21 (3) in clause (ii)—

22 (A) in subclause (II), by striking “grad-  
23 uate” and inserting “undergraduate scholar-  
24 ships, graduate fellowships, and”;

1 (B) in subclause (III), by striking “; and”  
2 and inserting “and staff;”;

3 (C) in subclause (IV)—

4 (i) by striking “biennial” and insert-  
5 ing “annual”; and

6 (ii) by striking the period at the end  
7 and inserting a semicolon; and

8 (D) by adding at the end the following:

9 “(V) to develop research clusters  
10 for particular areas of expertise; and

11 “(VI) to diversify the future  
12 workforce.”.

13 (b) RESEARCH CAPABILITY ENHANCEMENT.—Sec-  
14 tion 2203(b)(3) of the Energy Policy Act of 1992 (42  
15 U.S.C. 13503(b)(3)) is amended by striking subparagraph  
16 (F) and inserting the following:

17 “(F) RESEARCH CAPABILITY ENHANCE-  
18 MENT.—

19 “(i) SCHOLARSHIPS AND FELLOW-  
20 SHIPS.—

21 “(I) IN GENERAL.—Pursuant to  
22 subparagraph (E)(ii), the Secretary  
23 shall award grants to institutions of  
24 higher education in eligible jurisdic-  
25 tions for those institutions of higher

1 education to provide scholarships and  
2 fellowships.

3 “(II) GRANT.—A scholarship or  
4 fellowship awarded by an institution  
5 of higher education in an eligible ju-  
6 risdiction using a grant provided  
7 under subclause (I)—

8 “(aa) in the case of an un-  
9 dergraduate scholarship—

10 “(AA) shall be for a pe-  
11 riod of 1 year; and

12 “(BB) may be competi-  
13 tively renewable on an an-  
14 nual basis; and

15 “(bb) in the case of a grad-  
16 uate level fellowship, shall be for  
17 a period of not more than 5  
18 years.

19 “(ii) EARLY CAREER CAPACITY DE-  
20 VELOPMENT.—

21 “(I) IN GENERAL.—Pursuant to  
22 subparagraph (E)(ii), the Secretary  
23 shall award grants to early career fac-  
24 ulty and staff at institutions of higher  
25 education in eligible jurisdictions—



1                   “(aa) to support investi-  
2 gator-initiated research, including  
3 associated research equipment  
4 and instrumentation;

5                   “(bb) to support activities  
6 associated with identifying and  
7 responding to funding opportuni-  
8 ties;

9                   “(cc) to secure technical as-  
10 sistance for the pursuit of fund-  
11 ing opportunities; and

12                   “(dd) to develop and en-  
13 hance collaboration among Na-  
14 tional Laboratories, Department  
15 of Energy programs, the private  
16 sector, and other relevant enti-  
17 ties.

18                   “(II) GRANTS.—A grant awarded  
19 under subclause (I) shall be—

20                   “(aa) for a period of not  
21 more than 5 years; and

22                   “(bb) competitively renew-  
23 able for an additional 5-year pe-  
24 riod.

1                   “(iii) RESEARCH CAPACITY DEVELOP-  
2                   MENT.—

3                   “(I) IN GENERAL.—Pursuant to  
4                   subparagraph (E)(ii), the Secretary  
5                   shall award competitive grants to in-  
6                   stitutions of higher education in eligi-  
7                   ble jurisdictions for research capacity  
8                   development and implementation, in-  
9                   cluding—

10                   “(aa) developing expertise in  
11                   key technology areas, including  
12                   associated equipment and instru-  
13                   mentation;

14                   “(bb) developing and acquir-  
15                   ing novel, state-of-the-art instru-  
16                   ments and equipment that range  
17                   in cost from \$500,000 to  
18                   \$20,000,000;

19                   “(cc) enhancing collabora-  
20                   tion with National Laboratories,  
21                   the Department of Energy, and  
22                   the private sector through faculty  
23                   or staff placement programs; and

24                   “(dd) supporting formal  
25                   partnership programs with insti-

1                   tutions of higher education and  
2                   National Laboratories.

3                   “(II) GRANTS.—A grant awarded  
4                   under subclause (I) shall be—

5                   “ (aa) for a period of not  
6                   more than 5 years; and

7                   “ (bb) renewable for an addi-  
8                   tional 5-year period.

9                   “(III) EQUIPMENT AND INSTRU-  
10                  MENTATION.—To the maximum ex-  
11                  tent practicable, the Secretary shall  
12                  ensure that research equipment and  
13                  instrumentation developed or acquired  
14                  pursuant to a grant awarded under  
15                  subclause (I) may sustain continued  
16                  operation and be maintained without  
17                  the need for additional or subsequent  
18                  funding under this section.”.

19                  (c) PROGRAM IMPLEMENTATION UPDATE.—Section  
20                  2203(b)(3)(G) of the Energy Policy Act of 1992 (42  
21                  U.S.C. 13503(b)(3)(G)) is amended by adding at the end  
22                  the following:

23                                  “(iii) UPDATE.—Not later than 270  
24                                  days after the date of enactment of the Re-

1 search and Development, Competition, and  
2 Innovation Act, the Secretary shall—

3 “(I) update the plan submitted  
4 under clause (i); and

5 “(II) submit the updated plan to  
6 the committees described in that  
7 clause.”.

8 (d) PROGRAM EVALUATION REPORT.—Section  
9 2203(b)(3)(H) of the Energy Policy Act of 1992 (42  
10 U.S.C. 13503(b)(3)(H)) is amended by adding at the end  
11 the following:

12 “(iv) ANNUAL REPORT.—At the end  
13 of each fiscal year, the Secretary shall sub-  
14 mit to the Committee on Energy and Nat-  
15 ural Resources and the Committee on Ap-  
16 propriations of the Senate and the Com-  
17 mittee on Energy and Commerce and the  
18 Committee on Appropriations of the House  
19 of Representatives a report that includes—

20 “(I) the total amount of expendi-  
21 tures made by the Department to  
22 carry out EPSCoR in each eligible ju-  
23 risdiction for each of the 3 most re-  
24 cent fiscal years for which such infor-  
25 mation is available;

1                   “(II)(aa) the number of EPSCoR  
2                   awards made to institutions of higher  
3                   education located in eligible jurisdic-  
4                   tions; and

5                   “(bb) the amount and type of  
6                   each award;

7                   “(III) the number of awards that  
8                   are not EPSCoR awards made by the  
9                   Secretary to institutions of higher  
10                  education located in eligible jurisdic-  
11                  tions;

12                  “(IV)(aa) the number of rep-  
13                  resentatives of institutions of higher  
14                  education in eligible jurisdictions serv-  
15                  ing on each Office of Science advisory  
16                  committee; and

17                  “(bb) for each such advisory  
18                  committee, the percentage of com-  
19                  mittee membership that those individ-  
20                  uals constitute; and

21                  “(V) the number of individuals  
22                  from institutions of higher education  
23                  in eligible jurisdictions serving on peer  
24                  review committees.”.

1 (e) FUNDING.—Section 2203(b)(3) of the Energy  
2 Policy Act of 1992 (42 U.S.C. 13503(b)(3)) is amended  
3 by adding at the end the following:

4 “(I) FUNDING.—

5 “(i) AUTHORIZATION OF APPROPRIA-  
6 TIONS.—There are authorized to be appro-  
7 priated to the Secretary to carry out  
8 EPSCoR, to remain available until ex-  
9 pended—

10 “(I) \$50,000,000 for fiscal year  
11 2023;

12 “(II) \$50,000,000 for fiscal year  
13 2024;

14 “(III) \$75,000,000 for fiscal year  
15 2025;

16 “(IV) \$100,000,000 for fiscal  
17 year 2026; and

18 “(V) \$100,000,000 for fiscal year  
19 2027.

20 “(ii) GRANTS TO CONSORTIA.—In the  
21 case of an EPSCoR grant awarded to a  
22 consortium that contains institutions of  
23 higher education that are not located in el-  
24 igible jurisdictions, the Secretary may  
25 count—

1                   “(I) the full amount of funds ex-  
2                   pended to provide the grant towards  
3                   meeting the funding requirement in  
4                   clause (iii) if the lead entity of the  
5                   consortium is an institution of higher  
6                   education located in an eligible juris-  
7                   diction; and

8                   “(II) only the funds provided to  
9                   institutions of higher education lo-  
10                  cated in eligible jurisdictions towards  
11                  meeting the funding requirement in  
12                  clause (iii) if the lead entity of the  
13                  consortium is an institution of higher  
14                  education that is not located in an eli-  
15                  gible jurisdiction.

16                  “(iii) ADDITIONAL FUNDS FOR ELIGI-  
17                  BLE JURISDICTIONS.—In addition to funds  
18                  authorized to be appropriated under clause  
19                  (i), the Secretary, to the maximum extent  
20                  practicable while maintaining the competi-  
21                  tive, merit-based award processes of the  
22                  Office of Science, shall ensure that, of the  
23                  research and development funds of the Of-  
24                  fice of Science that are awarded by the  
25                  Secretary each year to institutions of high-

1 er education, not less than 10 percent is  
2 awarded to institutions of higher education  
3 in eligible jurisdictions pursuant to the  
4 evaluation and selection criteria in section  
5 605.10 of title 10, Code of Federal Regula-  
6 tions (or successor regulations).

7 “(iv) ADDITIONAL FUNDS FOR EQUIP-  
8 MENT AND INSTRUMENTATION.—In addi-  
9 tion to funds authorized to be appropriated  
10 under clause (i), there is authorized to be  
11 appropriated to the Secretary to award  
12 grants under subparagraph (F)(iii)(I) for  
13 the purpose described in item (bb) of that  
14 subparagraph \$25,000,000 for each of fis-  
15 cal years 2023 through 2027, to remain  
16 available until expended.

17 “(v) ACCOUNTING.—To the maximum  
18 extent practicable, the Secretary shall en-  
19 sure that each program within the Depart-  
20 ment of Energy that endorses an EPSCoR  
21 grant awardee shall contribute funding to  
22 the award to acknowledge the research  
23 benefits to the mission of that program.”.

24 (f) ADVISORY COMMITTEES TO THE OFFICE OF  
25 SCIENCE.—In order to improve the advice and guidance



1 provided to the Office of Science, the Undersecretary for  
2 Science shall seek to ensure, to the maximum extent prac-  
3 ticable, the robust participation of institutions of higher  
4 education (as defined in section 101 of the Higher Edu-  
5 cation Act of 1965 (20 U.S.C. 1001)) located in eligible  
6 jurisdictions (as defined in section 2203(b)(3)(A) of the  
7 Energy Policy Act of 1992 (42 U.S.C. 13503(b)(3)(A)))  
8 on the Office of Science Federal Advisory Committee.

9 (g) TECHNICAL AMENDMENTS.—Section 2203(b) of  
10 the Energy Policy Act of 1992 (42 U.S.C. 13503(b)) is  
11 amended—

12 (1) in paragraph (1), by striking “(1) The Sec-  
13 retary” and inserting the following:

14 “(1) UNIVERSITY RESEARCH REACTORS.—The  
15 Secretary”; and

16 (2) in paragraph (2), by striking “(2) The Sec-  
17 retary” and inserting the following:

18 “(2) METHOD TO EVALUATE EFFECTIVENESS  
19 OF EDUCATION PROGRAMS.—The Secretary”.

20 **SEC. 10114. RESEARCH SECURITY.**

21 (a) DEFINITIONS.—In this section:

22 (1) COUNTRY OF RISK.—

23 (A) IN GENERAL.—The term “country of  
24 risk” means a foreign country determined by  
25 the Secretary, in accordance with subparagraph

1 (B), to present a risk of theft of United States  
2 intellectual property or a threat to the national  
3 security of the United States if nationals of the  
4 country, or entities owned or controlled by the  
5 country or nationals of the country, participate  
6 in any research, development, demonstration, or  
7 deployment activity authorized under this divi-  
8 sion or division A or an amendment made by  
9 this division or division A.

10 (B) DETERMINATION.—In making a deter-  
11 mination under subparagraph (A), the Sec-  
12 retary, in coordination with the Director of the  
13 Office of Intelligence and Counterintelligence,  
14 shall take into consideration—

15 (i) the most recent World Wide  
16 Threat Assessment of the United States  
17 Intelligence Community, prepared by the  
18 Director of National Intelligence; and

19 (ii) the most recent National Counter-  
20 intelligence Strategy of the United States.

21 (2) COVERED SUPPORT.—The term “covered  
22 support” means any grant, contract, subcontract,  
23 award, loan, program, support, or other activity au-  
24 thorized under this division or division A, or an  
25 amendment made by this division or division A.

1           (3) ENTITY OF CONCERN.—The term “entity of  
2           concern” means any entity, including a national,  
3           that is—

4                   (A) identified under section 1237(b) of the  
5                   Strom Thurmond National Defense Authoriza-  
6                   tion Act for Fiscal Year 1999 (50 U.S.C. 1701  
7                   note; Public Law 105–261);

8                   (B) identified under section 1260H of the  
9                   William M. (Mac) Thornberry National Defense  
10                  Authorization Act for Fiscal Year 2021 (10  
11                  U.S.C. 113 note; Public Law 116–283);

12                  (C) on the Entity List maintained by the  
13                  Bureau of Industry and Security of the Depart-  
14                  ment of Commerce and set forth in Supplement  
15                  No. 4 to part 744 of title 15, Code of Federal  
16                  Regulations;

17                  (D) included in the list required by section  
18                  9(b)(3) of the Uyghur Human Rights Policy  
19                  Act of 2020 (Public Law 116–145; 134 Stat.  
20                  656); or

21                  (E) identified by the Secretary, in coordi-  
22                  nation with the Director of the Office of Intel-  
23                  ligence and Counterintelligence and the applica-  
24                  ble office that would provide, or is providing,

1 covered support, as posing an unmanageable  
2 threat—

3 (i) to the national security of the  
4 United States; or

5 (ii) of theft or loss of United States  
6 intellectual property.

7 (4) NATIONAL.—The term “national” has the  
8 meaning given the term in section 101 of the Immi-  
9 gration and Nationality Act (8 U.S.C. 1101).

10 (5) SECRETARY.—The term “Secretary” means  
11 the Secretary of Energy.

12 (b) SCIENCE AND TECHNOLOGY RISK ASSESS-  
13 MENT.—

14 (1) IN GENERAL.—The Secretary shall develop  
15 and maintain tools and processes to manage and  
16 mitigate research security risks, such as a science  
17 and technology risk matrix, informed by threats  
18 identified by the Director of the Office of Intel-  
19 ligence and Counterintelligence, to facilitate deter-  
20 minations of the risk of loss of United States intel-  
21 lectual property or threat to the national security of  
22 the United States posed by activities carried out  
23 under any covered support.

1           (2) CONTENT AND IMPLEMENTATION.—In de-  
2           veloping and using the tools and processes developed  
3           under paragraph (1), the Secretary shall—

4                   (A) deploy risk-based approaches to evalu-  
5                   ating, awarding, and managing certain re-  
6                   search, development, demonstration, and de-  
7                   ployment activities, including designations that  
8                   will indicate the relative risk of activities;

9                   (B) assess, to the extent practicable, ongo-  
10                  ing high-risk activities;

11                  (C) designate an officer or employee of the  
12                  Department of Energy to be responsible for  
13                  tracking and notifying recipients of any covered  
14                  support of unmanageable threats to United  
15                  States national security or of theft or loss of  
16                  United States intellectual property posed by an  
17                  entity of concern;

18                  (D) consider requiring recipients of covered  
19                  support to implement additional research secu-  
20                  rity mitigations for higher-risk activities if ap-  
21                  propriate; and

22                  (E) support the development of research  
23                  security training for recipients of covered sup-  
24                  port on the risks posed by entities of concern.

1           (3) ANNUAL UPDATES.—The tools and proc-  
2           esses developed under paragraph (1) shall be evalu-  
3           ated annually and updated as needed, with threat-  
4           informed input from the Office of Intelligence and  
5           Counterintelligence, to reflect changes in the risk  
6           designation under paragraph (2)(A) of research, de-  
7           velopment, demonstration, and deployment activities  
8           conducted by the Department.

9           (c) ENTITY OF CONCERN.—

10           (1) PROHIBITION.—Except as provided in para-  
11           graph (2), no entity of concern, or individual that  
12           owns or controls, is owned or controlled by, or is  
13           under common ownership or control with an entity  
14           of concern, may receive, or perform work under, any  
15           covered support.

16           (2) WAIVER OF PROHIBITION.—

17           (A) IN GENERAL.—The Secretary may  
18           waive the prohibition under paragraph (1) if de-  
19           termined by the Secretary to be in the national  
20           interest.

21           (B) NOTIFICATION TO CONGRESS.—Not  
22           less than 2 weeks prior to issuing a waiver  
23           under subparagraph (A), the Secretary shall no-  
24           tify the Committee on Energy and Natural Re-  
25           sources of the Senate and the Committee on

1 Science, Space, and Technology of the House of  
2 Representatives of the intent to issue the waiver,  
3 including a justification for the waiver.

4 (3) PENALTY.—

5 (A) TERMINATION OF SUPPORT.—On find-  
6 ing that any entity of concern or individual de-  
7 scribed in paragraph (1) has received covered  
8 support and has not received a waiver under  
9 paragraph (2), the Secretary shall terminate all  
10 covered support to that entity of concern or in-  
11 dividual, as applicable.

12 (B) PENALTIES.—An entity of concern or  
13 individual identified under subparagraph (A)  
14 shall be—

15 (i) prohibited from receiving or par-  
16 ticipating in covered support for a period  
17 of not less than 1 year but not more than  
18 10 years, as determined by the Secretary;  
19 or

20 (ii) instead of the penalty described in  
21 clause (i), subject to any other penalties  
22 authorized under applicable law or regula-  
23 tions that the Secretary determines to be  
24 in the national interest.

1           (C) NOTIFICATION TO CONGRESS.—Prior  
2 to imposing a penalty under subparagraph (B),  
3 the Secretary shall notify the Committee on En-  
4 ergy and Natural Resources of the Senate and  
5 the Committee on Science, Space, and Tech-  
6 nology of the House of Representatives of the  
7 intent to impose the penalty, including a de-  
8 scription of and justification for the penalty.

9           (4) COORDINATION.—The Secretary shall—

10           (A) share information about the unman-  
11 ageable threats described in subsection  
12 (a)(3)(E) with other Federal agencies; and

13           (B) develop consistent approaches to iden-  
14 tifying entities of concern.

15           (d) INTERNATIONAL AGREEMENTS.—This section  
16 shall be applied in a manner consistent with the obliga-  
17 tions of the United States under international agreements.

18           (e) REPORT REQUIRED.—Not later than 240 days  
19 after the date of enactment of this Act, the Secretary shall  
20 submit to Congress a report that—

21           (1) describes—

22           (A) the tools and processes developed  
23 under subsection (b)(1) and any updates to  
24 those tools and processes; and



1 (B) if applicable, the science and tech-  
2 nology risk matrix developed under that sub-  
3 section and how that matrix has been applied;

4 (2) includes a mitigation plan for managing  
5 risks posed by countries of risk with respect to fu-  
6 ture or ongoing research and development activities  
7 of the Department of Energy; and

8 (3) defines critical research areas, designated  
9 by risk, as determined by the Secretary.

10 **TITLE II—NATIONAL INSTITUTE**  
11 **OF STANDARDS AND TECH-**  
12 **NOLOGY FOR THE FUTURE**

13 **SEC. 10201. DEFINITIONS.**

14 In this title:

15 (1) **DIRECTOR.**—The term “Director” means  
16 the Director of the National Institute of Standards  
17 and Technology.

18 (2) **ENROLLMENT OF NEEDY STUDENTS.**—The  
19 term “enrollment of needy students” has the mean-  
20 ing given the term in section 312(d) of the Higher  
21 Education Act of 1965 (20 U.S.C. 1058(d)).

22 (3) **FRAMEWORK.**—The term “Framework”  
23 means the Framework for Improving Critical Infra-  
24 structure Cybersecurity developed by the National  
25 Institute of Standards and Technology and referred

1 to in Executive Order No. 13800 issued on May 11,  
2 2017 (82 Fed. Reg. 22391 et seq.).

3 (4) INSTITUTE.—The term “Institute” means  
4 the National Institute of Standards and Technology.

5 (5) INTERNATIONAL STANDARDS ORGANIZA-  
6 TION.—The term “international standards organiza-  
7 tion” has the meaning given such term in section  
8 451 of the Trade Agreements Act of 1979 (19  
9 U.S.C. 2571).

10 (6) SECRETARY.—The term “Secretary” means  
11 the Secretary of Commerce.

12 **Subtitle A—Authorization of**  
13 **Appropriations**

14 **SEC. 10211. AUTHORIZATION OF APPROPRIATIONS.**

15 (a) FISCAL YEAR 2023.—

16 (1) IN GENERAL.—There are authorized to be  
17 appropriated to the Secretary of Commerce  
18 \$1,551,450,000 for the National Institute of Stand-  
19 ards and Technology for fiscal year 2023.

20 (2) SPECIFIC ALLOCATIONS.—Of the amount  
21 authorized by paragraph (1)—

22 (A) \$979,100,000 is authorized for sci-  
23 entific and technical research and services lab-  
24 oratory activities;

1 (B) \$200,000,000 is authorized for the  
2 construction and maintenance of facilities, of  
3 which \$80,000,000 is authorized to be appro-  
4 priated for Safety, Capacity, Maintenance, and  
5 Major Repairs; and

6 (C) \$372,350,000 is authorized for indus-  
7 trial technology services activities, of which  
8 \$275,300,000 is authorized to be appropriated  
9 for the Manufacturing Extension Partnership  
10 program under sections 25, 25A, and 26 of the  
11 National Institute of Standards and Technology  
12 Act (15 U.S.C. 278k, 278k-1, and 278l) (of  
13 which \$31,000,000 is authorized to establish  
14 the National Supply Chain Database under sec-  
15 tion 10253) and \$97,050,000 is authorized to  
16 be appropriated for the Manufacturing USA  
17 Program under section 34 of the National Insti-  
18 tute of Standards and Technology Act (15  
19 U.S.C. 278s).

20 (b) FISCAL YEAR 2024.—

21 (1) IN GENERAL.—There are authorized to be  
22 appropriated to the Secretary of Commerce  
23 \$1,651,600,000 for the National Institute of Stand-  
24 ards and Technology for fiscal year 2024.

1           (2) SPECIFIC ALLOCATIONS.—Of the amount  
2 authorized by paragraph (1)—

3           (A) \$1,047,600,000 is authorized for sci-  
4 entific and technical research and services lab-  
5 oratory activities;

6           (B) \$200,000,000 is authorized for the  
7 construction and maintenance of facilities, of  
8 which \$80,000,000 is authorized to be appro-  
9 priated for Safety, Capacity, Maintenance, and  
10 Major Repairs, including \$20,000,000 for IT  
11 infrastructure; and

12           (C) \$404,000,000 is authorized for indus-  
13 trial technology services activities, of which  
14 \$300,000,000 is authorized to be appropriated  
15 for the Manufacturing Extension Partnership  
16 program under sections 25, 25A, and 26 of the  
17 National Institute of Standards and Technology  
18 Act (15 U.S.C. 278k, 278k-1, and 278l) (of  
19 which \$26,000,000 is authorized to maintain,  
20 update, and support Federal coordination of  
21 State supply chain databases maintained by the  
22 Centers (as such term is defined in such section  
23 25 of such Act)) and \$104,000,000 is author-  
24 ized to be appropriated for the Manufacturing  
25 USA Program under section 34 of the National

1 Institute of Standards and Technology Act (15  
2 U.S.C. 278s).

3 (c) FISCAL YEAR 2025.—

4 (1) IN GENERAL.—There are authorized to be  
5 appropriated to the Secretary of Commerce  
6 \$2,039,900,000 for the National Institute of Stand-  
7 ards and Technology for fiscal year 2025.

8 (2) SPECIFIC ALLOCATIONS.—Of the amount  
9 authorized by paragraph (1)—

10 (A) \$1,120,900,000 is authorized for sci-  
11 entific and technical research and services lab-  
12 oratory activities;

13 (B) \$200,000,000 is authorized for the  
14 construction and maintenance of facilities, of  
15 which \$80,000,000 is authorized to be appro-  
16 priated for Safety, Capacity, Maintenance, and  
17 Major Repairs, including \$20,000,000 for IT  
18 infrastructure; and

19 (C) \$719,000,000 is authorized for indus-  
20 trial technology services activities, of which  
21 \$550,000,000 is authorized to be appropriated  
22 for the Manufacturing Extension Partnership  
23 program under sections 25, 25A, and 26 of the  
24 National Institute of Standards and Technology  
25 Act (15 U.S.C. 278k, 278k-1, and 278l) (of

1           which \$26,000,000 is authorized to maintain,  
2           update, and support Federal coordination of  
3           State supply chain databases maintained by the  
4           Centers (as such term is defined in such section  
5           25 of such Act)) and \$169,000,000 is author-  
6           ized to be appropriated for the Manufacturing  
7           USA Program under section 34 of the National  
8           Institute of Standards and Technology Act (15  
9           U.S.C. 278s).

10       (d) FISCAL YEAR 2026.—

11           (1) IN GENERAL.—There are authorized to be  
12           appropriated to the Secretary of Commerce  
13           \$2,158,400,000 for the National Institute of Stand-  
14           ards and Technology for fiscal year 2026.

15           (2) SPECIFIC ALLOCATIONS.—Of the amount  
16           authorized by paragraph (1)—

17                   (A) \$1,199,400,000 is authorized for sci-  
18                   entific and technical research and services lab-  
19                   oratory activities;

20                   (B) \$200,000,000 is authorized for the  
21                   construction and maintenance of facilities, of  
22                   which \$80,000,000 is authorized to be appro-  
23                   priated for Safety, Capacity, Maintenance, and  
24                   Major Repairs, including \$20,000,000 for IT  
25                   infrastructure; and

1           (C) \$759,000,000 is authorized for indus-  
2           trial technology services activities, of which  
3           \$550,000,000 is authorized to be appropriated  
4           for the Manufacturing Extension Partnership  
5           program under sections 25, 25A, and 26 of the  
6           National Institute of Standards and Technology  
7           Act (15 U.S.C. 278k, 278k-1, and 278l) (of  
8           which \$26,000,000 is authorized to maintain,  
9           update, and support Federal coordination of  
10          State supply chain databases maintained by the  
11          Centers (as such term is defined in such section  
12          25 of such Act)) and \$209,000,000 is author-  
13          ized to be appropriated for the Manufacturing  
14          USA Program under section 34 of the National  
15          Institute of Standards and Technology Act (15  
16          U.S.C. 278s).

17       (e) FISCAL YEAR 2027.—

18           (1) IN GENERAL.—There are authorized to be  
19           appropriated to the Secretary of Commerce  
20           \$2,283,360,000 for the National Institute of Stand-  
21           ards and Technology for fiscal year 2027.

22           (2) SPECIFIC ALLOCATIONS.—Of the amount  
23           authorized by paragraph (1)—

1 (A) \$1,283,360,000 is authorized for sci-  
2 entific and technical research and services lab-  
3 oratory activities;

4 (B) \$200,000,000 is authorized for the  
5 construction and maintenance of facilities, of  
6 which \$80,000,000 is authorized to be appro-  
7 priated for Safety, Capacity, Maintenance, and  
8 Major Repairs, including \$20,000,000 for IT  
9 infrastructure; and

10 (C) \$800,000,000 is authorized for indus-  
11 trial technology services activities, of which  
12 \$550,000,000 is authorized to be appropriated  
13 for the Manufacturing Extension Partnership  
14 program under sections 25, 25A, and 26 of the  
15 National Institute of Standards and Technology  
16 Act (15 U.S.C. 278k, 278k-1, and 23 278l) (of  
17 which \$26,000,000 is authorized to maintain,  
18 update, and support Federal coordination of  
19 State supply chain databases maintained by the  
20 Centers (as such term is defined in such section  
21 25 of such Act)) and \$250,000,000 is author-  
22 ized to be appropriated for the Manufacturing  
23 USA Program under section 34 of the National  
24 Institute of Standards and Technology Act (15  
25 U.S.C. 278s).



## 1 **Subtitle B—Measurement Research**

### 2 **SEC. 10221. ENGINEERING BIOLOGY AND BIOMETROLOGY.**

3 (a) IN GENERAL.—The Director, in coordination with  
4 the National Engineering Biology Research and Develop-  
5 ment Initiative established pursuant to title IV, shall—

6 (1) support basic measurement science and  
7 technology research for engineering biology, bio-  
8 manufacturing, and biometrology to advance—

9 (A) measurement technologies to support  
10 foundational understanding of the mechanisms  
11 of conversion of DNA information into cellular  
12 function;

13 (B) technologies for measurement of such  
14 biomolecular components and related systems;

15 (C) new data tools, techniques, and proe-  
16 cesses to improve engineering biology, biomanu-  
17 facturing, and biometrology research; and

18 (D) other areas of measurement science  
19 and technology research determined by the Di-  
20 rector to be critical to the development and de-  
21 ployment of engineering biology, biomanufac-  
22 turing and biometrology;

23 (2) support activities to inform and expand the  
24 development of measurements infrastructure needed  
25 to develop technical standards to establish interoper-

1 ability and facilitate commercial development of bio-  
2 molecular measurement technology and engineering  
3 biology applications;

4 (3) convene industry, institutions of higher edu-  
5 cation, nonprofit organizations, Federal laboratories,  
6 and other Federal agencies engaged in engineering  
7 biology research and development to develop coordi-  
8 nated technical roadmaps for authoritative measure-  
9 ment of the molecular components of the cell;

10 (4) provide access to user facilities with ad-  
11 vanced or unique equipment, services, materials, and  
12 other resources to industry, institutions of higher  
13 education, nonprofit organizations, and government  
14 agencies to perform research and testing;

15 (5) establish or expand collaborative partner-  
16 ships or consortia with other Federal agencies en-  
17 gaged in engineering biology research and develop-  
18 ment, institutions of higher education, Federal lab-  
19 oratories, and industry to advance engineering biol-  
20 ogy applications; and

21 (6) support graduate and postgraduate research  
22 and training in biometrology, biomanufacturing, and  
23 engineering biology.

24 (b) RULE OF CONSTRUCTION.—Nothing in this sec-  
25 tion may be construed to alter the policies, processes, or

1 practices of individual Federal agencies in effect on the  
2 day before the date of the enactment of this Act relating  
3 to the conduct or support of biomedical research and ad-  
4 vanced development, including the solicitation and review  
5 of extramural research proposals.

6 (c) CONTROLS.—In carrying out activities authorized  
7 by this section, the Secretary shall ensure proper security  
8 controls are in place to protect sensitive information, as  
9 appropriate.

10 **SEC. 10222. GREENHOUSE GAS MEASUREMENT RESEARCH.**

11 (a) IN GENERAL.—The Director, in consultation with  
12 the Administrator of the National Oceanic and Atmos-  
13 pheric Administration, the Administrator of the Environ-  
14 mental Protection Agency, the National Aeronautics and  
15 Space Administration, the Director of the National  
16 Science Foundation, the Secretary of Energy, and the  
17 heads of other Federal agencies, as appropriate, shall  
18 carry out a measurement research program to inform the  
19 development or improvement of best practices, bench-  
20 marks, methodologies, procedures, and technical stand-  
21 ards for the measurement of greenhouse gas emissions and  
22 to assess and improve the performance of greenhouse gas  
23 emissions measurement systems placed in situ and on  
24 space-based platforms.

1 (b) ACTIVITIES.—In carrying out such a program,  
2 the Director may—

3 (1) conduct research and testing to improve the  
4 accuracy, efficacy, and reliability of the measure-  
5 ment of greenhouse gas emissions at a range of  
6 scales that covers direct measurement at the compo-  
7 nent or process level through atmospheric observa-  
8 tions;

9 (2) conduct research to create novel measure-  
10 ment technologies and techniques for the measure-  
11 ment of greenhouse gas emissions;

12 (3) convene and engage with relevant Federal  
13 agencies and stakeholders to establish common defi-  
14 nitions and characterizations for the measurement of  
15 greenhouse gas emissions, taking into account any  
16 existing United States and international technical  
17 standards and guidance;

18 (4) conduct outreach and coordination to share  
19 technical expertise with relevant industry and non-  
20 industry stakeholders and standards development or-  
21 ganizations to—

22 (A) assist such entities in the development  
23 and adoption of best practices and technical  
24 standards for greenhouse gas emissions meas-  
25 urements; and

1 (B) promote consistency and traceability in  
2 international reference standards and central  
3 calibration laboratories;

4 (5) in coordination with the Administrator of  
5 the National Oceanic and Atmospheric Administra-  
6 tion, the Administrator of the Environmental Pro-  
7 tection Agency, and the Secretary of Energy, develop  
8 such standard reference materials as the Director  
9 determines is necessary to further the development  
10 of such technical standards, taking into account any  
11 existing United States or international standards;

12 (6) coordinate with the National Oceanic and  
13 Atmospheric Administration to ensure data are man-  
14 aged, stewarded, and archived at all levels and pro-  
15 mote full and open exchange at Federal and State  
16 levels, and with academia, industry, and other users;  
17 and

18 (7) coordinate with international partners, in-  
19 cluding international standards organizations, to  
20 maintain global greenhouse gas measurement tech-  
21 nical standards.

22 (c) TESTBEDS.—In coordination with the private sec-  
23 tor, institutions of higher education, State and local gov-  
24 ernments, the National Oceanic and Atmospheric Admin-  
25 istration, the Environmental Protection Agency, the De-

1 partment of Energy, and other Federal agencies, as appro-  
2 priate, the Director may continue to develop and manage  
3 testbeds to advance research and standards development  
4 for greenhouse gas emissions measurements from in situ  
5 and space-based platforms.

6 (d) CENTER FOR GREENHOUSE GAS MEASURE-  
7 MENTS, STANDARDS, AND INFORMATION.—

8 (1) IN GENERAL.—The Director, in collabora-  
9 tion with the Administrator of the National Oceanic  
10 and Atmospheric Administration, the Administrator  
11 of the Environmental Protection Agency, and the  
12 heads of other Federal agencies, as appropriate,  
13 shall establish a Center for Greenhouse Gas Meas-  
14 urements, Standards, and Information (in this sub-  
15 section referred to as the “Center”).

16 (2) COLLABORATIONS.—The Director shall re-  
17 quire that the activities of the Center include col-  
18 laboration among public and private organizations,  
19 including institutions of higher education, nonprofit  
20 organizations, private sector entities, and State,  
21 Tribal, territorial, and local officials.

22 (3) PURPOSE.—The purpose of the Center shall  
23 be to—

24 (A) advance measurement science, data  
25 analytics, and modeling at a range of scales

1           that covers direct measurement and estimation  
2           at the component or process level through at-  
3           mospheric observations and at the analysis level  
4           to improve the accuracy of spatially and tem-  
5           porally resolved greenhouse gas emissions meas-  
6           urement, validation, and attribution to specific  
7           underlying activities and processes;

8           (B) test and evaluate the performance of  
9           existing capabilities, and inform and improve  
10          best practices, benchmarks, methodologies, pro-  
11          cedures, and technical standards, for the meas-  
12          urement and validation of greenhouse gas emis-  
13          sions at scales noted in subparagraph (A);

14          (C) educate and train students in measure-  
15          ment science, computational science, and sys-  
16          tems engineering research relevant to green-  
17          house gas emissions measurements;

18          (D) foster collaboration among academic  
19          researchers, private sector stakeholders, and  
20          State, Tribal, territorial, and local officials in  
21          the use of Institute testbeds as described in  
22          subsection (c);

23          (E) conduct activities with research insti-  
24          tutions, industry partners, and State and local  
25          officials to identify research, testing, and tech-

1 nical standards needs relevant to greenhouse  
2 gas emissions; and

3 (F) collaborate with other Federal agencies  
4 to conduct outreach and coordination to share  
5 and promote technical data, tools, and expertise  
6 with relevant public and private sector stake-  
7 holders, including State, Tribal, territorial, and  
8 local officials, to assist such in the accurate  
9 measurement of greenhouse gas emissions.

10 **SEC. 10223. NIST AUTHORITY FOR CYBERSECURITY AND**  
11 **PRIVACY ACTIVITIES.**

12 Subsection (c) of section 2 of the National Institute  
13 of Standards and Technology Act (15 U.S.C. 272) is  
14 amended—

15 (1) in paragraph (16), by striking the period at  
16 the end and inserting a semicolon;

17 (2) by redesignating paragraphs (16) through  
18 (27) as paragraphs (21) through (32), respectively;

19 and

20 (3) by inserting after paragraph (15) the fol-  
21 lowing:

22 “(16) support information security measures  
23 for the development and lifecycle of software and the  
24 software supply chain, including development of vol-  
25 untary, consensus-based technical standards, best



1 practices, frameworks, methodologies, procedures,  
2 processes, and software engineering toolkits and con-  
3 figurations;

4 “(17) support information security measures,  
5 including voluntary, consensus-based technical  
6 standards, best practices, and guidelines, for the de-  
7 sign, adoption, and deployment of cloud computing  
8 services;

9 “(18) support research, development, and prac-  
10 tical application to improve the usability of cyberse-  
11 curity processes and technologies;

12 “(19) facilitate and support the development of  
13 a voluntary, consensus-based set of technical stand-  
14 ards, guidelines, best practices, methodologies, pro-  
15 cedures, and processes to improve privacy protec-  
16 tions in systems, technologies, and processes used by  
17 both the public and private sector;

18 “(20) support privacy measures, including vol-  
19 untary, consensus-based technical standards, best  
20 practices, guidelines, metrology, and testbeds for the  
21 design, adoption, and deployment of privacy enhanc-  
22 ing technologies;”.

23 **SEC. 10224. SOFTWARE SECURITY AND AUTHENTICATION.**

24 (a) VULNERABILITIES IN OPEN SOURCE SOFT-  
25 WARE.—The Director shall assign severity metrics to iden-

1 tified vulnerabilities with open source software and  
2 produce voluntary guidance to assist the entities that  
3 maintain open source software repositories to discover and  
4 mitigate vulnerabilities.

5 (b) ARTIFICIAL INTELLIGENCE-ENABLED DE-  
6 FENSES.—The Director shall carry out research and test-  
7 ing to improve the effectiveness of artificial intelligence-  
8 enabled cybersecurity, including by generating optimized  
9 data sets to train artificial intelligence defense systems  
10 and evaluating the performance of varying network archi-  
11 tectures at strengthening network security.

12 (c) AUTHENTICATION OF INSTITUTE SOFTWARE.—  
13 The Director shall ensure all software released by the In-  
14 stitute is digitally signed and maintained to enable stake-  
15 holders to verify its authenticity and integrity upon instal-  
16 lation and execution.

17 (d) ASSISTANCE TO INSPECTORS GENERAL.—Subject  
18 to available funding, the Director shall provide technical  
19 assistance to improve the education and training of indi-  
20 vidual Federal agency Inspectors General and staff who  
21 are responsible for the annual independent evaluation they  
22 are required to perform of the information security pro-  
23 gram and practices of Federal agencies under section  
24 3555 of title 44, United States Code.

1 (e) SOFTWARE SUPPLY CHAIN SECURITY PRAC-  
2 TICES.—

3 (1) IN GENERAL.—The Director shall, in co-  
4 ordination with industry, academia, and other Fed-  
5 eral agencies, as appropriate, develop a set of secu-  
6 rity outcomes and practices, including security con-  
7 trols, control enhancements, supplemental guidance,  
8 or other supporting information to enable software  
9 developers and operators to identify, assess, and  
10 manage cybersecurity risks over the full lifecycle of  
11 software products.

12 (2) OUTREACH.—The Director shall conduct  
13 outreach and coordination activities to share tech-  
14 nical expertise with Federal agencies, relevant indus-  
15 try stakeholders, and standards development organi-  
16 zations, as appropriate, to encourage the voluntary  
17 adoption of the software lifecycle security practices  
18 by Federal agencies and industry stakeholders.

19 **SEC. 10225. DIGITAL IDENTITY MANAGEMENT RESEARCH.**

20 Section 504 of the Cybersecurity Enhancement Act  
21 of 2014 (15 U.S.C. 7464) is amended to read as follows:

22 **“SEC. 504. IDENTITY MANAGEMENT RESEARCH AND DEVEL-  
23 OPMENT.**

24 “(a) IN GENERAL.—The Director shall carry out a  
25 program of research to support the development of vol-

1 untary, consensus-based technical standards, best prac-  
2 tices, benchmarks, methodologies, metrology, testbeds,  
3 and conformance criteria for identity management, taking  
4 into account appropriate user concerns to—

5           “(1) improve interoperability and portability  
6           among identity management technologies;

7           “(2) strengthen identity proofing and  
8           verification methods used in identity management  
9           systems commensurate with the level of risk, includ-  
10          ing identity and attribute validation services pro-  
11          vided by Federal, State, and local governments;

12          “(3) improve privacy protection in identity  
13          management systems; and

14          “(4) improve the accuracy, usability, and  
15          inclusivity of identity management systems.

16          “(b) DIGITAL IDENTITY TECHNICAL ROADMAP.—  
17          The Director, in consultation with other relevant Federal  
18          agencies and stakeholders from the private sector, shall  
19          develop and maintain a technical roadmap for digital iden-  
20          tity management research and development focused on en-  
21          abling the voluntary use and adoption of modern digital  
22          identity solutions that align with the four criteria in sub-  
23          section (a).

24          “(c) DIGITAL IDENTITY MANAGEMENT GUIDANCE.—

1           “(1) IN GENERAL.—The Director shall develop,  
2           and periodically update, in collaboration with other  
3           public and private sector organizations, common  
4           definitions and voluntary guidance for digital iden-  
5           tity management systems, including identity and at-  
6           tribute validation services provided by Federal,  
7           State, and local governments.

8           “(2) GUIDANCE.—The Guidance shall—

9                   “(A) align with the four criteria in sub-  
10                  section (a), as practicable;

11                  “(B) provide case studies of implementa-  
12                  tion of guidance;

13                  “(C) incorporate voluntary technical stand-  
14                  ards and industry best practices; and

15                  “(D) not prescribe or otherwise require the  
16                  use of specific technology products or services.

17           “(3) CONSULTATION.—In carrying out this sub-  
18           section, the Director shall consult with—

19                   “(A) Federal and State agencies;

20                   “(B) industry;

21                   “(C) potential end-users and individuals  
22                  that will use services related to digital identity  
23                  verification; and

1                   “(D) experts with relevant experience in  
2                   the systems that enable digital identity  
3                   verification, as determined by the Director.”.

4 **SEC. 10226. BIOMETRICS RESEARCH AND TESTING.**

5           (a) IN GENERAL.—The Secretary, acting through the  
6 Director, shall establish a program to support measure-  
7 ment research to inform the development of best practices,  
8 benchmarks, methodologies, procedures, and voluntary,  
9 consensus-based technical standards for biometric identi-  
10 fication systems, including facial recognition systems, to  
11 assess and improve the performance of such systems. In  
12 carrying out such program, the Director may—

13           (1) conduct measurement research to support  
14 efforts to improve the performance of biometric iden-  
15 tification systems, including in areas related to con-  
16 formity assessment, image quality and interoper-  
17 ability, contactless biometric capture technologies,  
18 and human-in-the-loop biometric identification sys-  
19 tems and processes;

20           (2) convene and engage with relevant stake-  
21 holders to establish common definitions and charac-  
22 terizations for biometric identification systems,  
23 which may include accuracy, fairness, bias, privacy,  
24 consent, and other properties, taking into account

1 definitions in relevant international technical stand-  
2 ards and other publications;

3 (3) carry out measurement research and testing  
4 on a range of biometric modalities, such as finger-  
5 prints, voice, iris, face, vein, behavioral biometrics,  
6 genetics, multimodal biometrics, and emerging appli-  
7 cations of biometric identification technology;

8 (4) study the use of privacy-enhancing tech-  
9 nologies and other technical protective controls to fa-  
10 cilitate access, as appropriate, to public data sets for  
11 biometric research;

12 (5) conduct outreach and coordination to share  
13 technical expertise with relevant industry and non-  
14 industry stakeholders and standards development or-  
15 ganizations to assist such entities in the development  
16 of best practices and voluntary technical standards;  
17 and

18 (6) develop such standard reference artifacts as  
19 the Director determines is necessary to further the  
20 development of such voluntary technical standards.

21 (b) BIOMETRICS TEST PROGRAM.—

22 (1) IN GENERAL.—The Secretary, acting  
23 through the Director, shall carry out a test program  
24 to provide biometrics vendors the opportunity to test

1 biometric identification technologies across a range  
2 of modalities.

3 (2) ACTIVITIES.—In carrying out the program  
4 under this subsection, the Director shall—

5 (A) conduct research and regular testing to  
6 improve and benchmark the accuracy, efficacy,  
7 and bias of biometric identification technologies,  
8 which may include research and testing on de-  
9 mographic variations, capture devices, presen-  
10 tation attack detection, partially occluded or  
11 computer generated images, privacy and secu-  
12 rity designs and controls, template protection,  
13 de-identification, and comparison of algorithm,  
14 human, and combined algorithm-human rec-  
15 ognition capability;

16 (B) develop an approach for testing soft-  
17 ware and cloud-based biometrics applications,  
18 including remote systems, in Institute test fa-  
19 cilities;

20 (C) establish reference use cases for bio-  
21 metric identification technologies and perform-  
22 ance criteria for assessing each use case, includ-  
23 ing accuracy, efficacy, and bias metrics;



1           (D) produce public-facing reports of the  
2 findings from such testing for a general audi-  
3 ence;

4           (E) develop policies and procedures ac-  
5 counting for the legal and social implications of  
6 activities under this paragraph when working  
7 with a foreign entity of concern (as such term  
8 is defined in section 10612);

9           (F) establish procedures to prioritize test-  
10 ing of biometrics identification technologies de-  
11 veloped by entities headquartered in the United  
12 States; and

13           (G) conduct such other activities as deter-  
14 mined necessary by the Director.

15       (c) GAO REPORT TO CONGRESS.—Not later than 18  
16 months after the date of the enactment of this Act, the  
17 Comptroller General of the United States shall submit a  
18 detailed report to Congress on the impact of biometric  
19 identification technologies on historically marginalized  
20 communities, including low-income communities and mi-  
21 nority religious, racial, and ethnic groups. Such report  
22 should be made publicly available on an internet website.

1 **SEC. 10227. FEDERAL BIOMETRIC PERFORMANCE STAND-**  
2 **ARDS.**

3 Subsection (b) of section 20 of the National Institute  
4 of Standards and Technology Act (15 U.S.C. 278g-3) is  
5 amended—

6 (1) in paragraph (2), by striking “and” after  
7 the semicolon;

8 (2) in paragraph (3), by striking the period and  
9 inserting “; and”; and

10 (3) by adding at the end the following:

11 “(4) performance standards and guidelines for  
12 high risk biometric identification systems, including  
13 facial recognition systems, accounting for various  
14 use cases, types of biometric identification systems,  
15 and relevant operational conditions.”.

16 **SEC. 10228. PROTECTING RESEARCH FROM CYBERSECU-**  
17 **RITY THEFT.**

18 Subparagraph (A) of section 2(e)(1) of the National  
19 Institute of Standards and Technology Act (15 U.S.C.  
20 272(e)(1)) is amended—

21 (1) in clause (viii), by striking “and” after the  
22 semicolon;

23 (2) by redesignating clause (ix) as clause (x);  
24 and

25 (3) by inserting after clause (viii) the following:

1                   “(ix) consider institutions of higher  
2                   education (as such term is defined in sec-  
3                   tion 101 of the Higher Education Act of  
4                   1965 (20 U.S.C. 1001)); and”.

5 **SEC. 10229. DISSEMINATION OF RESOURCES FOR RE-**  
6 **SEARCH INSTITUTIONS.**

7           (a) DISSEMINATION OF RESOURCES FOR RESEARCH  
8 INSTITUTIONS.—

9           (1) IN GENERAL.—Not later than one year  
10 after the date of the enactment of this Act, the Di-  
11 rector shall, using the authorities of the Director  
12 under subsections (c)(15) and (e)(1)(A)(ix) of sec-  
13 tion 2 of the National Institute of Standards and  
14 Technology Act (15 U.S.C. 272), disseminate and  
15 make publicly available tailored resources to help  
16 qualifying institutions identify, assess, manage, and  
17 reduce their cybersecurity risk related to conducting  
18 research.

19           (2) REQUIREMENTS.—The Director shall en-  
20 sure that the resources disseminated pursuant to  
21 paragraph (1)—

22                   (A) are generally applicable and usable by  
23 a wide range of qualifying institutions;

24                   (B) vary with the nature and size of the  
25 qualifying institutions, and the nature and sen-

1           sitivity of the data collected or stored on the in-  
2           formation systems or devices of the qualifying  
3           institutions;

4           (C) include elements that promote aware-  
5           ness of simple, basic controls, a workplace cy-  
6           bersecurity culture, and third-party stakeholder  
7           relationships, to assist qualifying institutions in  
8           mitigating common cybersecurity risks;

9           (D) include case studies, examples, and  
10          scenarios of practical application;

11          (E) are outcomes-based and can be imple-  
12          mented using a variety of technologies that are  
13          commercial and off-the-shelf; and

14          (F) to the extent practicable, are based on  
15          international technical standards.

16          (3) NATIONAL CYBERSECURITY AWARENESS  
17          AND EDUCATION PROGRAM.—The Director shall en-  
18          sure that the resources disseminated under para-  
19          graph (1) are consistent with the efforts of the Di-  
20          rector under section 303 of the Cybersecurity En-  
21          hancement Act of 2014 (15 U.S.C. 7443).

22          (4) UPDATES.—The Director shall review peri-  
23          odically and update the resources under paragraph  
24          (1) as the Director determines appropriate.

1           (5) VOLUNTARY RESOURCES.—The use of the  
2           resources disseminated under paragraph (1) shall be  
3           considered voluntary.

4           (b) OTHER FEDERAL CYBERSECURITY REQUIRE-  
5           MENTS.—Nothing in this section may be construed to su-  
6           persede, alter, or otherwise affect any cybersecurity re-  
7           quirements applicable to Federal agencies.

8           (c) DEFINITIONS.—In this section:

9           (1) QUALIFYING INSTITUTIONS.—The term  
10          “qualifying institutions” means institutions of high-  
11          er education that are awarded in excess of  
12          \$50,000,000 per year in total Federal research fund-  
13          ing.

14          (2) RESOURCES.—The term “resources” means  
15          guidelines, tools, best practices, technical standards,  
16          methodologies, and other ways of providing informa-  
17          tion.

18   **SEC. 10230. ADVANCED COMMUNICATIONS RESEARCH.**

19          The National Institute of Standards and Technology  
20   Act (15 U.S.C. 271 et seq.) is amended—

21          (1) by redesignating section 35 as section 36;

22          and

23          (2) by inserting after section 34 the following:

1 **“SEC. 35. ADVANCED COMMUNICATIONS RESEARCH ACTIVI-**  
2 **TIES.**

3 “(a) ADVANCED COMMUNICATIONS RESEARCH.—

4 “(1) IN GENERAL.—The Director, in consulta-  
5 tion with the Assistant Secretary for Communica-  
6 tions and Information, the Director of the National  
7 Science Foundation, and heads of other Federal  
8 agencies, as appropriate, shall carry out a program  
9 of measurement research for advanced communica-  
10 tions technologies.

11 “(2) RESEARCH AREAS.—Research areas may  
12 include—

13 “(A) radio frequency emissions and inter-  
14 ference, including technologies and techniques  
15 to mitigate such emissions and interference;

16 “(B) advanced antenna arrays and artifi-  
17 cial intelligence systems capable of operating  
18 advanced antenna arrays;

19 “(C) artificial intelligence systems to en-  
20 able internet of things networks, immersive  
21 technology, and other advanced communications  
22 technologies;

23 “(D) network sensing and monitoring tech-  
24 nologies;

25 “(E) technologies to enable spectrum flexi-  
26 bility and agility;

1                   “(F) optical and quantum communications  
2 technologies;

3                   “(G) security of advanced communications  
4 systems;

5                   “(H) public safety communications;

6                   “(I) resilient internet of things applications  
7 for advanced manufacturing; and

8                   “(J) other research areas determined nec-  
9 essary by the Director.

10                  “(3) TESTBEDS.—In coordination with the As-  
11 sistant Secretary for Communications and Informa-  
12 tion, the private sector, and other Federal agencies  
13 as appropriate, the Director may develop and man-  
14 age testbeds for research and development of ad-  
15 vanced communications technologies, avoiding dupli-  
16 cation of existing testbeds run by other agencies or  
17 the private sector.

18                  “(4) OUTREACH.—In carrying out the activities  
19 under this subsection, the Director shall seek input  
20 from other Federal agencies and from private sector  
21 stakeholders, on an ongoing basis, to help inform re-  
22 search and development priorities, including through  
23 workshops and other multistakeholder activities.

24                  “(5) TECHNICAL ROADMAPS.—In carrying out  
25 the activities under this subsection, the Director

1 shall convene industry, institutions of higher edu-  
2 cation, nonprofit organizations, Federal laboratories,  
3 and other Federal agencies engaged in advanced  
4 communications research and development to de-  
5 velop, and periodically update, coordinated technical  
6 roadmaps for advanced communications research in  
7 priority areas, such as those described in paragraph  
8 (2).

9 “(b) NATIONAL ADVANCED SPECTRUM AND COMMU-  
10 NICATIONS TEST NETWORK.—

11 “(1) IN GENERAL.—The Director, in coordina-  
12 tion with the Administrator of the National Tele-  
13 communications and Information Administration  
14 and heads of other Federal agencies, as appropriate,  
15 shall operate a national network of government, aca-  
16 demic, and commercial test capabilities and facilities  
17 to be known as the National Advanced Spectrum  
18 and Communications Test Network (referred to in  
19 this section as ‘NASCTN’).

20 “(2) PURPOSES.—NASCTN shall be for the  
21 purposes of facilitating and coordinating the use of  
22 intellectual capacity, modeling and simulation, lab-  
23 oratory facilities, and test facilities to meet national  
24 spectrum interests and challenges, including—



1           “(A) measurements and analyses of elec-  
2           tromagnetic propagation, radio systems charac-  
3           teristics, and operating techniques affecting the  
4           utilization of the electromagnetic spectrum in  
5           coordination with specialized, related research  
6           and analysis performed by other Federal agen-  
7           cies in their areas of responsibility;

8           “(B) conducting research and analysis in  
9           the general field of telecommunications sciences  
10          in support of the Institute’s mission and in sup-  
11          port of other Government agencies;

12          “(C) developing methodologies for testing,  
13          measuring, and setting guidelines for inter-  
14          ference;

15          “(D) conducting interference tests to bet-  
16          ter understand the impact of current and pro-  
17          posed Federal and commercial spectrum activi-  
18          ties;

19          “(E) conducting research and testing to  
20          improve spectrum interference tolerance, flexi-  
21          bility, agility, and interference mitigation meth-  
22          ods; and

23          “(F) other activities as determined nec-  
24          essary by the Director.”.

1 **SEC. 10231. NEUTRON SCATTERING.**

2 (a) STRATEGIC PLAN FOR THE INSTITUTE NEUTRON  
3 REACTOR.—The Director shall develop a strategic plan for  
4 the future of the NIST Center for Neutron Research after  
5 the current neutron reactor is decommissioned, includ-  
6 ing—

7 (1) a succession plan for the reactor, including  
8 a roadmap with timeline and milestones;

9 (2) conceptual design of a new reactor and ac-  
10 companying facilities, as appropriate; and

11 (3) a plan to minimize disruptions to the user  
12 community during the transition.

13 (b) COORDINATION WITH THE DEPARTMENT OF EN-  
14 ERGY.—The Secretary, acting through the Director, shall  
15 coordinate with the Secretary of Energy on issues related  
16 to Federal support for neutron science, including esti-  
17 mation of long-term needs for research using neutron  
18 sources, and planning efforts for future facilities to meet  
19 such needs.

20 (c) REPORT TO CONGRESS.—Not later than 30  
21 months after the date of enactment of this Act, the Direc-  
22 tor shall submit to Congress the plan required under sub-  
23 section (a), and shall notify Congress of any substantial  
24 updates to such plan in subsequent years.

1 **SEC. 10232. ARTIFICIAL INTELLIGENCE.**

2 (a) IN GENERAL.—The Director shall continue to  
3 support the development of artificial intelligence and data  
4 science, and carry out the activities of the National Artifi-  
5 cial Intelligence Initiative Act of 2020 authorized in divi-  
6 sion E of the National Defense Authorization Act for Fis-  
7 cal Year 2021 (Public Law 116–283), including  
8 through—

9 (1) expanding the Institute’s capabilities, in-  
10 cluding scientific staff and research infrastructure;

11 (2) supporting measurement research and de-  
12 velopment for advanced computer chips and hard-  
13 ware designed for artificial intelligence systems;

14 (3) supporting the development of technical  
15 standards and guidelines that promote safe and  
16 trustworthy artificial intelligence systems, such as  
17 enhancing the accuracy, explainability, privacy, reli-  
18 ability, robustness, safety, security, and mitigation  
19 of harmful bias in artificial intelligence systems;

20 (4) creating a framework for managing risks  
21 associated with artificial intelligence systems; and

22 (5) developing and publishing cybersecurity  
23 tools, encryption methods, and best practices for ar-  
24 tificial intelligence and data science.

1 (b) AI TESTBEDS.—Section 22A of the National In-  
2 stitute of Standards and Technology Act (15 U.S.C.  
3 278h–1) is amended—

4 (1) by redesignating subsection (g) as sub-  
5 section (h); and

6 (2) by inserting after subsection (f) the fol-  
7 lowing:

8 “(g) TESTBEDS.—In coordination with other Federal  
9 agencies as appropriate, the private sector, and institu-  
10 tions of higher education (as such term is defined in sec-  
11 tion 101 of the Higher Education Act of 1965 (20 U.S.C.  
12 1001)), the Director may establish testbeds, including in  
13 virtual environments, to support the development of robust  
14 and trustworthy artificial intelligence and machine learn-  
15 ing systems, including testbeds that examine the  
16 vulnerabilities and conditions that may lead to failure in,  
17 malfunction of, or attacks on such systems.”.

18 **SEC. 10233. SUSTAINABLE CHEMISTRY RESEARCH AND**  
19 **EDUCATION.**

20 In accordance with section 263 of the National De-  
21 fense Authorization Act for Fiscal Year 2021 (15 U.S.C.  
22 9303), the Director shall carry out activities in support  
23 of sustainable chemistry, including coordinating and  
24 partnering with academia, industry, nonprofit organiza-  
25 tions, and other entities in activities to support clean, safe,

1 and economic alternatives, technologies, and methodolo-  
2 gies to traditional chemical products and processes.

3 **SEC. 10234. PREMISE PLUMBING RESEARCH.**

4 (a) IN GENERAL.—The Secretary, acting through the  
5 Director, shall create a program, in consultation with the  
6 Environmental Protection Agency, for premise plumbing  
7 research, including to—

8 (1) conduct metrology research on premise  
9 plumbing in relation to water safety, security, effi-  
10 ciency, sustainability, and resilience; and

11 (2) coordinate research activities with aca-  
12 demia, the private sector, nonprofit organizations,  
13 and other Federal agencies.

14 (b) DEFINITIONS.—For purposes of this section, the  
15 term “premise plumbing” means the water distribution  
16 system located within the property lines of a property, in-  
17 cluding all buildings and permanent structures on such  
18 property. Such term includes building supply and distribu-  
19 tion pipes, fixtures, fittings, water heaters, water-treating  
20 and water-using equipment, and all respective joints, con-  
21 nections, devices, and appurtenances.

22 **SEC. 10235. DR. DAVID SATCHER CYBERSECURITY EDU-**  
23 **CATION GRANT PROGRAM.**

24 (a) AUTHORIZATION OF GRANTS.—

1           (1) IN GENERAL.—Subject to the availability of  
2           appropriations, the Director shall carry out the Dr.  
3           David Satcher Cybersecurity Education Grant Pro-  
4           gram by—

5                   (A) awarding grants to assist institutions  
6                   of higher education that have an enrollment of  
7                   needy students, historically Black colleges and  
8                   universities, Tribal Colleges and Universities,  
9                   and minority-serving institutions, to establish or  
10                  expand cybersecurity programs, to build and  
11                  upgrade institutional capacity to better support  
12                  new or existing cybersecurity programs, includ-  
13                  ing cybersecurity partnerships with public and  
14                  private entities, and to support such institutions  
15                  on the path to producing qualified entrants in  
16                  the cybersecurity workforce or becoming a Na-  
17                  tional Center of Academic Excellence in Cyber-  
18                  security; and

19                   (B) awarding grants to build capacity at  
20                   institutions of higher education that have an  
21                   enrollment of needy students, historically Black  
22                   colleges and universities, Tribal Colleges and  
23                   Universities, and minority-serving institutions,  
24                   to expand cybersecurity education opportunities,  
25                   cybersecurity programs, cybersecurity research,

1           and cybersecurity partnerships with public and  
2           private entities.

3           (2) RESERVATION.—The Director shall award  
4           not less than 50 percent of the amount available for  
5           grants under this section to historically Black col-  
6           leges and universities, Tribal Colleges and Univer-  
7           sities, and minority-serving institutions.

8           (3) COORDINATION.—The Director shall carry  
9           out this section in coordination with appropriate  
10          Federal agencies, including the Departments of  
11          Homeland Security, Education, and Labor.

12          (4) SUNSET.—The Director's authority to  
13          award grants under paragraph (1) shall terminate  
14          on the date that is 5 years after the date the Direc-  
15          tor first awards a grant under paragraph (1).

16          (b) APPLICATIONS.—An eligible institution seeking a  
17          grant under subsection (a) shall submit an application to  
18          the Director at such time, in such manner, and containing  
19          such information as the Director may reasonably require,  
20          including a statement of how the institution will use the  
21          funds awarded through the grant to expand cybersecurity  
22          education opportunities at the eligible institution.

23          (c) ACTIVITIES.—An eligible institution that receives  
24          a grant under this section may use the funds awarded  
25          through such grant for increasing research, education,

1 technical, partnership, and innovation capacity, including  
2 for—

3           (1) building and upgrading institutional capac-  
4 ity to better support new or existing cybersecurity  
5 programs, including cybersecurity partnerships with  
6 public and private entities;

7           (2) building and upgrading institutional capac-  
8 ity to provide hands-on research and training experi-  
9 ences for undergraduate and graduate students; and

10           (3) outreach and recruitment to ensure stu-  
11 dents are aware of such new or existing cybersecu-  
12 rity programs, including cybersecurity partnerships  
13 with public and private entities.

14 (d) REPORTING REQUIREMENTS.—Not later than—

15           (1) one year after the effective date of this sec-  
16 tion, as provided in subsection (f), and annually  
17 thereafter until the Director submits the report  
18 under paragraph (2), the Director shall prepare and  
19 submit to Congress a report on the status and  
20 progress of implementation of the grant program  
21 under this section, including on the number and de-  
22 mographics of institutions participating, the number  
23 and nature of students served by cybersecurity pro-  
24 grams at institutions receiving grants, as well as the  
25 number of certificates or degrees awarded through



1 such cybersecurity programs, the level of funding  
2 provided to grant recipients, the types of activities  
3 being funded by the grants program, and plans for  
4 future implementation and development; and

5 (2) five years after the effective date of this sec-  
6 tion, as provided in subsection (f), the Director shall  
7 prepare and submit to Congress a report on the sta-  
8 tus of cybersecurity education programming and ca-  
9 pacity-building at institutions receiving grants under  
10 this section, including changes in the scale and scope  
11 of these programs, associated facilities, or in accredi-  
12 tation status, and on the educational and employ-  
13 ment outcomes of students participating in cyberse-  
14 curity programs that have received support under  
15 this section.

16 (e) PERFORMANCE METRICS.—The Director shall es-  
17 tablish performance metrics for grants awarded under this  
18 section.

19 (f) EFFECTIVE DATE.—This section shall take effect  
20 1 year after the date of enactment of this Act.

## 21 **Subtitle C—General Activities**

### 22 **SEC. 10241. EDUCATIONAL OUTREACH AND SUPPORT FOR** 23 **UNDERREPRESENTED COMMUNITIES.**

24 Section 18 of the National Institute of Standards and  
25 Technology Act (15 U.S.C. 278g–1) is amended—

1 (1) in subsection (a), in the second sentence—

2 (A) by striking “may” and inserting  
3 “shall”; and

4 (B) by striking “academia” and inserting  
5 “diverse types of institutions of higher edu-  
6 cation, including historically Black colleges and  
7 universities, Tribal Colleges and Universities,  
8 and minority-serving institutions, and commu-  
9 nity colleges”; and

10 (2) in subsection (e)—

11 (A) in paragraph (4), by striking “and” at  
12 the end;

13 (B) in paragraph (5), by striking the pe-  
14 riod at the end and inserting “; and”; and

15 (C) by inserting after paragraph (5) the  
16 following:

17 “(6) conduct outreach to and develop research  
18 collaborations with historically Black colleges and  
19 universities, Tribal Colleges or Universities, and mi-  
20 nority serving institutions, including through the re-  
21 cruitment of students and faculty at such institu-  
22 tions to participate in programs developed under  
23 paragraph (3);

24 “(7) conduct outreach to and develop research  
25 collaborations with community colleges, including

1 through the recruitment of students and faculty at  
2 such institutions to participate in programs devel-  
3 oped under paragraph (3);

4 “(8) carry out other activities to increase the  
5 participation of persons historically underrep-  
6 resented in STEM in the Institute’s programs; and

7 “(9) conduct outreach to and develop collabora-  
8 tions with nontraditional educational organizations,  
9 including those that offer training through nonprofit  
10 associations and professional associations or profes-  
11 sional societies, to engage persons historically under-  
12 represented in STEM through programs developed  
13 under this subsection.”.

14 **SEC. 10242. OTHER TRANSACTIONS AUTHORITY.**

15 (a) IN GENERAL.—Paragraph (4) of section 2(b) of  
16 the National Institute of Standards and Technology Act  
17 (15 U.S.C. 272(b)) is amended to read as follows:

18 “(4) to enter into and perform such contracts,  
19 including cooperative research and development ar-  
20 rangements and grants and cooperative agreements  
21 or other transactions, as may be necessary in the  
22 conduct of its work and on such terms as it may de-  
23 termine appropriate, in furtherance of the purposes  
24 of this Act;”.

1           (b) REPORTING.—Not later than one year after the  
2 date of the enactment of this Act and not less than annu-  
3 ally thereafter, the Secretary shall submit to the Com-  
4 mittee on Science, Space, and Technology and the Com-  
5 mittee on Appropriations of the House of Representatives  
6 and the Committee on Commerce, Science, and Transpor-  
7 tation and the Committee on Appropriations of the Senate  
8 a report on the use of agreements, activities, and associ-  
9 ated funding for transactions (other than contracts, coop-  
10 erative agreements, and grants) described in paragraph  
11 (4) of section 2(b) of the National Institute of Standards  
12 and Technology Act (as amended by subsection (a)), in-  
13 cluding the following elements:

14           (1) A description of when the other transactions  
15 authority described in such amended paragraph was  
16 used and for what purpose.

17           (2) A description of why such other trans-  
18 actions authority was required.

19           (3) Steps taken to ensure necessary and suffi-  
20 cient oversight of Federal Government requirements  
21 implemented using such other transactions author-  
22 ity.

1 **SEC. 10243. REPORT TO CONGRESS ON COLLABORATIONS**  
2 **WITH GOVERNMENT AGENCIES.**

3 Not later than 6 months after the date of the enact-  
4 ment of this Act, the Director shall submit a report to  
5 the Committee on Science, Space, and Technology and the  
6 Committee on Appropriations of the House of Representa-  
7 tives and the Committee on Commerce, Science, and  
8 Transportation and the Committee on Appropriations of  
9 the Senate describing the Institute’s challenges with re-  
10 spect to collaboration between the Institute and other Fed-  
11 eral agencies. The report shall include, at a minimum—

12 (1) an assessment of the challenges that arise  
13 with interagency collaboration, including transfer of  
14 funds with a limited period of availability to the In-  
15 stitute and issues with sharing personnel, associates,  
16 facilities, and property with collaborating agencies;  
17 and

18 (2) descriptions of projects that were disrupted  
19 due to the challenges outlined in paragraph (1).

20 **SEC. 10244. HIRING CRITICAL TECHNICAL EXPERTS.**

21 Section 6 of the National Institute of Standards and  
22 Technology Act (15 U.S.C. 275) is amended to read as  
23 follows:

24 **“SEC. 6. HIRING CRITICAL TECHNICAL EXPERTS.**

25 “(a) IN GENERAL.—The officers and employees of  
26 the Institute, except the director, shall be appointed by

1 the Secretary at such time as their respective services may  
2 become necessary.

3 “(b) **HIRING CRITICAL TECHNICAL EXPERTS.**—Not-  
4 withstanding section 3104 of title 5 or the provisions of  
5 any other law relating to the appointment, number, classi-  
6 fication, or compensation of employees, the Secretary shall  
7 have the authority to make appointments of scientific, en-  
8 gineering, and professional personnel, and to fix the basic  
9 pay of such personnel at a rate to be determined by the  
10 Secretary at rates not in excess of the highest total annual  
11 compensation payable at the rate determined under sec-  
12 tion 104 of title 3, United States Code. The Director shall  
13 appoint not more than 15 personnel under this section.

14 “(c) **SUNSET.**—The authority under section (b) shall  
15 expire on the date that is 5 years after the date of the  
16 enactment of this section.”.

17 **SEC. 10245. INTERNATIONAL STANDARDS DEVELOPMENT.**

18 (a) **SENSE OF CONGRESS.**—It is the sense of Con-  
19 gress that—

20 (1) the principles of openness, transparency,  
21 due process, balance of interests, appeals, and con-  
22 sensus in the development of international standards  
23 are critical;

24 (2) voluntary consensus standards, developed  
25 through an industry-led process, serve as the corner-

1 stone of the United States standardization system  
2 and have become the basis of a sound national econ-  
3 omy and the key to global market access;

4 (3) strengthening the unique United States  
5 public-private partnerships approach to standards  
6 development is critical to United States economic  
7 competitiveness; and

8 (4) the United States Government should en-  
9 sure cooperation and coordination across Federal  
10 agencies to partner with and support private sector  
11 stakeholders to continue to shape international dia-  
12 logues in regard to standards development for  
13 emerging technologies.

14 (b) INTERNATIONAL STANDARDS ENGAGEMENT.—

15 (1) IN GENERAL.—The Director shall lead in-  
16 formation exchange and coordination among Federal  
17 agencies and communication from Federal agencies  
18 to the private sector of the United States to ensure  
19 effective Federal engagement in the development  
20 and use of international technical standards.

21 (2) REQUIREMENTS.—To support private sec-  
22 tor-led engagement and ensure effective Federal en-  
23 gagement in the development and use of inter-  
24 national technical standards, the Director shall con-  
25 sider—

1 (A) the role and needs of the Federal Gov-  
2 ernment with respect to international technical  
3 standards;

4 (B) organizations developing international  
5 technical standards of interest to the United  
6 States, United States representation and influ-  
7 ence in these organizations, and key contribu-  
8 tors for technical and leadership expertise in  
9 these organizations;

10 (C) support for persons with domain sub-  
11 ject matter expertise, especially from small  
12 businesses located in the United States, to in-  
13 fluence and engage in technical standards lead-  
14 ership positions, working groups and meetings;

15 (D) opportunities for partnerships for sup-  
16 porting international technical standards from  
17 across the Federal Government, Federally fund-  
18 ed research and development centers, univer-  
19 sity-affiliated research centers, institutions of  
20 higher education, industry, industry associa-  
21 tions, nonprofit organizations, and other key  
22 contributors;

23 (E) support for activities to encourage the  
24 adoption of technical standards developed in the



1 United States to be adopted by international  
2 standards organizations; and

3 (F) other activities determined by the Di-  
4 rector to be necessary to support United States  
5 participation in international standards develop-  
6 ment, economic competitiveness, and national  
7 security in the development and use of inter-  
8 national technical standards.

9 (c) CAPACITY BUILDING GUIDANCE.—The Director  
10 shall support education and workforce development efforts  
11 to promote United States participation in international  
12 standards organizations. The Director shall—

13 (1) identify and create, as appropriate, tech-  
14 nical standards education and training resources for  
15 interested businesses, industry associations, aca-  
16 demia, nonprofit organizations, Federal agencies,  
17 and other relevant standards contributors, including  
18 activities targeted at integrating standards content  
19 into undergraduate and graduate curricula in  
20 science, engineering, business, public policy, and law;

21 (2) conduct outreach, including to private sec-  
22 tor leaders, to support engagement by more United  
23 States stakeholders in international technical stand-  
24 ards development; and

1           (3) other activities determined necessary by the  
2 Director to support increased engagement, influence,  
3 and leadership of United States organizations in the  
4 development of international technical standards.

5 (d) CAPACITY BUILDING PILOT PROGRAM.—

6           (1) IN GENERAL.—The Director, in coordina-  
7 tion with the Director of the National Science Foun-  
8 dation, and the heads of other relevant Federal  
9 agencies, as appropriate, shall establish or enter into  
10 cooperative agreements with appropriate nongovern-  
11 mental organizations to establish a 5-year pilot pro-  
12 gram to award grants, on a merit-reviewed, competi-  
13 tive basis, to private sector entities, institutions of  
14 higher education, or nonprofit institutions based in  
15 the United States to support increased participation  
16 and leadership by small business and academic inter-  
17 ests in international standards organizations.

18           (2) USE OF FUNDS.—Grants awarded to eligi-  
19 ble entities under this subsection may be used to  
20 cover reasonable costs, up to a specified ceiling set  
21 by the Director, of activities to support increased en-  
22 gagement and leadership of eligible entity employees  
23 in international standards organizations, which may  
24 include costs associated with—

25                   (A) travel;

1 (B) education and training;

2 (C) dues or fees related to participation in  
3 technical standards development activities; and

4 (D) other such costs that the Director de-  
5 termines may reasonably support participation  
6 of the eligible entity in international standards  
7 organizations.

8 (3) AWARD CRITERIA.—The Director shall en-  
9 sure that award decisions made under this sub-  
10 section take into account the extent to which the eli-  
11 gible entity—

12 (A) employs full-time an individual or indi-  
13 viduals who demonstrate deep technical stand-  
14 ards expertise;

15 (B) employs full-time an individual or indi-  
16 viduals who demonstrate knowledge with the  
17 processes of the standards development organi-  
18 zation in which the eligible entity intends to en-  
19 gage using grant funds;

20 (C) proposes a feasible set of standard  
21 deliverables to be completed over the period of  
22 the grant;

23 (D) explains how the eligible entity will  
24 fund additional standards-related activities nec-  
25 essary to achieve the deliverables referred to in

1           subparagraph (C) if the grant funds are insuffi-  
2           cient to cover all costs of such activities;

3           (E) commits personnel with appropriate  
4           expertise to regularly engage in relevant inter-  
5           national organizations responsible for devel-  
6           oping technical standards over the period of the  
7           grant; and

8           (F) identifies a clearly defined current or  
9           anticipated market need or gap that would be  
10          addressed by their standards development pro-  
11          posal.

12          (4) ELIGIBILITY.—A small business concern (as  
13          such term is defined in section 3 of the Small Busi-  
14          ness Act (15 U.S.C. 632) based in the United  
15          States, an institution of higher education, or a non-  
16          profit institution (as such term is defined in section  
17          4 of the Stevenson-Wydler Technology Innovation  
18          Act of 1980 (15 U.S.C. 3703)) shall be eligible to  
19          receive grants under this program.

20          (5) GUIDANCE ON APPLICATION AND AWARD  
21          PROCESS.—The Director shall develop, and periodi-  
22          cally update, guidance, including eligibility, applicant  
23          disclosure requirements, grant amount and duration,  
24          the merit review process, priority areas for stand-

1       ards development, and any additional requirements  
2       for how grants are awarded under this subsection.

3           (6) MERIT REVIEW PROCESS.—The Director  
4       shall ensure that grants under this subsection are  
5       awarded based on a competitive, merit review pro-  
6       cess including the use of merit review panels that  
7       may include experts from both government, the pri-  
8       vate sector, and, as appropriate, academic, non-  
9       profit, or other organizations as the Director deter-  
10      mines appropriate.

11          (7) CONSULTATION.—In carrying out the pilot  
12      program established under this subsection, the Di-  
13      rector shall consult with other Federal agencies, pri-  
14      vate sector organizations, institutions of higher edu-  
15      cation, and nonprofit organizations to help inform  
16      the pilot program, including the guidance developed  
17      under paragraph (5).

18          (8) REPORT TO CONGRESS.—The Director shall  
19      brief Congress after the second year of the pilot pro-  
20      gram and each year following that includes the fol-  
21      lowing:

22            (A) An assessment of the effectiveness of  
23            the pilot program for improving the participa-  
24            tion of United States small businesses, United  
25            States institutions of higher education, or other

1 nonprofit research institutions in international  
2 standards organizations, including—

3 (i) the type of activities supported, in-  
4 cluding leadership roles;

5 (ii) the international standards orga-  
6 nizations participated in; and

7 (iii) the technical areas covered by the  
8 activities.

9 (B) If determined effective, a plan for per-  
10 manent implementation of the pilot program.

11 **SEC. 10246. STANDARD TECHNICAL UPDATE.**

12 (a) NATIONAL INSTITUTE OF STANDARDS AND  
13 TECHNOLOGY ACT UPDATES.—The National Institute of  
14 Standards and Technology Act (15 U.S.C. 271) is amend-  
15 ed—

16 (1) by amending subsection (a) of section 17  
17 (15 U.S.C. 278g) to read as follows:

18 “(a) The Secretary is authorized, notwithstanding  
19 any other provision of law, to expend such sums, within  
20 the limit of appropriated funds, as the Secretary may de-  
21 termine desirable through direct support for activities of  
22 international organizations and foreign national metrology  
23 institutes with which the Institute cooperates to advance  
24 measurement methods, technical standards, and related  
25 basic technologies, for official representation, to host offi-

1 cial receptions, dinners, and similar events, and to other-  
2 wise extend official courtesies, including transportation of  
3 foreign dignitaries and representatives of foreign national  
4 metrology institutes to and from the Institute, for the pur-  
5 pose of maintaining the standing and prestige of the De-  
6 partment of Commerce and the Institute, through the  
7 grant of fellowships or other appropriate form of financial  
8 or logistical assistance or support to foreign nationals not  
9 in service to the Government of the United States while  
10 they are performing scientific or engineering work at the  
11 Institute or participating in the exchange of scientific or  
12 technical information at the Institute.”; and

13 (2) in section 20 (15 U.S.C. 278g-3)—

14 (A) in subsection (c), by amending para-  
15 graph (3) to read as follows:

16 “(3) submit such standards and guidelines to  
17 the Secretary of Commerce for promulgation under  
18 section 11331 of title 40;” and

19 (B) in subsection (d)—

20 (i) in paragraph (1), by striking “Di-  
21 rector of the Office of Management and  
22 Budget” and inserting “Secretary of Com-  
23 merce”; and

24 (ii) in paragraph (8), by striking “Di-  
25 rector of Management and Budget with

1           such standards submitted to the Director”  
2           and inserting “Secretary of Commerce  
3           with such standards submitted to the Sec-  
4           retary”.

5           (b) STEVENSON-WYDLER UPDATES.—The Steven-  
6           son-Wydler Technology Innovation Act of 1980 (15 U.S.C.  
7           3701 et seq.) is amended—

8           (1) in paragraph (1) of section 17(c) (15  
9           U.S.C. 3711a(c))—

10           (A) by moving each of subparagraphs (D)  
11           and (E) two ems to the left; and

12           (B) by adding at the end the following:

13           “(G) Community.”; and

14           (2) in subsection (m) of section 26 (15 U.S.C.  
15           3721)—

16           (A) by striking paragraph (2);

17           (B) by redesignating paragraph (3) as  
18           paragraph (2); and

19           (C) in paragraph (2), as so redesignated,  
20           by striking “and the Comptroller General’s re-  
21           view under paragraph (2)”.

22           (c) AMERICAN INNOVATION AND COMPETITIVENESS  
23           ACT UPDATE.—Section 113 of the American Innovation  
24           and Competitiveness Act (15 U.S.C. 278e note) is re-  
25           pealed.



1 (d) CLERICAL AMENDMENT.—The item relating to  
2 section 113 in the table of contents in section 1(b) of the  
3 American Innovation and Competitiveness Act is repealed.

4 (e) FEDERAL ENERGY MANAGEMENT IMPROVEMENT  
5 ACT UPDATE.—Section 4 of the Federal Energy Manage-  
6 ment Improvement Act of 1988 (15 U.S.C. 5001) is  
7 amended—

8 (1) by striking “Secretary of Commerce” and  
9 “Secretary” each place either such term appears and  
10 inserting “Consumer Product Safety Commission”;

11 (2) by redesignating the second subsection (c)  
12 as subsection (e); and

13 (3) in subsection (g), by redesignating clauses  
14 (i) and (ii) as paragraphs (1) and (2), respectively.

15 (f) TITLE 40, UNITED STATES CODE.—Section  
16 11331 of title 40, United States Code, is amended by  
17 striking subsections (a) through (d) and inserting the fol-  
18 lowing:

19 “(a) STANDARDS AND GUIDELINES.—

20 “(1) AUTHORITY TO PRESCRIBE.—Except as  
21 provided under paragraph (2), the Secretary of  
22 Commerce shall, on the basis of standards and  
23 guidelines developed by the National Institute of  
24 Standards and Technology pursuant to paragraphs  
25 (2) and (3) of section 20(a) of the National Institute

1 of Standards and Technology Act (15 U.S.C. 278g–  
2 3(a)), prescribe standards and guidelines pertaining  
3 to Federal information systems.

4 “(2) NATIONAL SECURITY SYSTEMS.—Stand-  
5 ards and guidelines for national security systems  
6 shall be developed, prescribed, enforced, and over-  
7 seen as otherwise authorized by law and as directed  
8 by the President.

9 “(b) MANDATORY REQUIREMENTS.—

10 “(1) AUTHORITY TO MAKE MANDATORY.—Ex-  
11 cept as provided under paragraph (2), the Secretary  
12 of Commerce shall make standards prescribed under  
13 subsection (a)(1) compulsory and binding to the ex-  
14 tent determined necessary by the Secretary to im-  
15 prove the efficiency of operation or security of Fed-  
16 eral information systems.

17 “(2) REQUIRED MANDATORY STANDARDS.—

18 “(A) IN GENERAL.—Standards prescribed  
19 under subsection (a)(1) shall include informa-  
20 tion security standards that—

21 “(i) provide minimum information se-  
22 curity requirements as determined under  
23 section 20(b) of the National Institute of  
24 Standards and Technology Act (15 U.S.C.  
25 278g–3(b)); and

1                   “(ii) are otherwise necessary to im-  
2                   prove the security of Federal information  
3                   and information systems.

4                   “(B) REQUIREMENT.—Information secu-  
5                   rity standards described in subparagraph (A)  
6                   shall be compulsory and binding.

7                   “(c) AUTHORITY TO DISAPPROVE OR MODIFY.—The  
8                   President may disapprove or modify the standards and  
9                   guidelines referred to in subsection (a)(1) if the President  
10                  determines such action to be in the public interest. The  
11                  President’s authority to disapprove or modify such stand-  
12                  ards and guidelines may not be delegated. Notice of such  
13                  disapproval or modification shall be published promptly in  
14                  the Federal Register. Upon receiving notice of such dis-  
15                  approval or modification, the Secretary of Commerce shall  
16                  immediately rescind or modify such standards or guide-  
17                  lines as directed by the President.

18                  “(d) EXERCISE OF AUTHORITY.—To ensure fiscal  
19                  and policy consistency, the Secretary of Commerce shall  
20                  exercise the authority conferred by this section subject to  
21                  direction by the President and in coordination with the  
22                  Director of the Office of Management and Budget.

23                  “(e) APPLICATION OF MORE STRINGENT STAND-  
24                  ARDS.—The head of an executive agency may employ  
25                  standards for the cost-effective information security for

1 Federal information systems within or under the super-  
2 vision of that agency that are more stringent than the  
3 standards the Secretary prescribes under this section if  
4 the more stringent standards—

5           “(1) contain at least the applicable standards  
6           made compulsory and binding by the Secretary of  
7           Commerce; and

8           “(2) are otherwise consistent with policies and  
9           guidelines issued under section 3553 of title 44.

10          “(f) DECISIONS ON PROMULGATION OF STAND-  
11 ARDS.—The decision by the Secretary of Commerce re-  
12 garding the promulgation of any standard under this sec-  
13 tion shall occur not later than 6 months after the submis-  
14 sion of the proposed standard to the Secretary by the Na-  
15 tional Institute of Standards and Technology, as provided  
16 under section 20 of the National Institute of Standards  
17 and Technology Act (15 U.S.C. 278g–3).

18          “(g) DEFINITIONS.—In this section:

19           “(1) FEDERAL INFORMATION SYSTEM.—The  
20           term ‘Federal information system’ means an infor-  
21           mation system used or operated by an executive  
22           agency, by a contractor of an executive agency, or by  
23           another organization on behalf of an executive agen-  
24           cy.

1           “(2) INFORMATION SECURITY.—The term ‘in-  
2           formation security’ has the meaning given that term  
3           in section 3552(b)(3) of title 44.

4           “(3) NATIONAL SECURITY SYSTEM.—The term  
5           ‘national security system’ has the meaning given  
6           that term in section 3552(b)(6) of title 44.”.

7           (g) TECHNICAL AND CONFORMING AMENDMENT.—  
8           Paragraph (2) of section 20(a) of the National Institute  
9           of Standards and Technology Act (15 U.S.C. 278g–3(a))  
10          is amended by striking “section 3552(b)(5) of title 44,  
11          United States Code” and inserting “section 3552(b)(6) of  
12          title 44, United States Code”.

13          (h) NATIONAL CONSTRUCTION SAFETY TEAM ACT  
14          UPDATES.—Section 4 of the National Construction Safety  
15          Team Act (15 U.S.C. 7303) is amended—

16                 (1) in subsection (c), by adding at the end the  
17                 following:

18                         “(5) CIVIL SUITS.—Where practicable, a Team  
19                         shall cooperate with civil litigants without compro-  
20                         mising a Team’s investigation or the evidence pres-  
21                         ervation activities as described in this section.”; and

22                 (2) in subsection (d)—

23                         (A) in the subsection heading, by striking  
24                         “INTERAGENCY” and inserting “INVESTIGA-  
25                         TION”; and

1 (B) in paragraph (1), by inserting “or any  
2 civil suit or civil action” after “Federal agen-  
3 cy”.

4 **SEC. 10247. GAO STUDY OF NIST RESEARCH SECURITY**  
5 **POLICIES AND PROTOCOLS.**

6 (a) EVALUATION.—Not later than 1 year after the  
7 date of enactment of this Act, the Comptroller General  
8 of the United States shall conduct a study of the Insti-  
9 tute’s policies and protocols to protect its research and  
10 combat undue foreign influence.

11 (b) MATTERS TO BE INCLUDED.—The study con-  
12 ducted under subsection (a) shall include, to the extent  
13 practicable, the following:

14 (1) An analysis of steps taken by the Institute  
15 to address foreign threats to Institute-funded re-  
16 search over the previous 5 years.

17 (2) An analysis of the coordination and engage-  
18 ment between the Department of Commerce’s Office  
19 of Inspector General, the Department of Commerce’s  
20 Office of Intelligence, the National Counterintel-  
21 ligence and Security Center of the Office of the Di-  
22 rector of National Intelligence, and the Institute in  
23 identifying and addressing concerning findings.

24 (3) An assessment of the Institute’s review  
25 process for foreign national associates.

1           (4) An assessment of the Institute’s policies as  
2 it relates to employees and associates participating  
3 in foreign talent recruitment programs.

4           (5) An assessment of the Institute’s implemen-  
5 tation of conflict of interest and disclosure policies  
6 and requirements, including the disclosure require-  
7 ments authorized in section 223 of the National De-  
8 fense Authorization Act for Fiscal Year 2021 (Pub-  
9 lic Law 116–283).

10          (6) An assessment of the Institute’s, the De-  
11 partment of Commerce’s Office of Security, the De-  
12 partment of Commerce’s Office of Intelligence, and  
13 the Department of Commerce’s Office of Inspector  
14 General’s ability to monitor and enforce conflict of  
15 interest and disclosure policies and requirements, in-  
16 cluding the disclosure requirements authorized in  
17 section 223 of the National Defense Authorization  
18 Act for Fiscal Year 2021 (Public Law 116–283).

19          (7) An assessment of the Institute’s, the De-  
20 partment of Commerce’s, and the Department of  
21 Commerce’s Office of Inspector General’s ability to  
22 conduct risk assessments of research and develop-  
23 ment award applications and disclosures to the Insti-  
24 tute.

1           (8) An assessment of the Institute’s research  
2 security training programs for both internal and ex-  
3 ternally-supported researchers and associates, in-  
4 cluding training focused on international collabora-  
5 tion, and international travel, foreign interference,  
6 and rules for proper use of funds, disclosure, conflict  
7 of commitment, and conflict of interest.

8           (9) An analysis and summary of incidents of  
9 undue foreign influence at Institute-supported re-  
10 search facilities and programs over the past 10  
11 years.

12           (10) Recommendations for the Institute to bol-  
13 ster its research security policies and protocols.

14           (11) Other matters the Comptroller General de-  
15 termines appropriate.

16       (c) CONGRESSIONAL BRIEFING.—Not later than 180  
17 days after the date of enactment of this Act, the Comp-  
18 troller General shall brief the Committee on Science,  
19 Space, and Technology and the Permanent Select Com-  
20 mittee on Intelligence of the House of Representatives and  
21 the Committee of Commerce, Science, and Transportation  
22 and the Select Committee on Intelligence of the Senate  
23 on the findings available from the evaluation conducted  
24 under subsection (a).



1 (d) REPORT.—Not later than 18 months after the  
2 date of enactment of this Act, the Comptroller General  
3 shall submit to the congressional committees specified in  
4 subsection (c) a report on the findings and recommenda-  
5 tions of the evaluation conducted under subsection (a).

6 **SEC. 10248. STANDARDS DEVELOPMENT ORGANIZATION**  
7 **GRANTS.**

8 (a) NONGOVERNMENTAL STANDARDS DEVELOPMENT  
9 ORGANIZATION DEFINED.—In this section, the term  
10 “nongovernmental standards development organization”  
11 means a nongovernmental standards development organi-  
12 zation (as defined in section 2(e) of the Office of Manage-  
13 ment and Budget Circular A–119 (relating to Federal par-  
14 ticipation in the development and use of voluntary con-  
15 sensus standards in conformity assessment activities), or  
16 any successor document) that adheres to the American  
17 National Standards Institute (ANSI) Essential Require-  
18 ments for Due Process for American National Standards.

19 (b) GRANT AUTHORITY.—The Secretary of Com-  
20 merce, acting through the Director, shall establish a com-  
21 petitive program of grants for nongovernmental standards  
22 development organizations for the purposes described in  
23 subsection (c).

24 (c) PURPOSES.—A grant awarded under subsection  
25 (b) shall be used to develop, approve, disseminate, main-

1 tain, and review forensic science voluntary consensus  
2 standards and best practices that shall be available to the  
3 public free of charge.

4 (d) **ADDITIONAL REQUIREMENTS.**—The Director  
5 may promulgate such requirements, guidelines, and proce-  
6 dures as may be necessary to carry out this section.

7 (e) **AUTHORIZATION OF APPROPRIATIONS.**—There  
8 are authorized to be appropriated to carry out this section  
9 \$2,000,000 for each of fiscal years 2022 through 2026.

10 **Subtitle D—Hollings Manufacturing**  
11 **Extension Partnership**

12 **SEC. 10251. ESTABLISHMENT OF EXPANSION AWARDS**  
13 **PILOT PROGRAM AS A PART OF THE HOL-**  
14 **LINGS MANUFACTURING EXTENSION PART-**  
15 **NERSHIP.**

16 (a) **ESTABLISHMENT OF EXPANSION AWARDS PRO-**  
17 **GRAM.**—The National Institute of Standards and Tech-  
18 nology Act (15 U.S.C. 271 et seq.) is amended by insert-  
19 ing after section 25A (15 U.S.C. 278k–1) the following:

20 **“SEC. 25B. EXPANSION AWARDS PILOT PROGRAM.**

21 “(a) **DEFINITIONS.**—The terms used in this section  
22 have the meanings given the terms in section 25.

23 “(b) **ESTABLISHMENT.**—The Director shall establish,  
24 subject to the availability of appropriations, as a part of  
25 the Hollings Manufacturing Extension Partnership under

1 sections 25 and 25A, a pilot program of expansion awards  
2 among participants described in subsection (c) for the pur-  
3 poses described in subsection (e).

4 “(c) PARTICIPANTS.—Participants receiving awards  
5 under this section shall be Centers, or a consortium of  
6 Centers (as such term is defined in section 25).

7 “(d) AWARD AMOUNTS.—Subject to the availability  
8 of appropriations, an award for a recipient under this sec-  
9 tion shall be in an amount equal to the sum of the fol-  
10 lowing:

11 “(1) Such amount as the Director considers ap-  
12 propriate as a minimum base funding level for each  
13 award under this section.

14 “(2) Such additional amount as the Director  
15 considers in proportion to the manufacturing density  
16 of the region of the recipient.

17 “(3) Such supplemental amounts as the Direc-  
18 tor considers appropriate.

19 “(e) PURPOSE OF AWARDS.—An award under this  
20 section shall be made for one or more of the following pur-  
21 poses:

22 “(1) To provide worker education, training, de-  
23 velopment, and entrepreneurship training and to  
24 connect individuals or business with such services of-  
25 fered in their community, which may include em-

1        ployee ownership and workforce training, including  
2        connecting manufacturers with career and technical  
3        education entities, institutions of higher education  
4        (including community colleges), workforce develop-  
5        ment boards, labor organizations, and nonprofit job  
6        training providers to develop and support training  
7        and job placement services, including apprenticeship  
8        and online learning platforms, for new and incum-  
9        bent workers, programming to prevent job losses  
10       when adopting new technologies and processes, and  
11       development of employee ownership practices.

12            “(2) To provide services to improve the resil-  
13        iency of domestic supply chains.

14            “(3) To mitigate vulnerabilities to cyberattacks,  
15        including helping to offset the cost of cybersecurity  
16        projects for small manufacturers.

17            “(4) To expand advanced technology services to  
18        United States-based small- and medium-sized manu-  
19        facturers, which may include—

20                    “(A) developing technology demonstration  
21        laboratories;

22                    “(B) training and demonstration in areas  
23        of supply chain and critical technology needs,  
24        including a focus on the demonstration of tech-

1 nologies developed by companies based in the  
2 United States;

3 “(C) services for the adoption of advanced  
4 technologies, including smart manufacturing  
5 technologies and practices; and

6 “(D) establishing partnerships, for the de-  
7 velopment, demonstration, and deployment of  
8 advanced technologies, with—

9 “(i) national laboratories (as defined  
10 in section 2 of the Energy Policy Act of  
11 2005 (42 U.S.C. 15801));

12 “(ii) Federal laboratories;

13 “(iii) Manufacturing USA institutes  
14 (as described in section 34(d)); and

15 “(iv) institutions of higher education.

16 “(5) To build capabilities across the Hollings  
17 Manufacturing Extension Partnership for domestic  
18 supply chain resiliency and optimization, including—

19 “(A) assessment of domestic manufac-  
20 turing capabilities, expanded capacity for re-  
21 searching and deploying information on supply  
22 chain risk, hidden costs of reliance on offshore  
23 suppliers, redesigning products and processes to  
24 encourage reshoring, and other relevant topics;  
25 and

1           “(B) expanded services to provide indus-  
2           trywide support that assists United States man-  
3           ufacturers with reshoring manufacturing to  
4           strengthen the resiliency of domestic supply  
5           chains, including in critical technology areas  
6           and foundational manufacturing capabilities  
7           that are key to domestic manufacturing com-  
8           petitiveness and resiliency, including forming,  
9           casting, machining, joining, surface treatment,  
10          tooling, and metal or chemical refining.

11          “(f) REIMBURSEMENT.—The Director may reim-  
12          burse Centers for costs incurred by the Centers under this  
13          section.

14          “(g) APPLICATIONS.—Applications for awards under  
15          this section shall be submitted in such manner, at such  
16          time, and containing such information as the Director  
17          shall require in consultation with the Manufacturing Ex-  
18          tension Partnership Advisory Board.

19          “(h) SELECTION.—

20                  “(1) REVIEWED AND MERIT-BASED.—The Di-  
21                  rector shall ensure that awards under this section  
22                  are reviewed and merit-based.

23                  “(2) GEOGRAPHIC DIVERSITY.—The Director  
24                  shall endeavor to have broad geographic diversity  
25                  among selected proposals.

1           “(3) CRITERIA.—The Director shall select ap-  
2           plications consistent with the purposes identified  
3           pursuant to subsection (e) to receive awards that the  
4           Director determines will achieve one or more of the  
5           following:

6                   “(A) Improvement of the competitiveness  
7                   of industries in the region in which the Center  
8                   or Centers are located.

9                   “(B) Creation of jobs or training of newly  
10                  hired employees.

11                  “(C) Promotion of the transfer and com-  
12                  mercialization of research and technology from  
13                  institutions of higher education, national lab-  
14                  oratories, or other federally funded research  
15                  programs, and nonprofit research institutes.

16                  “(D) Recruitment of a diverse manufac-  
17                  turing workforce, including through outreach to  
18                  underrepresented populations, including individ-  
19                  uals identified in section 33 or section 34 of the  
20                  Science and Engineering Equal Opportunities  
21                  Act (42 U.S.C. 1885a, 1885b).

22                  “(E) Any other result the Director deter-  
23                  mines will advance the objective set forth in  
24                  section 25(c) or 25A.

1       “(i) PROGRAM CONTRIBUTION.—Recipients of  
2 awards under this section shall not be required to provide  
3 a matching contribution.

4       “(j) GLOBAL MARKETPLACE PROJECTS.—In making  
5 an award under this section, the Director, in consultation  
6 with the Manufacturing Extension Partnership Advisory  
7 Board and the Secretary, may take into consideration  
8 whether an application has significant potential for en-  
9 hancing the competitiveness of small and medium-sized  
10 United States manufacturers in the global marketplace.

11       “(k) DURATION.—The Director shall ensure that the  
12 duration of an award under this section is aligned and  
13 consistent with a Center’s cooperative agreement estab-  
14 lished in section 25(e).

15       “(l) REPORT.—Not later than October 1, 2025, the  
16 Director shall submit to Congress a report that includes—

17               “(1) a summary description of what activities  
18 were funded and the measurable outcomes of such  
19 activities;

20               “(2) a description of which types of activities  
21 under paragraph (1) could remain as part of a per-  
22 manent expansion awards program;

23               “(3) a description of which types of activities  
24 under paragraph (1) could be integrated into, and  
25 supported under, the program under section 25;



1           “(4) a description of which types of activities  
2           under paragraph (1) could be integrated into, and  
3           supported under, the competitive awards program  
4           under section 25A; and

5           “(5) a recommendation, supported by a clear  
6           explanation, as to whether the pilot program should  
7           be continued.”.

8           (b) RESOURCE OPTIMIZATION.—Of amounts author-  
9           ized for the Hollings Manufacturing Extension Partner-  
10          ship program under section 25 of the National Institute  
11          of Standards and Technology Act (15 U.S.C. 278k), the  
12          Secretary shall optimize funding across sections 25 and  
13          25A of such Act, as well as the program established under  
14          section 25B of such Act (as added by subsection (a)), to  
15          the extent practicable and subject to the availability of ap-  
16          propriations, in order to maximize Center (as such term  
17          is defined in such section 25) participation as well as com-  
18          petitiveness, productivity, and technological performance  
19          in United States manufacturing.

20       **SEC. 10252. UPDATE TO HOLLINGS MANUFACTURING EX-**  
21                               **TENSION PARTNERSHIP.**

22          (a) ACCEPTANCE OF FUNDS.—Subsection (l) of sec-  
23          tion 25 of the National Institute of Standards and Tech-  
24          nology Act (15 U.S.C. 278k) is amended to read as fol-  
25          lows:

1 “(1) ACCEPTANCE OF FUNDS.—

2 “(1) IN GENERAL.—To the extent provided in  
3 advance in appropriations Acts, other Federal de-  
4 partments and agencies may transfer amounts to the  
5 Institute, and the Secretary and Director may ac-  
6 cept and make available cash donations from the  
7 private sector pursuant to section 2(c)(7), to be used  
8 for strengthening United States manufacturing  
9 under this section.

10 “(2) COMPETITIVE AWARDS.—Funds accepted  
11 from other Federal departments and agencies and  
12 from the private sector under paragraph (1) shall be  
13 awarded competitively by the Secretary and Director  
14 to Centers, provided that the Secretary and Director  
15 may make noncompetitive awards, pursuant to this  
16 section or section 25A, or as a non-competitive con-  
17 tract, as appropriate, if the Secretary and Director  
18 determine that—

19 “(A) the manufacturing market or sector  
20 targeted is limited geographically or in scope;

21 “(B) the number of States (or territory, in  
22 the case of Puerto Rico) with Centers serving  
23 manufacturers of such market or sector is five  
24 or fewer; and

1                   “(C) such Center has or Centers have re-  
2                   ceived a positive evaluation in the most recent  
3                   evaluation conducted pursuant to subsection  
4                   (g).”.

5           (b) SUPPORTING AMERICAN MANUFACTURING.—Sec-  
6           tion 25 of the National Institute of Standards and Tech-  
7           nology Act (15 U.S.C. 278k) is amended—

8                   (1) in subsection (a)(5)—

9                           (A) by striking “or consortium thereof,”;  
10                           and

11                           (B) by inserting “or a consortium thereof”  
12                           before the period at the end of the sentence;

13                   (2) in subsection (c)(4), by inserting “United  
14                   States-based” before “industrial”;

15                   (3) in subsection (d)—

16                           (A) in paragraph (1), by inserting “at  
17                           United States-based industrial facilities, includ-  
18                           ing small and medium manufacturing compa-  
19                           nies” before “based”;

20                           (B) in paragraph (2), by inserting “United  
21                           States-based” before “companies”; and

22                           (C) in paragraph (3), by inserting “United  
23                           States-based” before “small”;

1           (4) in subsection (f)(5)(B)(i), by inserting “in  
2           the United States” before the semicolon at the end  
3           of the clause; and

4           (5) in subsection (n)(1)(A), by inserting  
5           “United States-based” before “small”.

6           (c) AMENDING THE MEP COMPETITIVE AWARDS  
7 PROGRAM.—Section 25A(c)(2) of the National Institute of  
8 Standards and Technology Act (15 U.S.C. 278k-1(c)(2))  
9 is amended by inserting “United States” before “manu-  
10 facturers”.

11          (d) MEP OUTREACH.—Section 25 of the National  
12 Institute of Standards and Technology Act (15 U.S.C.  
13 278k) is amended—

14           (1) in subsection (c)—

15                (A) in paragraph (6), by striking “commu-  
16                nity colleges and area career and technical edu-  
17                cation schools” and inserting the following:  
18                “secondary schools, community colleges, and  
19                area career and technical education schools, in-  
20                cluding those in underserved and rural commu-  
21                nities,”; and

22                (B) in paragraph (7)—

23                   (i) by striking “and local colleges”  
24                   and inserting “local secondary schools and  
25                   local colleges, including historically Black

1 colleges and universities, Tribal Colleges or  
2 Universities, minority-serving institutions,  
3 community colleges, and secondary schools  
4 and colleges in underserved and rural com-  
5 munities,”; and

6 (ii) by inserting “or other applied  
7 learning opportunities” after “apprentice-  
8 ships”; and

9 (2) in subsection (d)(3), by striking “, commu-  
10 nity colleges, and area career and technical edu-  
11 cation schools,” and inserting the following: “and  
12 local high schools, community colleges, and area ca-  
13 reer and technical education schools, including those  
14 in underserved and rural communities,”.

15 **SEC. 10253. NATIONAL SUPPLY CHAIN DATABASE.**

16 (a) ESTABLISHMENT OF NATIONAL SUPPLY CHAIN  
17 DATABASE.—The Director shall establish a voluntary Na-  
18 tional Supply Chain Database, subject to the availability  
19 of appropriations.

20 (b) PURPOSE.—The purpose of the voluntary Na-  
21 tional Supply Chain Database shall be to assist the Fed-  
22 eral Government and industry sectors in minimizing dis-  
23 ruptions to the United States supply chain by having an  
24 assessment of United States manufacturers’ capabilities.

1           (c) STUDY ON NATIONAL SUPPLY CHAIN DATA-  
2 BASE.—In establishing the National Supply Chain Data-  
3 base, the Director shall consider the findings and rec-  
4 ommendations from the study authorized pursuant to sec-  
5 tion 9413 of the National Defense Authorization Act for  
6 Fiscal Year 2021 (Public Law 116–283), including meas-  
7 ures to secure and protect the Database from adversarial  
8 attacks and vulnerabilities.

9           (d) DATABASE AND MANUFACTURING EXTENSION  
10 PARTNERSHIP.—

11           (1) IN GENERAL.—The Director shall establish  
12 the infrastructure for the National Supply Chain  
13 Database through the Hollings Manufacturing Ex-  
14 tension Partnership, established pursuant to section  
15 25 of the National Institute of Standards and Tech-  
16 nology Act (15 U.S.C. 278k), by connecting infor-  
17 mation from the Centers (as such term is defined in  
18 such section) through the Database.

19           (2) NATIONAL VIEW.—The Director shall en-  
20 sure that connections under paragraph (1)—

21           (A) provide a national overview of the net-  
22 works of supply chains of the United States;  
23 and

24           (B) support understanding of whether  
25 there is a need for some manufacturers to re-

1           tool in some critical areas to meet the urgent  
2           need for key products.

3           (3) INDIVIDUAL HOLLINGS MANUFACTURING  
4           EXTENSION PARTNERSHIP CENTER DATABASES.—

5           (A) IN GENERAL.—The Director shall en-  
6           sure that—

7                   (i) each Center is connected to the  
8                   National Supply Chain Database; and

9                   (ii) each supply chain database main-  
10                  tained by a Center is interoperable with  
11                  the Database.

12           (B) RULE OF CONSTRUCTION.—Nothing in  
13           this section may be construed to require a State  
14           or territory of the United States to establish a  
15           new supply chain database through the Hollings  
16           Manufacturing Extension Partnership program.

17           (e) MAINTENANCE OF NATIONAL SUPPLY CHAIN  
18           DATABASE.—The Director, acting through the Hollings  
19           Manufacturing Extension Partnership program or a des-  
20           ignee of the program—

21                   (1) shall maintain the National Supply Chain  
22           Database as an integration of State-level databases  
23           from the Center of each State or territory of the  
24           United States;

1           (2) may populate the Database with informa-  
2           tion from past or current clients of Centers; and

3           (3) may include in the Database information  
4           voluntarily provided by non-client private sector enti-  
5           ties based and operating in the United States, as ap-  
6           plicable and appropriate.

7           (f) DATABASE CONTENT.—The National Supply  
8 Chain Database may include the following:

9           (1) Basic private sector entity information.

10           (2) An overview of capabilities, accreditations,  
11           and products.

12           (3) Proprietary information.

13           (g) STANDARD CLASSIFICATION SYSTEM.—The Na-  
14 tional Supply Chain Database may, where applicable, use  
15 the North American Industry Classification System  
16 (NAICS) Codes as follows:

17           (1) Sector 31-33 – Manufacturing.

18           (2) Sector 54 – Professional, Scientific, and  
19           Technical Services.

20           (3) Sector 48-49 – Transportation and  
21           Warehousing.

22           (h) LEVELS.—The National Supply Chain Database  
23 shall be multi-leveled as agreed to under terms of mutual  
24 disclosure as follows:



1           (1) Level 1 shall have the capability to provide  
2           basic private sector entity information and shall be  
3           available to the public.

4           (2) Level 2 shall have the capability to provide  
5           a deeper, nonproprietary overview into capabilities,  
6           products, and accreditations and shall be available to  
7           all companies that contribute to the Database.

8           (3) Level 3 shall have the capability to hold  
9           proprietary information.

10          (i) MATTERS RELATING TO DISCLOSURE AND AC-  
11          CESS.—

12           (1) FOIA EXEMPTION.—The National Supply  
13          Chain Database, and any information contained  
14          therein that is not publicly released by the Institute,  
15          shall be exempt from public disclosure under section  
16          552(b)(3) of title 5, United States Code.

17           (2) LIMITATION ON ACCESS TO CONTENT.—Ac-  
18          cess to a contributing private sector entity's non-  
19          public content in the National Supply Chain Data-  
20          base shall be limited to—

21           (A) the contributing private sector entity,  
22           the Institute, and staff from a Center who sign  
23           a nondisclosure agreement, and

24           (B) other Federal departments and agen-  
25           cies,

1 as the Director considers appropriate.

2 (3) AGGREGATED INFORMATION.—The Director  
3 may make aggregated, de-identified information  
4 available to contributing companies, Centers, or the  
5 public, as the Director considers appropriate, in sup-  
6 port of the purposes of this section.

7 (j) COORDINATION WITH NATIONAL TECHNOLOGY  
8 AND INDUSTRIAL BASE COUNCIL.—The Director, acting  
9 through the Hollings Manufacturing Extension Partner-  
10 ship program, may work with the National Defense Tech-  
11 nology and Industrial Base Council established under sec-  
12 tion 4812 of title 10, United States Code, as the Director  
13 considers appropriate, to include in the National Supply  
14 Chain Database information regarding the defense manu-  
15 facturing supply chain.

16 (k) PROTECTIONS.—

17 (1) IN GENERAL.—Supply chain information  
18 that is voluntarily and lawfully submitted to the Na-  
19 tional Supply Chain Database by a private sector en-  
20 tity and accompanied by an express statement de-  
21 scribed in paragraph (2)—

22 (A) shall be exempt from disclosure under  
23 section 552(b)(3) of title 5, United States Code;

24 (B) may not be made available pursuant to  
25 any Federal, State, local, or Tribal authority

1           pursuant to any Federal, State, local, or Tribal  
2           law requiring public disclosure of information or  
3           records; and

4           (C) may not, without the written consent  
5           of the private sector entity submitting such in-  
6           formation, be used directly by the Director, or  
7           any other Federal, State, or local authority in  
8           any civil enforcement action brought by a Fed-  
9           eral, State, Tribal, or local authority.

10          (2) EXPRESS STATEMENT.—The express state-  
11         ment described in this paragraph, with respect to in-  
12         formation or records, is—

13                 (A) in the case of written information or  
14                 records, a written marking on the information  
15                 or records substantially similar to the following:  
16                 “This information is voluntarily submitted to  
17                 the Federal Government in expectation of pro-  
18                 tection from disclosure as provided by the provi-  
19                 sions of section 10253(k) of the Research and  
20                 Development, Competition, and Innovation  
21                 Act.”; or

22                 (B) in the case of oral information, a writ-  
23                 ten statement similar to the statement de-  
24                 scribed in subparagraph (A) submitted within a

1           reasonable period following the oral communica-  
2           tion.

3           (1) RULES OF CONSTRUCTION.—

4           (1) PRIVATE ENTITIES.—Nothing in this sec-  
5           tion may be construed to require any private sector  
6           entity to share data, including proprietary informa-  
7           tion, with the Director or the National Supply Chain  
8           Database.

9           (2) PROHIBITION ON NEW REGULATORY AU-  
10          THORITY.—Nothing in this section may be construed  
11          to grant the Director, or the head of any other Fed-  
12          eral agency, any authority to promulgate regulations  
13          or set standards on manufacturers, based on data  
14          within the National Supply Chain Database, that  
15          was not in effect on the day before the date of the  
16          enactment of this section.

17   **SEC. 10254. HOLLINGS MANUFACTURING EXTENSION PART-**  
18                                   **nership Activities.**

19          Section 70924(b) of the Infrastructure Investment  
20   and Jobs Act (Public Law 117–58) is amended to read  
21   as follows:

22          “(b) AUTOMATIC ENROLLMENT IN GSA ADVAN-  
23   TAGE.—The Administrator of the General Services Ad-  
24   ministration and the Secretary of Commerce, acting  
25   through the Under Secretary of Commerce for Standards

1 and Technology, shall jointly ensure that businesses that  
2 participate in the Hollings Manufacturing Extension Part-  
3 nership, and so desire, are automatically enrolled in Gen-  
4 eral Services Administration Advantage.”.

5 **SEC. 10255. AMENDMENT TO THE HOLLINGS MANUFAC-**  
6 **TURING EXTENSION PARTNERSHIP RELAT-**  
7 **ING TO INSTITUTIONS OF HIGHER EDU-**  
8 **CATION.**

9 Subsection (a) of section 25 of the National Institute  
10 of Standards and Technology Act (15 U.S.C. 278k) is  
11 amended—

12 (1) by redesignating paragraph (6) (relating to  
13 the definition of “Hollings Manufacturing Extension  
14 Partnership or Program”) as paragraph (7);

15 (2) by inserting after paragraph (5) the fol-  
16 lowing new paragraph:

17 “(6) HISTORICALLY BLACK COLLEGE AND UNI-  
18 VERSITY.—The term ‘historically Black college and  
19 university’ has the meaning given the term ‘part B  
20 institution’ in section 322 of the Higher Education  
21 Act of 1965 (20 U.S.C. 1061).”;

22 (3) by redesignating the second paragraph (7)  
23 (relating to the definition of “MEP Advisory  
24 Board”) as paragraph (8);

1           (4) by inserting after paragraph (6) (as in-  
2           serted by paragraph (2), relating to the definition of  
3           “historically Black college and university”) the fol-  
4           lowing new paragraph:

5           “(7) INSTITUTION OF HIGHER EDUCATION.—  
6           The term ‘institution of higher education’ has the  
7           meaning given such term in section 101 of the High-  
8           er Education Act of 1965 (20 U.S.C. 1001).”;

9           (5) by adding at the end the following new  
10          paragraphs:

11          “(9) MINORITY-SERVING INSTITUTION.—The  
12          term ‘minority-serving institution’ means a His-  
13          panic-serving institution as defined in section 502(a)  
14          of the Higher Education Act of 1965 (20 U.S.C.  
15          1101a(a)); an Alaska Native-serving institution or  
16          Native Hawaiian-serving institution as defined in  
17          section 317(b) of such Act (20 U.S.C. 1059d(b)); or  
18          a Predominantly Black institution, Asian American  
19          and Native American Pacific Islander-serving insti-  
20          tution, or Native American-serving nontribal institu-  
21          tion as defined in section 371(c) of such Act (20  
22          U.S.C. 1067q(c)).

23          “(10) SECONDARY SCHOOL.—The term ‘sec-  
24          ondary school’ has the meaning given such term in

1 section 8101 of the Elementary and Secondary Edu-  
2 cation Act of 1965 (20 U.S.C. 7801).

3 “(11) TRIBAL COLLEGE OR UNIVERSITY.—The  
4 term ‘Tribal College or University’ has the meaning  
5 given the term ‘Tribal College or University’ in sec-  
6 tion 316 of the Higher Education Act of 1965 (20  
7 U.S.C. 1059c).”.

8 **Subtitle E—Manufacturing USA**  
9 **Program**

10 **SEC. 10261. SUPPORTING GEOGRAPHIC DIVERSITY.**

11 Section 34(e) of the National Institute of Standards  
12 and Technology Act (15 U.S.C. 278s(e)) is amended by  
13 adding at the end the following:

14 “(8) DIVERSITY PREFERENCES.—In awarding  
15 financial assistance under paragraph (1) for plan-  
16 ning or establishing a Manufacturing USA institute,  
17 an agency head shall give special consideration to  
18 Manufacturing USA institutes that—

19 “(A) contribute to the geographic diversity  
20 of the Manufacturing USA Program;

21 “(B) are located in an area with a low per  
22 capita income;

23 “(C) are located in an area with a high  
24 proportion of socially disadvantaged residents;

25 or

1                   “(D) are located in small and rural com-  
2                   munities.”.

3 **SEC. 10262. EXPANDING OPPORTUNITIES THROUGH THE**  
4 **MANUFACTURING USA PROGRAM.**

5           (a) IN GENERAL.—The Secretary of Commerce, in  
6 consultation with the Secretary of Energy, the Secretary  
7 of Defense, and the heads of such other Federal agencies  
8 as the Secretary of Commerce considers relevant, shall co-  
9 ordinate with existing and new Manufacturing USA insti-  
10 tutes to integrate covered entities as active members of  
11 the Manufacturing USA institutes, including through the  
12 development of preferences in selection criteria for pro-  
13 posals to create new Manufacturing USA institutes or  
14 renew existing Manufacturing USA institutes that include  
15 one or more covered entities.

16           (b) COVERED ENTITIES.—For purposes of this sub-  
17 section, a covered entity is—

- 18                   (1) an historically Black college and university;  
19                   (2) a Tribal College or University;  
20                   (3) a minority-serving institution;  
21                   (4) a minority business enterprise (as such  
22 term is defined in section 1400.2 of title 15, Code  
23 of Federal Regulations, or successor regulation); or



1           (5) a rural-serving institution of higher edu-  
2           cation (as such term is defined in section 861 of the  
3           Higher Education Act of 1965 (20 U.S.C. 1161q)).

4 **SEC. 10263. PROMOTING DOMESTIC PRODUCTION OF TECH-**  
5 **NOLOGIES DEVELOPED UNDER MANUFAC-**  
6 **TURING USA PROGRAM.**

7           (a) DEPARTMENT OF COMMERCE POLICIES TO PRO-  
8           MOTE DOMESTIC PRODUCTION OF TECHNOLOGIES DE-  
9           VELOPED UNDER MANUFACTURING USA NETWORK.—

10           (1) POLICIES.—

11           (A) IN GENERAL.—Each agency head (as  
12           such term is defined in section 34(a) of the Na-  
13           tional Institute of Standards and Technology  
14           Act (15 U.S.C. 278s(a))) and the Secretary of  
15           Defense shall, in consultation with the Sec-  
16           retary of Commerce, establish policies to pro-  
17           mote the domestic production of technologies  
18           developed by the Manufacturing USA Network.

19           (B) ELEMENTS.—The policies established  
20           under subparagraph (A) shall include the fol-  
21           lowing:

22           (i) Measures to partner domestic de-  
23           velopers of goods, services, or technologies  
24           by Manufacturing USA Network activities

1 with domestic manufacturers and sources  
2 of financing.

3 (ii) Measures to develop and provide  
4 incentives to promote transfer of intellec-  
5 tual property and goods, services, or tech-  
6 nologies developed by Manufacturing USA  
7 Network activities to domestic manufactur-  
8 ers.

9 (iii) Measures to assist with supplier  
10 scouting and other supply chain develop-  
11 ment, including the use of the Hollings  
12 Manufacturing Extension Partnership  
13 under section 25 of the National Institute  
14 of Standards and Technology Act (15  
15 U.S.C. 278k) to carry out such measures.

16 (iv) A process to review and approve  
17 or deny membership in a Manufacturing  
18 USA institute by foreign-owned entities,  
19 especially from countries of concern, in-  
20 cluding the People's Republic of China.

21 (v) Measures to prioritize Federal pro-  
22 curement of goods, services, or technologies  
23 developed by the Manufacturing USA Net-  
24 work activities from domestic sources, as  
25 appropriate.

1           (C) PROCESSES FOR WAIVERS.—The poli-  
2           cies established under this paragraph shall in-  
3           clude processes to permit waivers, on a case by  
4           case basis, for policies that promote domestic  
5           production based on cost, availability, severity  
6           of technical and mission requirements, emer-  
7           gency requirements, operational needs, other  
8           legal or international treaty obligations, or  
9           other factors determined important to the suc-  
10          cess of the Manufacturing USA Program.

11          (2) PROHIBITION.—

12           (A) IN GENERAL.—A company of the Peo-  
13           ple’s Republic of China may not participate in  
14           the Manufacturing USA Program without a  
15           waiver, as described in paragraph (1)(C).

16           (B) COMPANY DEFINED.—In this para-  
17           graph, the term “company” has the meaning  
18           given such term in section 847(a) of the Na-  
19           tional Defense Authorization Act for Fiscal  
20           Year 2020 (Public Law 116–92; 10 U.S.C.  
21           4819 note).

22          (b) COORDINATION OF MANUFACTURING USA INSTI-  
23          TUTES.—Subsection (h) of section 34 of the National In-  
24          stitute of Standards and Technology Act (15 U.S.C. 278s)  
25          is amended by adding at the end the following:

1           “(7) COUNCIL FOR COORDINATION OF INSTI-  
2 TUTES.—

3           “(A) COUNCIL.—The National Program  
4 Office shall establish or designate a council of  
5 heads of any Manufacturing USA institute re-  
6 ceiving Federal funding at any time to foster  
7 collaboration between Manufacturing USA in-  
8 stitutes.

9           “(B) MEETINGS.—The council established  
10 or designated pursuant to subparagraph (A)  
11 shall meet not less frequently than twice each  
12 year.

13           “(C) DUTIES OF THE COUNCIL.—The  
14 council established pursuant to subparagraph  
15 (A) shall assist the National Program Office in  
16 carrying out the functions of the National Pro-  
17 gram Office under paragraph (2).”.

18           (c) REQUIREMENT FOR NATIONAL PROGRAM OFFICE  
19 TO DEVELOP STRATEGIES FOR RETAINING DOMESTIC  
20 PUBLIC BENEFIT AFTER CESSATION OF FEDERAL FUND-  
21 ING.—Subparagraph (C) of section 34(h)(2) of the Na-  
22 tional Institute of Standards and Technology Act (15  
23 U.S.C. 278s(h)(2)) is amended by inserting “, including  
24 a strategy for retaining domestic public benefits from

1 Manufacturing USA institutes once Federal funding has  
2 been discontinued” after “Program”.

3 (d) MODIFICATION OF FUNCTIONS OF NATIONAL  
4 PROGRAM OFFICE TO INCLUDE DEVELOPMENT OF IN-  
5 DUSTRY CREDENTIALS.—Subparagraph (J) of section  
6 34(h)(2) of the National Institute of Standards and Tech-  
7 nology Act (15 U.S.C. 278s(h)(2)) is amended by insert-  
8 ing “, including the development of industry credentials”  
9 after “activities”.

10 (e) ADVICE FROM THE UNITED STATES MANUFAC-  
11 TURING COUNCIL.—The Secretary shall seek advice from  
12 the United States Manufacturing Council of the Inter-  
13 national Trade Administration of the Department of Com-  
14 merce on matters concerning investment in and support  
15 of the manufacturing workforce within the Manufacturing  
16 USA Program.

17 **TITLE III—NATIONAL SCIENCE**  
18 **FOUNDATION FOR THE FUTURE**

19 **Subtitle A—Preliminary Matters**

20 **SEC. 10301. SENSE OF CONGRESS.**

21 It is the sense of Congress that—

22 (1) the National Science Foundation, the De-  
23 partment of Energy and its National Laboratories,  
24 and other key Federal agencies have carried out  
25 vital work supporting basic and applied research to

1 create knowledge that is a key driver of the economy  
2 of the United States and a critical component of na-  
3 tional security;

4 (2) openness to diverse perspectives and a focus  
5 on freedom from censorship and political bias will  
6 continue to make educational and research institu-  
7 tions in the United States beacons to thousands of  
8 students from across the world;

9 (3) increasing research and technology transfer  
10 investments, building regional capacity and reducing  
11 geographic disparity, strengthening supply chains,  
12 and increasing capabilities in key technology focus  
13 areas will enhance the competitive advantage and  
14 leadership of the United States in the global econ-  
15 omy;

16 (4) the Federal Government must utilize the  
17 full talent and potential of the entire Nation by  
18 avoiding undue geographic concentration of research  
19 and STEM education funding, encouraging broader  
20 participation of populations underrepresented in  
21 STEM, and collaborating with nongovernment part-  
22 ners to ensure the leadership of the United States  
23 in technological innovation; and

24 (5) authorization and funding for investments  
25 in research, education, technology transfer, intellec-

1 tual property, manufacturing, and other core  
2 strengths of the United States innovation ecosystem,  
3 including at the National Science Foundation and  
4 the Department of Energy, should be done on a bi-  
5 partisan basis.

6 **SEC. 10302. DEFINITIONS.**

7 In this title:

8 (1) BOARD.—The term “Board” means the Na-  
9 tional Science Board.

10 (2) DIRECTOR.—The term “Director” means  
11 the Director of the National Science Foundation.

12 (3) NSF INCLUDES.—The term “NSF IN-  
13 CLUDES” means the initiative carried out under  
14 section 10323.

15 (4) STEM ECOSYSTEM.—The term “STEM  
16 ecosystem” means a local, regional, or statewide net-  
17 work, consortium, or multi-sector partnership, which  
18 may be led or co-led by a nonprofit organizational  
19 entity, that is operating in the United States with  
20 the goal of supporting participation in STEM study,  
21 activities, and career pathways as defined in the  
22 CoSTEM Annual Progress Report of 2020 with a  
23 broad range of non-Federal partners.

24 **SEC. 10303. AUTHORIZATION OF APPROPRIATIONS.**

25 (a) FISCAL YEAR 2023.—

1           (1) IN GENERAL.—There are authorized to be  
2           appropriated to the Foundation \$11,897,480,000 for  
3           fiscal year 2023.

4           (2) SPECIFIC ALLOCATIONS.—Of the amount  
5           authorized under paragraph (1)—

6                   (A) \$9,050,000,000 is authorized to be ap-  
7                   propriated to carry out research and related ac-  
8                   tivities, of which—

9                           (i) \$55,000,000 is authorized to be  
10                           appropriated for the Mid-Scale Research  
11                           Infrastructure Program; and

12                           (ii) \$1,500,000,000 is authorized to  
13                           be appropriated for the Directorate for  
14                           Technology, Innovation, and Partnerships;

15                   (B) \$1,950,000,000 is authorized to be ap-  
16                   propriated for STEM education, of which—

17                           (i) \$73,700,000 is authorized to be  
18                           appropriated for the Robert Noyce Teacher  
19                           Scholarship Program;

20                           (ii) \$59,500,000 is authorized to be  
21                           appropriated for the NSF Research  
22                           Traineeship Program;

23                           (iii) \$416,300,000 is authorized to be  
24                           appropriated for the Graduate Research  
25                           Fellowship Program;



1 (iv) \$70,000,000 is authorized to be  
2 appropriated for the Cybercorps Scholar-  
3 ship for Service Program; and

4 (v) \$350,000,000 is authorized to be  
5 appropriated for fellowships, traineeships,  
6 and scholarships described in section  
7 10393;

8 (C) \$249,000,000 is authorized to be ap-  
9 propriated for major research equipment and  
10 facilities construction, of which \$76,250,000 is  
11 authorized to be appropriated for the Mid-Scale  
12 Research Infrastructure Program;

13 (D) \$620,000,000 is authorized to be ap-  
14 propriated for agency operations and award  
15 management;

16 (E) \$5,090,000 is authorized to be appro-  
17 priated for the Office of the National Science  
18 Board; and

19 (F) \$23,390,000 is authorized to be appro-  
20 priated for the Office of the Inspector General.

21 (b) FISCAL YEAR 2024.—

22 (1) IN GENERAL.—There are authorized to be  
23 appropriated to the Foundation \$15,646,930,000 for  
24 fiscal year 2024.

1           (2) SPECIFIC ALLOCATIONS.—Of the amount  
2 authorized under paragraph (1)—

3           (A) \$12,050,000,000 is authorized to be  
4 appropriated to carry out research and related  
5 activities, of which—

6           (i) \$60,000,000 is authorized to be  
7 appropriated for the Mid-Scale Research  
8 Infrastructure Program; and

9           (ii) \$3,350,000,000 is authorized to  
10 be appropriated for the Directorate for  
11 Technology, Innovation, and Partnerships;

12           (B) \$2,500,000,000 is authorized to be ap-  
13 propriated for STEM education, of which—

14           (i) \$80,400,000 is authorized to be  
15 appropriated for the Robert Noyce Teacher  
16 Scholarship Program;

17           (ii) \$64,910,000 is authorized to be  
18 appropriated for the NSF Research  
19 Traineeship Program;

20           (iii) \$454,140,000 is authorized to be  
21 appropriated for the Graduate Research  
22 Fellowship Program;

23           (iv) \$72,000,000 is authorized to be  
24 appropriated for the Cybercorps Scholar-  
25 ship for Service Program; and

1 (v) \$800,000,000 is authorized to be  
2 appropriated for fellowships, traineeships,  
3 and scholarships described in section  
4 10393;

5 (C) \$355,000,000 is authorized to be ap-  
6 propriated for major research equipment and  
7 facilities construction, of which \$80,000,000 is  
8 authorized to be appropriated for the Mid-Scale  
9 Research Infrastructure Program;

10 (D) \$710,000,000 is authorized to be ap-  
11 propriated for agency operations and award  
12 management;

13 (E) \$5,320,000 is authorized to be appro-  
14 priated for the Office of the National Science  
15 Board; and

16 (F) \$26,610,000 is authorized to be appro-  
17 priated for the Office of the Inspector General.

18 (c) FISCAL YEAR 2025.—

19 (1) IN GENERAL.—There are authorized to be  
20 appropriated to the Foundation \$16,706,670,000 for  
21 fiscal year 2025.

22 (2) SPECIFIC ALLOCATIONS.—Of the amount  
23 authorized under paragraph (1)—

1 (A) \$12,850,000,000 is authorized to be  
2 appropriated to carry out research and related  
3 activities, of which—

4 (i) \$70,000,000 is authorized to be  
5 appropriated for the Mid-Scale Research  
6 Infrastructure Program; and

7 (ii) \$3,550,000,000 is authorized to  
8 be appropriated for the Directorate for  
9 Technology, Innovation, and Partnerships;

10 (B) \$2,700,000,000 is authorized to be ap-  
11 propriated for STEM education, of which—

12 (i) \$87,100,000 is authorized to be  
13 appropriated for the Robert Noyce Teacher  
14 Scholarship Program;

15 (ii) \$70,320,000 is authorized to be  
16 appropriated for the NSF Research  
17 Traineeship Program;

18 (iii) \$491,990,000 is authorized to be  
19 appropriated for the Graduate Research  
20 Fellowship Program;

21 (iv) \$78,000,000 is authorized to be  
22 appropriated for the Cybercorps Scholar-  
23 ship for Service Program; and

24 (v) \$900,000,000 is authorized to be  
25 appropriated for fellowships, traineeships,

1                   and scholarships described in section  
2                   10393;

3                   (C) \$370,000,000 is authorized to be ap-  
4                   propriated for major research equipment and  
5                   facilities construction, of which \$85,000,000 is  
6                   authorized to be appropriated for the Mid-Scale  
7                   Research Infrastructure Program;

8                   (D) \$750,000,000 is authorized to be ap-  
9                   propriated for agency operations and award  
10                  management;

11                  (E) \$5,560,000 is authorized to be appro-  
12                  priated for the Office of the National Science  
13                  Board; and

14                  (F) \$31,110,000 is authorized to be appro-  
15                  priated for the Office of the Inspector General.

16                  (d) FISCAL YEAR 2026.—

17                  (1) IN GENERAL.—There are authorized to be  
18                  appropriated to the Foundation \$17,832,420,000 for  
19                  fiscal year 2026.

20                  (2) SPECIFIC ALLOCATIONS.—Of the amount  
21                  authorized under paragraph (1)—

22                  (A) \$13,800,000,000 is authorized to be  
23                  appropriated to carry out research and related  
24                  activities, of which—

1 (i) \$75,000,000 is authorized to be  
2 appropriated for the Mid-Scale Research  
3 Infrastructure Program; and

4 (ii) \$3,800,000,000 is authorized to  
5 be appropriated for the Directorate for  
6 Technology, Innovation, and Partnerships;

7 (B) \$2,850,000,000 is authorized to be ap-  
8 propriated for STEM education, of which—

9 (i) \$93,800,000 is authorized to be  
10 appropriated for the Robert Noyce Teacher  
11 Scholarship Program;

12 (ii) \$75,730,000 is authorized to be  
13 appropriated for the NSF Research  
14 Traineeship Program;

15 (iii) \$529,830,000 is authorized to be  
16 appropriated for the Graduate Research  
17 Fellowship Program;

18 (iv) \$84,000,000 is authorized to be  
19 appropriated for the Cybercorps Scholar-  
20 ship for Service Program; and

21 (v) \$950,000,000 is authorized to be  
22 appropriated for fellowships, traineeships,  
23 and scholarships described in section  
24 10393;

1 (C) \$372,000,000 is authorized to be ap-  
2 propriated for major research equipment and  
3 facilities construction, of which \$90,000,000 is  
4 authorized to be appropriated for the Mid-Scale  
5 Research Infrastructure Program;

6 (D) \$770,000,000 is authorized to be ap-  
7 propriated for agency operations and award  
8 management;

9 (E) \$5,810,000 is authorized to be appro-  
10 priated for the Office of the National Science  
11 Board; and

12 (F) \$34,610,000 is authorized to be appro-  
13 priated for the Office of the Inspector General.

14 (e) FISCAL YEAR 2027.—

15 (1) IN GENERAL.—There are authorized to be  
16 appropriated to the Foundation \$18,919,180,000 for  
17 fiscal year 2027.

18 (2) SPECIFIC ALLOCATIONS.—Of the amount  
19 authorized under paragraph (1)—

20 (A) \$14,700,000,000 is authorized to be  
21 appropriated to carry out research and related  
22 activities, of which—

23 (i) \$80,000,000 is authorized to be  
24 appropriated for the Mid-Scale Research  
25 Infrastructure Program; and

1 (ii) \$4,100,000,000 is authorized to  
2 be appropriated for the Directorate for  
3 Technology, Innovation, and Partnerships;

4 (B) \$3,000,000,000 is authorized to be ap-  
5 propriated for STEM education, of which—

6 (i) \$100,500,000 is authorized to be  
7 appropriated for the Robert Noyce Teacher  
8 Scholarship Program;

9 (ii) \$81,140,000 is authorized to be  
10 appropriated for the NSF Research  
11 Traineeship Program;

12 (iii) \$567,680,000 is authorized to be  
13 appropriated for the Graduate Research  
14 Fellowship Program;

15 (iv) \$90,000,000 is authorized to be  
16 appropriated for the Cybercorps Scholar-  
17 ship for Service Program; and

18 (v) \$1,000,000,000 is authorized to be  
19 appropriated for fellowships, traineeships,  
20 and scholarships described in section  
21 10393;

22 (C) \$375,000,000 is authorized to be ap-  
23 propriated for major research equipment and  
24 facilities construction, of which \$100,000,000 is



1 authorized to be appropriated for the Mid-Scale  
2 Research Infrastructure Program;

3 (D) \$800,000,000 is authorized to be ap-  
4 propriated for agency operations and award  
5 management;

6 (E) \$6,070,000 is authorized to be appro-  
7 priated for the Office of the National Science  
8 Board; and

9 (F) \$38,110,000 is authorized to be appro-  
10 priated for the Office of the Inspector General.

## 11 **Subtitle B—STEM Education**

### 12 **SEC. 10311. PREK-12 STEM EDUCATION.**

13 (a) NATIONAL ACADEMIES STUDY.—Not later than  
14 120 days after the date of enactment of this Act, the Di-  
15 rector shall enter into an agreement with the National  
16 Academies to conduct a study to—

17 (1) review the research literature and identify  
18 research gaps regarding the interconnected factors  
19 that foster and hinder successful implementation of  
20 promising, evidence-based PreK–12 STEM edu-  
21 cation innovations at the local, regional, and na-  
22 tional level;

23 (2) present a compendium of promising, evi-  
24 dence-based PreK–12 STEM education practices,  
25 models, programs, and technologies;

1           (3) identify barriers to widespread and sus-  
2           tained implementation of such innovations; and

3           (4) make recommendations to the Foundation,  
4           the Department of Education, the National Science  
5           and Technology Council’s Committee on Science,  
6           Technology, Engineering, and Mathematics Edu-  
7           cation, State and local educational agencies, and  
8           other relevant stakeholders on measures to address  
9           such barriers.

10          (b) SUPPORTING PREK–12 INFORMAL STEM OP-  
11          PORTUNITIES.—Section 3 of the STEM Education Act of  
12          2015 (42 U.S.C. 1862q) is amended by adding at the end  
13          the following:

14          “(c) PreK–12 INFORMAL STEM.—

15                 “(1) IN GENERAL.—The Director of the Na-  
16                 tional Science Foundation shall make awards,  
17                 through existing programs where appropriate to in-  
18                 stitutions of higher education and nonprofit organi-  
19                 zations (or consortia of such intuitions or organiza-  
20                 tions) on a merit-reviewed, competitive basis for re-  
21                 search on effective approaches to engaging students  
22                 in PreK–12, including students from groups histori-  
23                 cally underrepresented in STEM and rural students.

24                 “(2) PURPOSES.—The purposes of this sub-  
25                 section are to—

1           “(A) provide effective, compelling, and en-  
2           gaging means for teaching and reinforcing fun-  
3           damental STEM concepts to PreK–12 students;

4           “(B) expand the STEM workforce pipeline  
5           by increasing the number of youth in the  
6           United States exposed to STEM from an early  
7           age and encourage them to pursue careers in  
8           STEM-related fields; and

9           “(C) broaden participation of groups his-  
10          torically underrepresented in STEM and rural  
11          students, in the STEM workforce.

12          “(3) USE OF FUNDS.—

13                 “(A) IN GENERAL.—Awards made under  
14                 this subsection shall support research and de-  
15                 velopment on innovative before-school, after-  
16                 school, out-of-school, or summer activities that  
17                 are designed to encourage interest, engagement,  
18                 and skills development in STEM, including for  
19                 students from groups historically underrep-  
20                 resented in STEM and rural students.

21                 “(B) PERMITTED ACTIVITIES.—The re-  
22                 search and development activities described in  
23                 subparagraph (A) may include—

24                         “(i) the provision of programming de-  
25                         scribed in such subparagraph for the pur-

1 pose of research described in such subpara-  
2 graph;

3 “(ii) the use of a variety of engage-  
4 ment methods, including cooperative and  
5 hands-on learning;

6 “(iii) exposure of students to role  
7 models in the fields of STEM and near-  
8 peer mentors;

9 “(iv) training of informal learning  
10 educators, youth-serving professionals, and  
11 volunteers who lead informal STEM pro-  
12 grams in using evidence-based methods  
13 consistent with the target student popu-  
14 lation being served;

15 “(v) education of students on the rel-  
16 evance and significance of STEM careers,  
17 provision of academic advice and assist-  
18 ance, and activities designed to help stu-  
19 dents make real-world connections to  
20 STEM content;

21 “(vi) the preparation of students to  
22 attend events, competitions, and academic  
23 programs that provide content expertise  
24 and encourage career exposure in STEM,  
25 which may include the purchase of parts

1 and supplies needed to prepare for partici-  
2 pation in such competitions;

3 “(vii) activities designed to engage  
4 parents and families of students in PreK–  
5 12 in STEM;

6 “(viii) innovative strategies to engage  
7 students, such as using leadership skills  
8 and outcome measures to impart youth  
9 with the confidence to pursue STEM  
10 coursework and academic study;

11 “(ix) coordination with STEM-rich  
12 environments, including other nonprofit,  
13 nongovernmental organizations, out-of-  
14 classroom settings, institutions of higher  
15 education, vocational facilities, corpora-  
16 tions, museums, or science centers; and

17 “(x) the acquisition of instructional  
18 materials or technology-based tools to con-  
19 duct applicable award activity.

20 “(4) APPLICATION.—An applicant seeking  
21 funding under this subsection shall submit an appli-  
22 cation at such time, in such manner, and containing  
23 such information as may be required by the Direc-  
24 tor. Applications that include or partner with a non-  
25 profit, nongovernmental organization that has exten-

1 sive experience and expertise in increasing the par-  
2 ticipation of students in PreK–12 in STEM are en-  
3 couraged. At a minimum, the application shall in-  
4 clude the following:

5 “(A) A description of the target audience  
6 to be served by the research activity or activi-  
7 ties for which such funding is sought.

8 “(B) A description of the process for re-  
9 cruitment and selection of students to partici-  
10 pate in such activities.

11 “(C) A description of how such activity or  
12 activities may inform programming that en-  
13 gages students in PreK–12 in STEM.

14 “(D) A description of how such activity or  
15 activities may inform programming that pro-  
16 motes student academic achievement in STEM.

17 “(E) An evaluation plan that includes, at  
18 a minimum, the use of outcome-oriented meas-  
19 ures to determine the impact and efficacy of  
20 programming being researched.

21 “(5) EVALUATIONS.—Each recipient of an  
22 award under this subsection shall provide, at the  
23 conclusion of every year during which the award  
24 funds are received, a report in a form prescribed by  
25 the Director.

1           “(6) ENCOURAGE APPLICATIONS.—In making  
2           awards under this subsection, the Director shall en-  
3           courage applications which, for the purpose of the  
4           activity or activities funded through the award, are  
5           from or include eligible nonprofit programs serving  
6           students that attend elementary schools or sec-  
7           ondary schools (including high schools) that—

8                   “(A) are implementing comprehensive sup-  
9                   port and improvement activities or targeted  
10                  support and improvement activities under para-  
11                  graph (1) or (2) of section 1111(d) of the Ele-  
12                  mentary and Secondary Education Act of 1965  
13                  (20 U.S.C. 6311(d)); or

14                   “(B) serve high percentages of students  
15                   who are eligible for a free or reduced-price  
16                   lunch under the Richard B. Russell National  
17                   School Lunch Act (42 U.S.C. 1751 et seq.)  
18                   (which, in the case of a high school, may be cal-  
19                   culated using comparable data from the schools  
20                   that feed into the high school).

21           “(7) ACCOUNTABILITY AND DISSEMINATION.—

22                   “(A) EVALUATION REQUIRED.—The Direc-  
23                   tor shall evaluate the activities established  
24                   under this subsection. Such evaluation shall—

1           “(i) use a common set of benchmarks  
2           and tools to assess the results of research  
3           conducted under such awards; and

4           “(ii) to the extent practicable, inte-  
5           grate the findings of the research resulting  
6           from the activity or activities funded  
7           through the award with the current re-  
8           search on serving students with respect to  
9           the pursuit of degrees or careers in STEM,  
10          including underrepresented and rural stu-  
11          dents, in PreK–12.

12          “(B) REPORT ON EVALUATIONS.—Not  
13          later than 180 days after the completion of the  
14          evaluation under subparagraph (A), the Direc-  
15          tor shall submit to Congress and make widely  
16          available to the public a report that includes—

17                 “(i) the results of the evaluation; and

18                 “(ii) any recommendations for admin-  
19                 istrative and legislative action that could  
20                 optimize the effectiveness of the program  
21                 under this subsection.

22          “(8) COORDINATION.—In carrying out this sub-  
23          section, the Director shall, for purposes of enhancing  
24          program effectiveness and avoiding duplication of ac-



1 activities, consult, and coordinate with other relevant  
2 Federal agencies.”.

3 (c) [LOG 907 S2522] NATIONAL STEM TEACHER  
4 CORPS PILOT.—

5 (1) PURPOSE.—It is the purpose of this sub-  
6 section to elevate the profession of STEM teaching  
7 by establishing a National STEM Teacher Corps  
8 pilot program to recognize outstanding STEM teach-  
9 ers in our Nation’s classrooms, rewards them for  
10 their accomplishments, elevates their public profile,  
11 and creates rewarding career paths to which all  
12 STEM teachers can aspire, both to prepare future  
13 STEM researchers and to create a scientifically lit-  
14 erate public.

15 (2) DEFINITIONS.—In this subsection:

16 (A) ADMINISTRATOR.—The term “Admin-  
17 istrator” means the Administrator of the Na-  
18 tional STEM Teacher Corps.

19 (B) ELIGIBLE ENTITY.—The term “eligible  
20 entity” means—

21 (i) an institution of higher education;

22 or

23 (ii) a consortium consisting of an in-  
24 stitution of higher education and one or  
25 more of the following:

1 (I) A State educational agency  
2 (as defined in section 8101 of the Ele-  
3 mentary and Secondary Education  
4 Act of 1965 (20 U.S.C. 7801)).

5 (II) A local educational agency  
6 (as defined in section 8101 of the Ele-  
7 mentary and Secondary Education  
8 Act of 1965 (20 U.S.C. 7801)).

9 (III) An education nonprofit As-  
10 sociation.

11 (IV) A cross sector STEM orga-  
12 nization.

13 (V) A private entity, including a  
14 STEM-related business.

15 (C) HIGH-NEED SCHOOL.—The term  
16 “high-need school” has the meaning given the  
17 term in section 2211(b) of the Elementary and  
18 Secondary Education Act of 1965 (20 U.S.C.  
19 6631(b)).

20 (D) PROFESSIONAL DEVELOPMENT.—The  
21 term “professional Development” has the mean-  
22 ing given the term in section 8101 of the Ele-  
23 mentary and Secondary Education Act of 1965  
24 (20 U.S.C. 7801).

1                   (E) CORPS ALLIANCE.—The term “Corps  
2                   Alliance” means a regionally or topically based  
3                   award under this subsection.

4                   (F) NATIONAL STEM TEACHER CORPS AD-  
5                   VISORY BOARD.—The term “National STEM  
6                   Teacher Corps Advisory Board” means the Ad-  
7                   visory Board for the National STEM Teacher  
8                   Corps established under paragraph (5).

9                   (3) ESTABLISHMENT OF NATIONAL STEM  
10                  TEACHER CORPS.—The Director may, subject to the  
11                  availability of appropriations, establish within the  
12                  Foundation, a National STEM Teacher Corps 10-  
13                  year pilot program to be administered by the Admin-  
14                  istrator, who shall be appointed by the Director. As  
15                  appropriate, the Director may use existing NSF pro-  
16                  grams to establish and execute this program.

17                  (4) DUTIES OF THE ADMINISTRATOR.—The Ad-  
18                  ministrator shall—

19                         (A) create a process and standards for se-  
20                         lection of eligible applicants to become members  
21                         of the National STEM Teacher Corps, includ-  
22                         ing—

23                                 (i) uniform selection criteria that in-  
24                                 cludes—

1 (I) deep knowledge of STEM  
2 content and pedagogy;

3 (II) a passion for STEM subjects  
4 and dedication to teaching, evidence  
5 of leadership skills, and potential for  
6 continued career growth as an educa-  
7 tor; and

8 (III) demonstrated experience in-  
9 creasing STEM student achievement  
10 and STEM participation rates for all  
11 students, particularly those from rural  
12 and high-need schools; and

13 (ii) a uniform selection process, in-  
14 cluding a comprehensive application that  
15 includes recommendations and other rel-  
16 evant professional information;

17 (B) promote the National STEM Teacher  
18 Corps and elevate best practices that emerge  
19 from the National STEM Teacher Corps to a  
20 national audience;

21 (C) evaluate the operation and effective-  
22 ness of the Corps alliances; and

23 (D) evaluate the overall and long-term im-  
24 pact of the National STEM Teacher Corps  
25 by—

1 (i) documenting, monitoring, and as-  
2 ssuming the program outcomes or impact  
3 on the STEM careers of participants; and

4 (ii) documenting, monitoring, and as-  
5 ssuming the program outcomes for the  
6 STEM education profession nationwide,  
7 particularly for rural and high-need  
8 schools.

9 (5) NATIONAL STEM TEACHER CORPS ADVISORY  
10 BOARD.—

11 (A) ESTABLISHMENT.—There is estab-  
12 lished a National STEM Teacher Corps Advi-  
13 sory Board to advise the Director on matters  
14 pertaining to the National STEM Teacher  
15 Corps for the length of the pilot program.

16 (B) COMPOSITION.—

17 (i) IN GENERAL.—The membership of  
18 the National STEM Teacher Corps Advi-  
19 sory Board shall—

20 (I) be appointed by the Director;

21 (II) include a representative from  
22 each of the following: School leaders,  
23 STEM researchers, STEM education  
24 researchers, Business leaders, PreK-  
25 12 STEM educators, and Students

1                   pursuing a postsecondary STEM de-  
2                   gree; and

3                   (III) be geographically diverse.

4                   (ii) EXISTING COMMITTEE.—The Di-  
5                   rector may assign the duties of the Na-  
6                   tional STEM Teacher Corps Advisory  
7                   Board to another advisory committee of  
8                   the Foundation.

9                   (6) DUTIES OF THE CORPS ALLIANCES.—Sub-  
10                  ject to the availability of appropriated funds, the Ad-  
11                  ministrator may make awards on a competitive,  
12                  merit-review basis, to establish Corps alliances at eli-  
13                  gible entities. Activities carried out by such alliances  
14                  shall include—

15                  (A) engaging local partners, which may in-  
16                  clude local educational agencies, institutions of  
17                  higher education, STEM organizations, or edu-  
18                  cation nonprofit organizations, to—

19                  (i) develop and serve the community  
20                  of National STEM Teacher Corps mem-  
21                  bers within the region or topic area, in co-  
22                  ordination with local partners to carry out  
23                  day-to-day activities;

1                   (ii) coordinate professional develop-  
2                   ment activities, including activities led by  
3                   National STEM Teacher Corps members;

4                   (iii) connect National STEM Teacher  
5                   Corps members with existing educator pro-  
6                   fessional development programs and co-  
7                   ordinate members' involvement as cooper-  
8                   ating teachers or mentors;

9                   (iv) seek opportunities to involve  
10                  teachers who are not members of the Na-  
11                  tional STEM Teacher Corps to participate  
12                  in National STEM Teacher Corps activi-  
13                  ties; and

14                  (v) build partnerships with existing  
15                  education organizations and other efforts  
16                  by State educational agencies and local  
17                  educational agencies that operate programs  
18                  relevant to the National STEM Teacher  
19                  Corps and its activities;

20                  (B) recruiting eligible applicants, with a  
21                  focus on recruiting diverse STEM educators to  
22                  advance equity based on race, ethnicity, sex, so-  
23                  cioeconomic status, age, disability status, geog-  
24                  raphy, and language ability;

1 (C) screening, interviewing, and selecting  
2 members of the National STEM Teacher Corps  
3 using procedures and standards provided by the  
4 Administrator;

5 (D) coordinating the online network that  
6 supports all National STEM Teacher Corps  
7 members in the region or topic area;

8 (E) convening occasional meetings of Na-  
9 tional STEM Teacher Corps members in a re-  
10 gion or topic area;

11 (F) creating opportunities for the profes-  
12 sional growth of National STEM Teacher Corps  
13 members, with a focus on increasing STEM  
14 student achievement and STEM participation  
15 rates for all students, particularly those from  
16 rural and high-need schools; and

17 (G) supporting the retention and success  
18 of National STEM Teacher Corps members in  
19 the region or topic area.

20 (7) DUTIES OF MEMBERS OF THE NATIONAL  
21 STEM TEACHER CORPS.—An applicant that is se-  
22 lected by a Corps alliance to be a member of the Na-  
23 tional STEM Teacher Corps shall—

24 (A) serve a 4-year term with a possibility  
25 of reappointment;



1 (B) receive an annual stipend in an  
2 amount not less than \$10,000; and

3 (C) have substantial responsibilities, in-  
4 cluding—

5 (i) working with other members of the  
6 National STEM Teacher Corps to develop  
7 and improve innovative teaching practices,  
8 including practices such as inquiry-based  
9 learning;

10 (ii) participating in professional devel-  
11 opment in innovative teaching methodology  
12 and mentorship; and

13 (iii) continuing to excel in teaching  
14 the member's own students, with a focus  
15 on advancing equity by spending additional  
16 time teaching and coaching underserved  
17 students to increase STEM student  
18 achievement and STEM participation rates  
19 for students from rural and high-need  
20 schools.

21 (8) EVALUATION.—The Director, acting  
22 through the Administrator, shall submit a report to  
23 Congress after the third year of the pilot program  
24 that includes—

1 (A) an assessment, drawing on the evalua-  
2 tions the Administrator shall conduct under  
3 subparagraphs (C) and (D) of paragraph (4),  
4 and other sources of information, of the effec-  
5 tiveness of the pilot program in recruiting and  
6 retaining high-quality STEM teachers in the se-  
7 lected regions or topic areas, particularly in  
8 high-need and rural schools; and

9 (B) if deemed effective, a proposal to Con-  
10 gress for permanent implementation of the pilot  
11 program.

12 (9) SUNSET.—The authority to carry out this  
13 subsection shall terminate on the date that is 15  
14 years after the date of enactment of this Act.

15 (10) AUTHORIZATION OF APPROPRIATIONS.—  
16 There are authorized to be appropriated  
17 \$60,000,000 for each of fiscal years 2023 through  
18 2032 to carry out this subsection.

19 **SEC. 10312. UNDERGRADUATE STEM EDUCATION.**

20 (a) RESEARCH ON STEM EDUCATION AND WORK-  
21 FORCE NEEDS.—The Director shall make awards, on a  
22 competitive basis, to four-year institutions of higher edu-  
23 cation or nonprofit organizations (or consortia of such in-  
24 stitutions or organizations) to support research and devel-  
25 opment activities to—

1           (1) encourage greater collaboration and coordi-  
2           nation between institutions of higher education and  
3           industry to enhance education, foster hands-on learn  
4           experiences, and improve alignment with workforce  
5           needs;

6           (2) understand the current composition of the  
7           STEM workforce and the factors that influence  
8           growth, retention, and development of that work-  
9           force;

10          (3) increase the size, diversity, capability, and  
11          flexibility of the STEM workforce; and

12          (4) increase dissemination and widespread  
13          adoption of effective practices in undergraduate edu-  
14          cation and workforce development.

15          (b) **ADVANCED TECHNOLOGICAL EDUCATION PRO-**  
16 **GRAM UPDATE.**—Section 3(b) of the Scientific and Ad-  
17 vanced-Technology Act of 1992 (42 U.S.C. 1862i(b)) is  
18 amended to read as follows:

19          “(b) **CENTERS OF SCIENTIFIC AND TECHNICAL EDU-**  
20 **CATION.**—

21                 “(1) **IN GENERAL.**—The Director shall make  
22                 awards for the establishment of centers of excellence,  
23                 in advanced-technology fields, among associate-de-  
24                 gree-granting colleges. Centers shall meet one or  
25                 both of the following criteria:

1                   “(A) Exceptional instructional programs in  
2                   advanced-technology fields.

3                   “(B) Excellence in undergraduate STEM  
4                   education.

5                   “(2) PURPOSES.—The centers shall serve as na-  
6                   tional and regional clearinghouses and models for  
7                   the benefit of both colleges and secondary schools,  
8                   and shall provide seminars and programs to dissemi-  
9                   nate model curricula and model teaching methods  
10                  and instructional materials to other associate-degree-  
11                  granting colleges.

12                  “(3) NETWORKS.—The centers may enter into  
13                  partnerships with other institutions of higher edu-  
14                  cation, nonprofit organizations, and stakeholder  
15                  groups, or a consortium thereof, to develop networks  
16                  to—

17                         “(A) coordinate research, training, and  
18                         education activities funded by awards under  
19                         subsection (a);

20                         “(B) share information and best practices;  
21                         or

22                         “(C) promote collaboration between aca-  
23                         demic institutions, workforce development pro-  
24                         grams, labor organizations, and industry to

1           communicate and meet workforce education and  
2           training needs.”.

3           (c) INNOVATIONS IN STEM EDUCATION AT COMMU-  
4   NITY COLLEGES.—

5           (1) IN GENERAL.—The Director shall make  
6           awards on a merit-reviewed, competitive basis to in-  
7           stitutions of higher education or nonprofit organiza-  
8           tions (or consortia of such institutions or organiza-  
9           tions) to advance research on the nature of learning  
10          and teaching at community colleges and to improve  
11          outcomes for students who enter the workforce upon  
12          completion of their STEM degree or credential or  
13          transfer to 4-year institutions, including by—

14                   (A) examining how to scale up successful  
15                   programs at community colleges that are im-  
16                   proving student outcomes in foundational  
17                   STEM courses;

18                   (B) supporting research on effective  
19                   STEM teaching practices in community college  
20                   settings;

21                   (C) designing and developing new STEM  
22                   curricula;

23                   (D) providing STEM students with hands-  
24                   on training and research experiences, intern-

1           ships, and other experiential learning opportuni-  
2           ties;

3           (E) increasing access to high quality  
4           STEM education through new technologies;

5           (F) re-skilling or up-skilling incumbent  
6           workers for new STEM jobs;

7           (G) building STEM career and seamless  
8           transfer pathways; and

9           (H) developing novel mechanisms to iden-  
10          tify and recruit talent into STEM programs, in  
11          particular talent from groups historically under-  
12          represented in STEM.

13          (2) PARTNERSHIPS.—In carrying out activities  
14          under this subsection, the Director shall encourage  
15          applications to develop, enhance, or expand coopera-  
16          tive STEM education and training partnerships be-  
17          tween institutions of higher education, industry, and  
18          labor organizations.

19          (d) IMPROVING ACCESS TO STEM EDUCATION AT  
20          CAREER AND TECHNICAL EDUCATION INSTITUTIONS.—

21                 (1) IN GENERAL.—The Director shall make  
22          awards, on a competitive basis, to institutions of  
23          higher education (including postsecondary vocational  
24          institutions) to support career and technical edu-  
25          cation in STEM and computer science related fields.

1           (2) PRIORITY.—In making awards under this  
2 subsection, the Director shall give priority to institu-  
3 tions that demonstrate effective strategies to recruit  
4 and provide career and technical education to vet-  
5 erans and members of the Armed Forces  
6 transitioning to the private sector workforce.

7           (3) CAREER AND TECHNICAL EDUCATION DE-  
8 FINED.—In this subsection, the term “career and  
9 technical education” has the meaning given that  
10 term in section 3 of the Carl D. Perkins Career and  
11 Technical Education Act of 2006 (20 U.S.C. 2302).

12       (e) COURSE-BASED UNDERGRADUATE RESEARCH  
13 EXPERIENCES.—

14           (1) IN GENERAL.—The Director shall carry out  
15 a 4-year pilot program under which the Director  
16 shall make awards, on a competitive basis, to insti-  
17 tutions of higher education and nonprofit organiza-  
18 tions (or consortia of such institutions or organiza-  
19 tions) to establish a total of not fewer than five Cen-  
20 ters to develop and scale up successful models for  
21 providing undergraduate students with hands-on,  
22 course-based research experiences.

23           (2) USE OF FUNDS.—Awards made under this  
24 paragraph shall be used to—

1 (A) develop, assess, and disseminate mod-  
2 els for providing undergraduate students with  
3 course-based research experiences across STEM  
4 disciplines and education levels;

5 (B) identify and address opportunities and  
6 challenges in facilitating implementation across  
7 a broad range of institution types, including  
8 historically Black colleges and universities,  
9 Tribal Colleges or Universities, minority serving  
10 institutions and community colleges;

11 (C) identify and develop best practices to  
12 address barriers for faculty, including institu-  
13 tional culture, resources, and incentive struc-  
14 tures;

15 (D) identify and address factors that may  
16 facilitate or discourage participation by stu-  
17 dents from all backgrounds;

18 (E) provide faculty with curriculum, pro-  
19 fessional development, training, networking op-  
20 portunities, and other support to enable the de-  
21 velopment, adaptation, or expansion of a  
22 course-based research experience; and

23 (F) collect data and carry out research to  
24 evaluate the impacts of course- based under-



1 graduate research experiences on the STEM  
2 workforce.

3 (3) PARTNERSHIPS.—In making awards under  
4 this paragraph, the Director shall consider the ex-  
5 tent to which the proposed Center will establish  
6 partnerships among multiple types of academic insti-  
7 tutions, including community colleges, emerging re-  
8 search institutions, EPSCoR institutions, historically  
9 Black colleges and universities, Tribal Colleges or  
10 Universities, and minority-serving institutions, the  
11 private sector, and other relevant stakeholders in  
12 supporting programs and activities to facilitate fac-  
13 ulty training and the widespread and sustained im-  
14 plementation of promising, evidence-based practices,  
15 models, programs, and curriculum.

16 (4) REPORT.—Not later than 180 days after  
17 the date on which the pilot program is completed,  
18 the Director shall submit to Congress a report that  
19 includes—

20 (A) an assessment, that includes feedback  
21 from the research community, of the effective-  
22 ness of the pilot program in increasing the  
23 number, diversity, and workforce readiness of  
24 STEM graduates; and

1 (B) if determined to be effective, a plan for  
2 permanent implementation of the pilot program.

3 (f) ADVANCED TECHNOLOGICAL MANUFACTURING  
4 ACT.—

5 (1) FINDINGS AND PURPOSE.—Section 2 of the  
6 Scientific and Advanced-Technology Act of 1992 (42  
7 U.S.C. 1862h) is amended—

8 (A) in subsection (a)—

9 (i) in paragraph (3), by striking  
10 “science, mathematics, and technology”  
11 and inserting “science, technology, engi-  
12 neering, and mathematics or STEM”;

13 (ii) in paragraph (4), by inserting  
14 “educated” and before “trained”; and

15 (iii) in paragraph (5), by striking  
16 “scientific and technical education and  
17 training” and inserting “STEM education  
18 and training”; and

19 (B) in subsection (b)—

20 (i) in paragraph (2), by striking  
21 “mathematics and science” and inserting  
22 “STEM fields”; and

23 (ii) in paragraph (4), by striking  
24 “mathematics and science instruction” and  
25 inserting “STEM instruction”.

1           (2) MODERNIZING REFERENCES TO STEM.—  
2           Section 3 of the Scientific and Advanced-Technology  
3           Act of 1992 (42 U.S.C. 1862i) is amended—

4           (A) in the section heading, by striking  
5           “**SCIENTIFIC AND TECHNICAL EDUCATION**”  
6           and inserting “**STEM EDUCATION**”;

7           (B) in subsection (a)—

8           (i) in the subsection heading, by strik-  
9           ing “SCIENTIFIC AND TECHNICAL EDU-  
10           CATION” and inserting “STEM EDU-  
11           CATION”;

12           (ii) in the matter preceding paragraph  
13           (1)—

14           (I) by inserting “and education  
15           to prepare the skilled technical work-  
16           force to meet workforce demands” be-  
17           fore “, and to improve”;

18           (II) by striking “core education  
19           courses in science and mathematics”  
20           and inserting “core education courses  
21           in STEM fields”;

22           (III) by inserting “veterans and  
23           individuals engaged in” before “work  
24           in the home”; and

1 (IV) by inserting “and on build-  
2 ing a pathway from secondary schools  
3 to associate-degree-granting institu-  
4 tions, to careers that require technical  
5 training” before “, and shall be de-  
6 signed”;

7 (iii) in paragraph (1)—

8 (I) by inserting “and study”  
9 after “development”; and

10 (II) by striking “core science and  
11 mathematics courses” and inserting  
12 “core STEM courses”;

13 (iv) in paragraph (2), by striking  
14 “science, mathematics, and advanced-tech-  
15 nology fields” and inserting “STEM and  
16 advanced- technology fields”;

17 (v) in paragraph (3)(A), by inserting  
18 “to support the advanced- technology in-  
19 dustries that drive the competitiveness of  
20 the United States in the global economy”  
21 before the semicolon at the end;

22 (vi) in paragraph (4), by striking “sci-  
23 entific and advanced- technology fields”  
24 and inserting “STEM and advanced-tech-  
25 nology fields”; and

1 (vii) in paragraph (5), by striking  
2 “advanced scientific and technical edu-  
3 cation” and inserting “advanced STEM  
4 and advanced- technology”;

5 (C) in subsection (c)—

6 (i) in paragraph (1)—

7 (I) in subparagraph (A)—

8 (aa) in the matter preceding  
9 clause (i), by striking “to encour-  
10 age” and all that follows through  
11 “such means as—” and inserting  
12 “to encourage the development of  
13 career and educational pathways  
14 with multiple entry and exit  
15 points leading to credentials and  
16 degrees, and to assist students  
17 pursuing pathways in STEM  
18 fields to transition from asso-  
19 ciate-degree-granting colleges to  
20 bachelor- degree-granting institu-  
21 tions, through such means as—”;

22 (bb) in clause (i), by striking  
23 “to ensure” and inserting “to de-  
24 velop articulation agreements  
25 that ensure”; and

1 (cc) in clause (ii), by strik-  
2 ing “courses at the bachelor-de-  
3 gree-granting institution” and in-  
4 serting “the career and edu-  
5 cational pathways supported by  
6 the articulation agreements”;  
7 (II) in subparagraph (B)—  
8 (aa) in clause (i), by insert-  
9 ing “veterans and individuals en-  
10 gaged in” before “work in the  
11 home”;  
12 (bb) in clause (iii)—  
13 (AA) by striking “bach-  
14 elor’s-degree- granting insti-  
15 tutions” and inserting “in-  
16 stitutions or work sites”;  
17 and  
18 (BB) by inserting “or  
19 industry internships” after  
20 “summer programs”; and  
21 (cc) by striking the flush  
22 text following clause (iv); and  
23 (III) by striking subparagraph  
24 (C);  
25 (ii) in paragraph (2)—

1 (I) by striking “mathematics and  
2 science programs” and inserting  
3 “STEM programs”;

4 (II) by inserting “and, as appro-  
5 priate, elementary schools,” after  
6 “with secondary schools”;

7 (III) by striking “mathematics  
8 and science education” and inserting  
9 “STEM education”;

10 (IV) by striking “secondary  
11 school students” and inserting “stu-  
12 dents at these schools”;

13 (V) by striking “science and ad-  
14 vanced-technology fields” and insert-  
15 ing “STEM and advanced-technology  
16 fields”; and

17 (VI) by striking “agreements  
18 with local educational agencies” and  
19 inserting “articulation agreements or  
20 dual credit courses with local sec-  
21 ondary schools, or other means as the  
22 Director determines appropriate,”;  
23 and

24 (iii) in paragraph (3)—

25 (I) by striking subparagraph (B);

1 (II) by striking “shall—” and all  
2 that follows through “establish a” and  
3 inserting “shall establish a”;

4 (III) by striking “the fields of  
5 science, technology, engineering, and  
6 mathematics” and inserting “STEM  
7 fields”; and

8 (IV) by striking “; and” and in-  
9 serting “, including jobs at Federal  
10 and academic laboratories.”;

11 (D) in subsection (d)(2)—

12 (i) in subparagraph (D), by striking  
13 “and” after the semicolon;

14 (ii) in subparagraph (E), by striking  
15 the period at the end and inserting a “;  
16 and”; and

17 (iii) by adding at the end the fol-  
18 lowing:

19 “(F) as appropriate, applications that  
20 apply the best practices for STEM education  
21 and technical skills education through distance  
22 learning or in a simulated work environment, as  
23 determined by research described in subsection  
24 (f); and”;



1 (E) in subsection (g), by striking the sec-  
2 ond sentence;

3 (F) in subsection (h)(1)—

4 (i) in subparagraph (A), by striking  
5 “2022” and inserting “2026”;

6 (ii) in subparagraph (B), by striking  
7 “2022” and inserting “2026”; and

8 (iii) in subparagraph (C)—

9 (I) by striking “up to  
10 \$2,500,000” and inserting “not less  
11 than \$3,000,000”; and

12 (II) by striking “2022” and in-  
13 serting “2026”;

14 (G) in subsection (i)—

15 (i) by striking paragraph (3); and

16 (ii) by redesignating paragraphs (4)  
17 and (5) as paragraphs (3) and (4), respec-  
18 tively; and

19 (H) in subsection (j)—

20 (i) by striking paragraph (1) and in-  
21 serting the following:

22 “(1) the term advanced-technology includes  
23 technological fields such as advanced manufacturing,  
24 agricultural-, biological- and chemical-technologies,  
25 energy and environmental technologies, engineering

1 technologies, information technologies, micro and  
2 nano-technologies, cybersecurity technologies,  
3 geospatial technologies, and new, emerging tech-  
4 nology areas;”;

5 (ii) in paragraph (4), by striking  
6 “separate bachelor-degree- granting insti-  
7 tutions” and inserting “other entities”;

8 (iii) by striking paragraph (7);

9 (iv) by redesignating paragraphs (8)  
10 and (9) as paragraphs (7) and (8), respec-  
11 tively;

12 (v) in paragraph (7), as redesignated  
13 by clause (iv), by striking “and” after the  
14 semicolon;

15 (vi) in paragraph (8), as redesignated  
16 by clause (iv)—

17 (I) by striking “mathematics,  
18 science, engineering, or technology”  
19 and inserting “science, technology, en-  
20 gineering, or mathematics”; and

21 (II) by striking the period at the  
22 end and inserting “; and”; and

23 (vii) by adding at the end the fol-  
24 lowing:

1           “(9) the term skilled technical workforce has  
2           the meaning given such term in section 4(b) of the  
3           Innovations in Mentoring, Training, and Apprentices-  
4           ships Act (42 U.S.C. 1862p).”.

5           (3) AUTHORIZATION OF APPROPRIATIONS.—  
6           Section 5 of the Scientific and Advanced-Technology  
7           Act of 1992 (42 U.S.C. 1862j) is amended to read  
8           as follows:

9           **“SEC. 5. AUTHORIZATION OF APPROPRIATIONS.**

10           “‘There are authorized to be appropriated to the Di-  
11           rector for carrying out sections 2 through 4 \$150,000,000  
12           for each of fiscal years 2023 through 2027.’”.

13           **SEC. 10313. GRADUATE STEM EDUCATION.**

14           (a) MENTORING AND PROFESSIONAL DEVELOP-  
15           MENT.—

16           (1) MENTORING PLANS.—

17           (A) UPDATE.—Section 7008(a) of the  
18           America Creating Opportunities to Meaning-  
19           fully Promote Excellence in Technology, Edu-  
20           cation, and Science Act (42 U.S.C. 1862o(a)) is  
21           amended by—

22                   (i) inserting “and graduate student”  
23                   after “postdoctoral”; and

24                   (ii) inserting “The requirement may  
25                   be satisfied by providing such individuals

1 with access to mentors, including individ-  
2 uals not listed on the award.” after “re-  
3 view criterion.”.

4 (B) EVALUATION.—Not later than 120  
5 days after the date of enactment of this Act,  
6 the Director shall enter into an agreement with  
7 a qualified independent organization to evaluate  
8 the effectiveness of the postdoctoral mentoring  
9 plan requirement for improving mentoring for  
10 Foundation-supported postdoctoral researchers.

11 (2) CAREER EXPLORATION.—

12 (A) IN GENERAL.—The Director shall  
13 make awards, on a competitive basis, to institu-  
14 tions of higher education and nonprofit organi-  
15 zations (or consortia of such institutions or or-  
16 ganizations) to develop innovative approaches  
17 for facilitating career exploration of academic  
18 and nonacademic career options and for pro-  
19 viding opportunity-broadening experiences, in-  
20 cluding work-integrated opportunities, for grad-  
21 uate students and postdoctoral scholars that  
22 can then be considered, adopted, or adapted by  
23 other institutions and to carry out research on  
24 the impact and outcomes of such activities.

1 (B) REVIEW OF PROPOSALS.—In selecting  
2 award recipients under this subparagraph, the  
3 Director shall consider, at a minimum—

4 (i) the extent to which the administra-  
5 tors of the institution are committed to  
6 making the proposed activity a priority;  
7 and

8 (ii) the likelihood that the institution  
9 or organization will sustain or expand the  
10 proposed activity effort beyond the period  
11 of the award.

12 (3) DEVELOPMENT PLANS.—The Director shall  
13 require that annual project reports for awards that  
14 support graduate students and postdoctoral scholars  
15 include certification by the principal investigator  
16 that each graduate student and postdoctoral scholar  
17 receiving substantial support from such award, as  
18 determined by has developed and annually updated  
19 an individual development plan to map educational  
20 goals, career exploration, and professional develop-  
21 ment.

22 (4) PROFESSIONAL DEVELOPMENT SUPPLE-  
23 MENT.—The Director shall carry out a five-year  
24 pilot initiative to award up to 2,500 administrative  
25 supplements of up to \$2,000 to existing research

1 awards annually, on a competitive basis, to support  
2 professional development experiences for graduate  
3 students and postdoctoral researchers who receive a  
4 substantial portion of their support under such  
5 award, as determined by the Director. Not more  
6 than 10 percent of supplements awarded under this  
7 subparagraph may be used to support professional  
8 development experiences for postdoctoral research-  
9 ers.

10 (5) GRADUATE EDUCATION RESEARCH.—The  
11 Director shall make awards, on a competitive basis,  
12 to institutions of higher education or nonprofit orga-  
13 nizations (or consortia of such institutions or organi-  
14 zations) to support research on the graduate edu-  
15 cation system and outcomes of various interventions  
16 and policies, including—

17 (A) the effects of traineeships, fellowships,  
18 internships, and teaching and research  
19 assistantships on outcomes for graduate stu-  
20 dents;

21 (B) the effects of graduate education and  
22 mentoring policies and procedures on degree  
23 completion, including differences by—

24 (i) sex, race and ethnicity, and citizen-  
25 ship; and

1 (ii) student debt load;

2 (C) the development and assessment of  
3 new or adapted interventions, including ap-  
4 proaches that improve mentoring relationships,  
5 develop conflict management skills, and pro-  
6 mote healthy research teams; and

7 (D) research, data collection, and assess-  
8 ment of the state of graduate student mental  
9 health and wellbeing, factors contributing to  
10 and consequences of poor graduate student  
11 mental health, and the development, adaptation,  
12 and assessment of evidence-based strategies and  
13 policies to support emotional wellbeing and  
14 mental health.

15 (b) GRADUATE RESEARCH FELLOWSHIP PROGRAM  
16 UPDATE.—

17 (1) SENSE OF CONGRESS.—It is the sense of  
18 Congress that the Foundation should increase the  
19 number of new graduate research fellows supported  
20 annually over the next 5 years to no fewer than  
21 3,000 fellows.

22 (2) PROGRAM UPDATE.—Section 10 of the Na-  
23 tional Science Foundation Act of 1950 (42 U.S.C.  
24 1869) is amended—

1 (A) in subsection (a), by inserting “and as  
2 will address national workforce demand in crit-  
3 ical STEM fields” after “throughout the United  
4 States”;

5 (B) in subsection (b), by striking “of  
6 \$12,000” and inserting “of at least \$16,000”;  
7 and

8 (C) by adding at the end the following:

9 “(c) OUTREACH.—The Director shall ensure program  
10 outreach to recruit fellowship applicants from fields of  
11 study that are in areas of critical national need from all  
12 regions of the country, and from historically underrep-  
13 resented populations in STEM.”.

14 (3) CYBERSECURITY SCHOLARSHIPS AND GRAD-  
15 UATE FELLOWSHIPS.—The Director shall ensure  
16 that students pursuing master’s degrees and doc-  
17 toral degrees in fields relating to cybersecurity are  
18 eligible to apply for scholarships and graduate fel-  
19 lowships under the Graduate Research Fellowship  
20 Program under section 10 of the National Science  
21 Foundation Act of 1950 (42 U.S.C. 1869).

22 (c) STUDY ON GRADUATE STUDENT FUNDING.—

23 (1) IN GENERAL.—Not later than 120 days  
24 after the date of enactment of this Act, the Director



1 shall enter into an agreement with a qualified inde-  
2 pendent organization to evaluate—

3 (A) the role of the Foundation in sup-  
4 porting graduate student education and train-  
5 ing through fellowships, traineeships, and other  
6 funding models; and

7 (B) the impact of different funding mecha-  
8 nisms on graduate student experiences and out-  
9 comes, including whether such mechanisms  
10 have differential impacts on subsets of the stu-  
11 dent population.

12 (2) REPORT.—Not later than 1 year after the  
13 date of enactment of this Act, the Director shall  
14 publish the results of the evaluation carried out  
15 under paragraph (1), including a recommendation  
16 for the appropriate balance between fellowships,  
17 traineeships, and other funding models.

18 (d) [LOG 165 H10304(G)/S2208] AI SCHOLARSHIP-  
19 FOR-SERVICE.—

20 (1) DEFINITION OF EXECUTIVE AGENCY.—In  
21 this subsection, the term “executive agency” has the  
22 meaning given the term “Executive agency” in sec-  
23 tion 105 of title 5, United States Code.

24 (2) AI SCHOLARSHIP-FOR-SERVICE INITIATIVE  
25 REPORT.—Not later than 1 year after the date of

1 enactment of this Act, the Director, in coordination  
2 with the Office of Personnel Management, shall sub-  
3 mit to the Committee on Commerce, Science, and  
4 Transportation of the Senate, the Committee on  
5 Science, Space, and Technology of the House of  
6 Representatives, the Committee on Homeland Secu-  
7 rity and Governmental Affairs of the Senate, and  
8 the Committee on Oversight and Reform of the  
9 House of Representatives a report on the need and  
10 feasibility, and if appropriate, plans to implement a  
11 program to recruit and train the next generation of  
12 artificial intelligence professionals to meet the needs  
13 of Federal, State, local, and Tribal governments.  
14 The report shall include—

15 (A) recent statistical data on the size, com-  
16 position, and educational requirements of the  
17 Federal AI workforce, including an assessment  
18 of current and future demand for additional AI  
19 professionals across the Federal Government;

20 (B) an assessment of the capacity of insti-  
21 tutions of higher education to produce grad-  
22 uates with degrees, certifications, and relevant  
23 skills related to artificial intelligence that meet  
24 the current and future needs of the Federal  
25 workforce; and

1 (C) an evaluation of the need for and feasi-  
2 bility of establishing a scholarship-for-service  
3 program to recruit and train the next genera-  
4 tion of artificial intelligence professionals to  
5 meet the needs of Federal, State, local, and  
6 Tribal governments, including opportunities for  
7 leveraging existing processes and resources for  
8 administering the Federal Cyber Scholarship-  
9 for-Service Program established under section  
10 302 of the Cybersecurity Enhancement Act of  
11 2014 (15 U.S.C. 7442) in standing up such a  
12 program.

13 (3) PROGRAM ESTABLISHMENT.—Upon submit-  
14 ting the report required in paragraph (2), the Direc-  
15 tor, in coordination with the Director of the Office  
16 of Personnel Management, the Director of the Na-  
17 tional Institute of Standards and Technology, and  
18 the heads of other agencies with appropriate sci-  
19 entific knowledge, is authorized to establish a Fed-  
20 eral artificial intelligence scholarship-for-service pro-  
21 gram (referred to in this section as the Federal AI  
22 Scholarship-for-Service Program) to recruit and  
23 train artificial intelligence professionals to lead and  
24 support the application of artificial intelligence to

1 the missions of Federal, State, local, and Tribal gov-  
2 ernments.

3 (4) QUALIFIED INSTITUTION OF HIGHER EDU-  
4 CATION.—The Director, in coordination with the  
5 heads of other agencies with appropriate scientific  
6 knowledge, shall establish criteria to designate quali-  
7 fied institutions of higher education that shall be eli-  
8 gible to participate in the Federal AI Scholarship-  
9 for-Service program. Such criteria shall include—

10 (A) measures of the institution’s dem-  
11 onstrated excellence in the education of stu-  
12 dents in the field of artificial intelligence; and

13 (B) measures of the institution’s ability to  
14 attract and retain a diverse and nontraditional  
15 student population in the fields of science, tech-  
16 nology, engineering, and mathematics, which  
17 may include the ability to attract women, mi-  
18 norities, and individuals with disabilities.

19 (5) PROGRAM DESCRIPTION AND COMPO-  
20 NENTS.—The Federal AI Scholarship-for-Service  
21 Program shall—

22 (A) provide scholarships through qualified  
23 institutions of higher education to students who  
24 are enrolled in programs of study at institutions  
25 of higher education leading to degrees or con-

1           centrations in or related to the artificial intel-  
2           ligence field;

3           (B) provide the scholarship recipients with  
4           summer internship opportunities or other mean-  
5           ingful temporary appointments in the Federal  
6           workforce focusing on AI projects or research;

7           (C) prioritize the employment placement of  
8           scholarship recipients in executive agencies;

9           (D) identify opportunities to promote  
10          multi-disciplinary programs of study that inte-  
11          grate basic or advanced AI training with other  
12          fields of study, including those that address the  
13          social, economic, legal, and ethical implications  
14          of human interaction with AI systems;

15          (E) support capacity-building education re-  
16          search programs that will enable postsecondary  
17          educational institutions to expand their ability  
18          to train the next-generation AI workforce, in-  
19          cluding AI researchers and practitioners;

20          (F) create courses or training programs in  
21          technology ethics for students receiving scholar-  
22          ships; and

23          (G) award fellowships to masters and doc-  
24          toral students who are pursuing degrees or re-  
25          search in artificial intelligence and related

1 fields, including in the field of technology eth-  
2 ics.

3 (6) SCHOLARSHIP AMOUNTS.—Each scholarship  
4 under paragraph (5) shall be in an amount that cov-  
5 ers the student’s tuition and fees at the institution  
6 for not more than 3 years and provides the student  
7 with an additional stipend.

8 (7) POST-AWARD EMPLOYMENT OBLIGA-  
9 TIONS.—Each scholarship recipient, as a condition  
10 of receiving a scholarship under the program, shall  
11 enter into an agreement under which the recipient  
12 agrees to work for a period equal to the length of  
13 the scholarship, following receipt of the student’s de-  
14 gree, in the AI mission of—

15 (A) an executive agency;

16 (B) Congress, including any agency, entity,  
17 office, or commission established in the legisla-  
18 tive branch;

19 (C) an interstate agency;

20 (D) a State, local, or Tribal government,  
21 which may include instruction in AI-related skill  
22 sets in a public school system; or

23 (E) a State, local, or Tribal government-af-  
24 filiated nonprofit entity that is considered to be  
25 critical infrastructure (as defined in section

1 1016(e) of the USA Patriot Act (42 U.S.C.  
2 5195c(e)).

3 (8) HIRING AUTHORITY.—

4 (A) APPOINTMENT IN EXCEPTED SERV-  
5 ICE.—Notwithstanding any provision of chapter  
6 33 of title 5, United States Code, governing ap-  
7 pointments in the competitive service, an execu-  
8 tive agency may appoint an individual who has  
9 completed the eligible degree program for which  
10 a scholarship was awarded to a position in the  
11 excepted service in the executive agency.

12 (B) NONCOMPETITIVE CONVERSION.—Ex-  
13 cept as provided in subparagraph (D), upon ful-  
14 fillment of the service term, an employee ap-  
15 pointed under subparagraph (A) may be con-  
16 verted noncompetitively to term, career-condi-  
17 tional, or career appointment.

18 (C) TIMING OF CONVERSION.—An execu-  
19 tive agency may noncompetitively convert a  
20 term employee appointed under subparagraph  
21 (B) to a career-conditional or career appoint-  
22 ment before the term appointment expires.

23 (D) AUTHORITY TO DECLINE CONVER-  
24 SION.—An executive agency may decline to

1           make the noncompetitive conversion or appoint-  
2           ment under subparagraph (B) for cause.

3           (9) ELIGIBILITY.—To be eligible to receive a  
4           scholarship under this section, an individual shall—

5                   (A) be a citizen or lawful permanent resi-  
6                   dent of the United States;

7                   (B) demonstrate a commitment to a career  
8                   in advancing the field of AI;

9                   (C) be—

10                           (i) a full-time student in an eligible  
11                           degree program at a qualified institution of  
12                           higher education, as determined by the Di-  
13                           rector;

14                           (ii) a student pursuing a degree on a  
15                           less than full-time basis, but not less than  
16                           half-time basis; or

17                           (iii) an AI faculty member on sab-  
18                           batical to advance knowledge in the field;

19                   and

20                   (D) accept the terms of a scholarship  
21           under this section.

22           (10) CONDITIONS OF SUPPORT.—

23                   (A) IN GENERAL.—As a condition of re-  
24                   ceiving a scholarship under this section, a re-  
25                   cipient shall agree to provide the qualified insti-



1           tution of higher education with annual  
2           verifiable documentation of post-award employ-  
3           ment and up-to-date contact information.

4           (B) TERMS.—A scholarship recipient  
5           under this section shall be liable to the United  
6           States as provided in paragraph (12) if the in-  
7           dividual—

8                   (i) fails to maintain an acceptable  
9                   level of academic standing at the applicable  
10                  institution of higher education, as deter-  
11                  mined by the Director;

12                  (ii) is dismissed from the applicable  
13                  institution of higher education for discipli-  
14                  nary reasons;

15                  (iii) withdraws from the eligible de-  
16                  gree program before completing the pro-  
17                  gram;

18                  (iv) declares that the individual does  
19                  not intend to fulfill the post- award em-  
20                  ployment obligation under this section; or

21                  (v) fails to fulfill the post-award em-  
22                  ployment obligation of the individual under  
23                  this section.

1           (11) MONITORING COMPLIANCE.—As a condi-  
2           tion of participating in the program, a qualified in-  
3           stitution of higher education shall—

4                   (A) enter into an agreement with the Di-  
5                   rector to monitor the compliance of scholarship  
6                   recipients with respect to their post-award em-  
7                   ployment obligations; and

8                   (B) provide to the Director, on an annual  
9                   basis, the post-award employment documenta-  
10                  tion required under paragraph (10) for scholar-  
11                  ship recipients through the completion of their  
12                  post-award employment obligations.

13           (12) AMOUNT OF REPAYMENT.—

14                   (A) LESS THAN 1 YEAR OF SERVICE.—If a  
15                   circumstance described in paragraph (10) oc-  
16                   curs before the completion of 1 year of a post-  
17                   award employment obligation under this sec-  
18                   tion, the total amount of scholarship awards re-  
19                   ceived by the individual under this section  
20                   shall—

21                           (i) be repaid; or

22                           (ii) be treated as a loan to be repaid  
23                   in accordance with paragraph (13).

24                   (B) 1 OR MORE YEARS OF SERVICE.—If a  
25                   circumstance described in clause (iv) or (v) of

1 paragraph (10)(B) occurs after the completion  
2 of 1 or more years of a post-award employment  
3 obligation under this section, the total amount  
4 of scholarship awards received by the individual  
5 under this section, reduced by the ratio of the  
6 number of years of service completed divided by  
7 the number of years of service required, shall—

8 (i) be repaid; or

9 (ii) be treated as a loan to be repaid  
10 in accordance with paragraph (13).

11 (13) REPAYMENTS.—A loan described in para-  
12 graph (12) shall—

13 (A) be treated as a Federal Direct Unsub-  
14 sidized Stafford Loan under part D of title IV  
15 of the Higher Education Act of 1965 (20  
16 U.S.C. 1087a et seq.); and

17 (B) be subject to repayment, together with  
18 interest thereon accruing from the date of the  
19 scholarship award, in accordance with terms  
20 and conditions specified by the Director (in con-  
21 sultation with the Secretary of Education).

22 (14) COLLECTION OF REPAYMENT.—

23 (A) IN GENERAL.—In the event that a  
24 scholarship recipient is required to repay the  
25 scholarship award under this section, the quali-

1           fied institution of higher education providing  
2           the scholarship shall—

3                   (i) determine the repayment amounts  
4                   and notify the recipient and the Director  
5                   of the amounts owed; and

6                   (ii) collect the repayment amounts  
7                   within a period of time as determined by  
8                   the Director, or the repayment amounts  
9                   shall be treated as a loan in accordance  
10                  with paragraph (13).

11                (B) RETURNED TO TREASURY.—Except as  
12                provided in subparagraph (C), any repayment  
13                under this subsection shall be returned to the  
14                Treasury of the United States.

15                (C) RETAIN PERCENTAGE.—A qualified in-  
16                stitution of higher education may retain a per-  
17                centage of any repayment the institution col-  
18                lects under this subsection to defray adminis-  
19                trative costs associated with the collection. The  
20                Director shall establish a fixed percentage that  
21                will apply to all eligible entities, and may up-  
22                date this percentage as needed, in the deter-  
23                mination of the Director.

24                (15) EXCEPTIONS.—The Director may provide  
25                for the partial or total waiver or suspension of any

1 service or payment obligation by an individual under  
2 this section whenever compliance by the individual  
3 with the obligation is impossible or would involve ex-  
4 treme hardship to the individual, or if enforcement  
5 of such obligation with respect to the individual  
6 would be unconscionable.

7 (16) PUBLIC INFORMATION.—

8 (A) EVALUATION.—The Director, in co-  
9 ordination with the Director of the Office of  
10 Personnel Management, shall annually evaluate  
11 and make public, in a manner that protects the  
12 personally identifiable information of scholar-  
13 ship recipients, information on the success of  
14 recruiting individuals for scholarships under  
15 this section and on hiring and retaining those  
16 individuals in the public sector AI workforce,  
17 including information on—

18 (i) placement rates;

19 (ii) where students are placed, includ-  
20 ing job titles and descriptions;

21 (iii) salary ranges for students not re-  
22 leased from obligations under this section;

23 (iv) how long after graduation stu-  
24 dents are placed;

1 (v) how long students stay in the posi-  
2 tions they enter upon graduation;

3 (vi) how many students are released  
4 from obligations; and

5 (vii) what, if any, remedial training is  
6 required.

7 (B) REPORTS.—The Director, in coordina-  
8 tion with the Office of Personnel Management,  
9 shall submit, not less frequently than once  
10 every 3 years, to the Committee on Homeland  
11 Security and Governmental Affairs of the Sen-  
12 ate, the Committee on Commerce, Science, and  
13 Transportation of the Senate, the Committee on  
14 Science, Space, and Technology of the House of  
15 Representatives, and the Committee on Over-  
16 sight and Reform of the House of Representa-  
17 tives a report, including the results of the eval-  
18 uation under subparagraph (A) and any recent  
19 statistics regarding the size, composition, and  
20 educational requirements of the Federal AI  
21 workforce.

22 (C) RESOURCES.—The Director, in coordi-  
23 nation with the Director of the Office of Per-  
24 sonnel Management, shall provide consolidated  
25 and user-friendly online resources for prospec-

1           tive scholarship recipients, including, to the ex-  
2           tent practicable—

3                   (i) searchable, up-to-date, and accu-  
4                   rate information about participating insti-  
5                   tutions of higher education and job oppor-  
6                   tunities related to the AI field; and

7                   (ii) a modernized description of AI ca-  
8                   reers.

9           (17) REFRESH.—Not less than once every 2  
10          years, the Director, in coordination with the Direc-  
11          tor of the Office of Personnel Management, shall re-  
12          view and update the Federal AI Scholarship-for-  
13          Service Program to reflect advances in technology.

14 **SEC. 10314. STEM WORKFORCE DATA.**

15          (a) SKILLED TECHNICAL WORKFORCE PORTFOLIO  
16          REVIEW.—

17               (1) IN GENERAL.—Not later than 1 year after  
18          the date of enactment of this Act, the Director shall  
19          conduct a full portfolio analysis of the Foundation’s  
20          skilled technical workforce investments across all Di-  
21          rectorates in the areas of education, research, infra-  
22          structure, data collection, and analysis.

23               (2) REPORT.—Not later than 180 days after  
24          the date of the review under paragraph (1) is com-  
25          plete, the Director shall submit to Congress and

1 make widely available to the public a summary re-  
2 port of the portfolio review.

3 (b) SURVEY DATA.—

4 (1) ROTATING TOPIC MODULES.—To meet  
5 evolving needs for data on the state of the science  
6 and engineering workforce, the Director shall assess,  
7 through coordination with other Federal statistical  
8 agencies and drawing on input from relevant stake-  
9 holders, the feasibility and benefits of incorporating  
10 questions or topic modules to existing National Cen-  
11 ter for Science and Engineering Statistics surveys  
12 that would vary from cycle to cycle.

13 (2) NEW DATA.—Not later than 1 year after  
14 the date of enactment of this Act, the Director shall  
15 submit to Congress and the Board the results of an  
16 assessment, carried out in coordination with other  
17 Federal agencies and with input from relevant stake-  
18 holders, of the feasibility and benefits of incor-  
19 porating new questions or topic modules to existing  
20 National Center for Science and Engineering Statis-  
21 tics surveys on—

22 (A) the skilled technical workforce;

23 (B) working conditions and work-life bal-  
24 ance;

25 (C) harassment and discrimination;



1 (D) immigration and emigration; and

2 (E) any other topics at the discretion of  
3 the Director.

4 (3) LONGITUDINAL DESIGN.—The Director  
5 shall continue and accelerate efforts to enhance the  
6 usefulness of National Center for Science and Engi-  
7 neering Statistics survey data for longitudinal re-  
8 search and analysis.

9 (4) GOVERNMENT ACCOUNTABILITY OFFICE RE-  
10 VIEW.—Not later than 1 year after the date of en-  
11 actment of this Act, the Comptroller General of the  
12 United States shall submit a report to Congress  
13 that—

14 (A) evaluates Foundation processes for en-  
15 suring the data and analysis produced by the  
16 National Center for Science and Engineering  
17 Statistics meets current and future needs; and

18 (B) includes such recommendations as the  
19 Comptroller General determines are appropriate  
20 to improve such processes.

21 **SEC. 10315. CYBER WORKFORCE DEVELOPMENT RESEARCH**  
22 **AND DEVELOPMENT.**

23 (a) IN GENERAL.—The Director shall make awards  
24 on a merit-reviewed, competitive basis to institutions of  
25 higher education or nonprofit organizations (or consortia

1 of such institutions or organizations) to carry out research  
2 on the cyber workforce.

3 (b) RESEARCH.—In carrying out research pursuant  
4 to subsection (a), the Director shall support research and  
5 development activities to—

6 (1) understand the current state of the cyber  
7 workforce, including factors that influence growth,  
8 retention, and development of that workforce;

9 (2) examine paths to entry and re-entry into  
10 the cyber workforce;

11 (3) understand trends of the cyber workforce,  
12 including demographic representation, educational  
13 and professional backgrounds present, competencies  
14 available, and factors that shape employee recruit-  
15 ment, development, and retention and how to in-  
16 crease the size, diversity, and capability of the cyber  
17 workforce;

18 (4) examine and evaluate training practices,  
19 models, programs, and technologies; and

20 (5) other closely related topics as the Director  
21 determines appropriate.

22 (c) REQUIREMENTS.—In carrying out the activities  
23 described in subsection (b), the Director shall—

24 (1) collaborate with the National Institute of  
25 Standards and Technology, including the National

1 Initiative for Cybersecurity Education, the Depart-  
2 ment of Homeland Security, the Department of De-  
3 fense, the Office of Personnel Management, and  
4 other Federal departments and agencies, as appro-  
5 priate;

6 (2) align with or build on the National Initia-  
7 tive on Cybersecurity Education Cybersecurity  
8 Workforce Framework wherever practicable and ap-  
9 plicable;

10 (3) leverage the collective body of knowledge  
11 from existing cyber workforce development research  
12 and education activities; and

13 (4) engage with other Federal departments and  
14 agencies, research communities, and potential users  
15 of information produced under this subsection.

16 **SEC. 10316. FEDERAL CYBER SCHOLARSHIP-FOR-SERVICE**  
17 **PROGRAM.**

18 (a) SENSE OF CONGRESS.—It is the sense of Con-  
19 gress that—

20 (1) since cybersecurity risks are constant in the  
21 growing digital world, it is critical that the United  
22 States stay ahead of malicious cyber activity with a  
23 workforce that can safeguard our innovation, re-  
24 search, and work environments; and

1           (2) Federal investments in the Federal Cyber  
2       Scholarship-for-Service Program at the National  
3       Science Foundation play a critical role in preparing  
4       and sustaining a strong, talented, and much-needed  
5       national cybersecurity workforce and should be  
6       strengthened.

7       (b) IN GENERAL.—Section 302(b)(1) of the Cyberse-  
8       curity Enhancement Act of 2014 (15 U.S.C. 7442(b)(1))  
9       is amended by striking the semicolon at the end and in-  
10      serting the following “and cybersecurity-related aspects of  
11      other related fields as appropriate, including artificial in-  
12      telligence, quantum computing and aerospace;”.

13   **SEC. 10317. CYBERSECURITY WORKFORCE DATA INITIA-**  
14                                   **TIVE.**

15       The Director, acting through the National Center for  
16      Science and Engineering Statistics established in section  
17      505 of the America COMPETES Reauthorization Act of  
18      2010 (42 U.S.C. 1862p) and in coordination with the Di-  
19      rector of the National Institute of Standards and Tech-  
20      nology and other appropriate Federal statistical agencies,  
21      shall establish a cybersecurity workforce data initiative  
22      that—

23           (1) assesses the feasibility of providing nation-  
24      ally representative estimates and statistical informa-  
25      tion on the cybersecurity workforce;

1           (2) utilizes the National Initiative for Cyberse-  
2           curity Education (NICE) Cybersecurity Workforce  
3           Framework (NIST Special Publication 800–181), or  
4           other frameworks, as appropriate, to enable a con-  
5           sistent measurement of the cybersecurity workforce;

6           (3) utilizes and complements existing data on  
7           employer requirements and unfilled positions in the  
8           cybersecurity workforce;

9           (4) consults key stakeholders and the broader  
10          community of practice in cybersecurity workforce de-  
11          velopment to determine data requirements needed to  
12          strengthen the cybersecurity workforce;

13          (5) evaluates existing Federal survey data for  
14          information pertinent to developing national esti-  
15          mates of the cybersecurity workforce;

16          (6) evaluates administrative data and other  
17          supplementary data sources, as available, to describe  
18          and measure the cybersecurity workforce; and

19          (7) collects statistical data, to the greatest ex-  
20          tent practicable, on credential attainment and em-  
21          ployment outcomes information for the cybersecurity  
22          workforce.

1 **SEC. 10318. MICROELECTRONICS WORKFORCE DEVELOP-**  
2 **MENT ACTIVITIES.**

3 (a) CREATING HELPFUL INITIATIVES TO PRODUCE  
4 PERSONNEL IN NEEDED GROWTH INDUSTRIES.—

5 (1) IN GENERAL.—The Director shall make  
6 awards to institutions of higher education, non-profit  
7 organizations, or consortia thereof, for research, de-  
8 velopment, and related activities to advance innova-  
9 tive approaches to developing, improving, and ex-  
10 panding evidence-based education and workforce de-  
11 velopment activities and learning experiences at all  
12 levels of education in fields and disciplines related to  
13 microelectronics.

14 (2) PURPOSES.—Activities carried out under  
15 this section shall be for the purpose of supporting  
16 the growth, retention, and development of a diverse  
17 and sustainable microelectronics workforce to meet  
18 the requirements of the programs established in sec-  
19 tion 9906(c)(2)(C) of the William M. (Mac) Thorn-  
20 berry National Defense Authorization Act for Fiscal  
21 Year 2021 in support of the evolving needs of indus-  
22 try, academia, government, and Federal laboratories.

23 (3) USES OF FUNDS.—Awards made under this  
24 section shall be used to support activities, such as—

25 (A) development of industry-oriented cur-  
26 ricula and teaching modules for topics relevant

1 to microelectronics, including those that provide  
2 meaningful hands-on learning experiences;

3 (B) dissemination of materials developed in  
4 subparagraph (A), including through the cre-  
5 ation and maintenance of a publicly-accessible  
6 database and online portal;

7 (C) development and implementation of  
8 training, research, and professional development  
9 programs for teachers, including innovative pre-  
10 service and in-service programs, in microelec-  
11 tronics and related fields;

12 (D) support for learning activities and ex-  
13 periences that provide physical, simulated, or  
14 remote access to training facilities and indus-  
15 try-standard processes and tools, including  
16 equipment and software for the design, develop-  
17 ment, manufacturing, and testing of microelec-  
18 tronics;

19 (E) increasing the integration of microelec-  
20 tronics content into STEM curricula at all edu-  
21 cation levels;

22 (F) Growing academic research capacity in  
23 microelectronics by incentivizing the hiring of  
24 faculty in fields critical to microelectronics;

1 (G) support for innovative industry path-  
2 way programs that connect high school, voca-  
3 tional, military, college, and graduate programs;  
4 and

5 (H) providing informal hands-on microelec-  
6 tronics learning opportunities for PreK-12 stu-  
7 dents in different learning environments, in-  
8 cluding competitions.

9 (4) ADVANCED MICROELECTRONICS  
10 TRAINEESHIPS.—

11 (A) IN GENERAL.—The Director shall  
12 make awards to institutions of higher education  
13 or nonprofit organizations (or consortia of such  
14 institutions and organizations) to establish  
15 traineeship programs for graduate students who  
16 pursue microelectronics research leading to a  
17 masters or doctorate degree by providing fund-  
18 ing and other assistance, and by providing  
19 graduate students with opportunities for re-  
20 search experiences in government or industry  
21 related to the students' microelectronics studies.

22 (B) USE OF FUNDS.—Institutions of high-  
23 er education or non-profit organizations (or  
24 consortia of such institutions and organizations)



1 shall use award funds provided under subpara-  
2 graph (A) for the purposes of—

3 (i) paying tuition and fees, and pro-  
4 viding stipends, for students receiving  
5 traineeships who are citizens, nationals, or  
6 aliens lawfully admitted for permanent res-  
7 idence;

8 (ii) facilitating opportunities for sci-  
9 entific internship programs for students re-  
10 ceiving traineeships in microelectronics at  
11 private industry, nonprofit research insti-  
12 tutions, or Federal laboratories; and

13 (iii) such other costs associated with  
14 the administration of the program.

15 (5) MICROELECTRONICS SKILLED TECHNICAL  
16 WORKFORCE PROGRAMS.—The Director shall make  
17 awards under the Scientific and Advanced-Tech-  
18 nology Act of 1992 (42 U.S.C. 1862h-j) to support  
19 programs for skilled technical workers in STEM dis-  
20 ciplines that are aligned with skilled workforce needs  
21 of the microelectronics industry and lead to an asso-  
22 ciate’s degree, or equivalent certification, by pro-  
23 viding funding and other assistance, including op-  
24 portunities for internships and other hands-on expe-

1       riences in industry related to the students' micro-  
2       electronics studies.

3               (6) MICROELECTRONICS RESEARCH EXPERI-  
4       ENCES THROUGH EXISTING PROGRAMS.—The Direc-  
5       tor shall seek to increase opportunities for microelec-  
6       tronics research for students and trainees at all lev-  
7       els by encouraging proposals in microelectronics  
8       through existing programs including—

9               (A) research experiences for undergradu-  
10       ates pursuant to section 514 of the America  
11       COMPETES Reauthorization Act of 2010 (42  
12       U.S.C. 1862p-6);

13              (B) postdoctoral fellowship programs es-  
14       tablished pursuant to section 522 of the Amer-  
15       ica COMPETES Act of 2010 (42 U.S.C.  
16       1862p-11);

17              (C) graduate fellowships established pursu-  
18       ant to section 10 of the National Science Foun-  
19       dation Act of 1950 (42 U.S.C. 1869);

20              (D) informal STEM education programs  
21       established pursuant to section 3 of the STEM  
22       Education Act of 2015 (42 U.S.C. 1862q);

23              (E) the Robert Noyce Teacher Scholarship  
24       Program established pursuant to section 10 of

1 the National Science Foundation Authorization  
2 Act of 2002 (42 U.S.C. 1862n-1);

3 (F) major research instrumentation pro-  
4 grams established pursuant to section 7036 of  
5 the America COMPETES Act (42 U.S.C.  
6 1862o-14); and

7 (G) low-income scholarship program estab-  
8 lished pursuant to section 414(d) of the Amer-  
9 ican Competitiveness and Workforce Improve-  
10 ment Act of 1998 (42 U.S.C. 1869c).

11 (7) INDUSTRY PARTNERSHIPS.—In carrying out  
12 the activities under this section, the Director shall  
13 encourage awardees to partner with industry and  
14 other private sector organizations to facilitate the  
15 expansion of workforce pipelines and enable access  
16 to industry-standard equipment and software for use  
17 in undergraduate and graduate microelectronics edu-  
18 cation programs.

19 (8) INTERAGENCY COORDINATION.—In carrying  
20 out activities under this section, the Director shall  
21 collaborate with the Subcommittee on Microelec-  
22 tronics Leadership of the National Science and  
23 Technology Council, established in subsection (a) of  
24 section 9906 of the William M. (Mac) Thornberry  
25 National Defense Authorization Act for Fiscal Year

1       2021 and the National Semiconductor Technology  
2       Center established in subsection (c) of section 9906  
3       of such Act, and other relevant Federal agencies to  
4       maintain the effectiveness of microelectronics work-  
5       force development activities across the agencies.

6       (b) NATIONAL NETWORK FOR MICROELECTRONICS  
7       EDUCATION.—

8               (1) IN GENERAL.—The Director, in coordina-  
9       tion with the Secretary of Commerce, shall on a  
10      competitive, merit-reviewed basis, make awards to  
11      institutions of higher education and non-profit orga-  
12      nizations (or consortia of such institutions and orga-  
13      nizations) to establish partnerships to enhance and  
14      broaden participation in microelectronics education.

15              (2) ACTIVITIES.—Awards made under this sub-  
16      section shall be used for the following:

17                      (A) To conduct training and education ac-  
18      tivities funded by awards under paragraph (1)  
19      and in coordination with the Network Coordina-  
20      tion Hub established in paragraph (3), includ-  
21      ing curricula design, development, dissemina-  
22      tion, and assessment, and the sharing of infor-  
23      mation and best practices across the network of  
24      awardees.

1           (B) To develop regional partnerships  
2 among associate-degree-granting colleges, bach-  
3 elor-degree-granting institutions, workforce de-  
4 velopment programs, labor organizations, and  
5 industry to create a diverse national technical  
6 workforce trained in microelectronics and en-  
7 sure education and training is meeting the  
8 evolving needs of industry.

9           (C) To develop local workforce pipelines  
10 that align with capacity investments made by  
11 industry and the Federal government, including  
12 vocational and high school training programs,  
13 community college degrees and certificates, vet-  
14 eran post service opportunities, and mentoring.

15           (D) To facilitate partnerships with employ-  
16 ers, employer consortia or other private sector  
17 organizations that offer apprenticeships, intern-  
18 ships, or applied learning experiences in the  
19 field of microelectronics.

20           (E) To develop shared infrastructure avail-  
21 able to institutions of higher education, two-  
22 year colleges, and private organizations to en-  
23 able experiential learning activities and provide  
24 physical or digital access to training facilities  
25 and industry-standard tools and processes.

1           (F) To create and disseminate public out-  
2 reach to support awareness of microelectronics  
3 education and career opportunities, including  
4 through outreach to PreK–12 schools and  
5 STEM-related organizations.

6           (G) To collaborate and coordinate with in-  
7 dustry and existing public and private organiza-  
8 tions conducting microelectronics education and  
9 workforce development activities, as practicable.

10       (3) NETWORK COORDINATION HUB.—The Di-  
11 rector shall make an award on a competitive, merit-  
12 reviewed basis to an institution of higher education  
13 or nonprofit organization (or a consortium thereof)  
14 to establish a national network of partnerships (re-  
15 ferred to in this section as the “National Network  
16 for Microelectronics Education”) to coordinate ac-  
17 tivities, best practice sharing, and access to facilities  
18 across the partnerships established in accordance  
19 with paragraph (1).

20       (4) INCENTIVIZING PARTICIPATION.—To the ex-  
21 tent practicable, the Director shall encourage partici-  
22 pation in the National Network for Microelectronics  
23 Education through the coordination of activities and  
24 distribution of awards described in subsection (a).

1           (5) PARTNERSHIPS.—The Director shall en-  
2 encourage the submission of proposals that are led by  
3 historically Black colleges and universities, Tribal  
4 Colleges or Universities, and minority-serving insti-  
5 tutions or that include partnerships with or among  
6 such institutions to increase the recruitment of stu-  
7 dents from groups historically underrepresented in  
8 STEM to pursue graduate studies in microelec-  
9 tronics.

10           (6) OUTREACH.—In addition to any other re-  
11 quirements as determined appropriate by the Direc-  
12 tor, the Director shall require that proposals for  
13 awards under this section shall include a description  
14 of how the applicant will develop and implement out-  
15 reach activities to increase the participation of  
16 women and other students from groups historically  
17 underrepresented in STEM.

18           (7) COORDINATION ACROSS FOUNDATION PRO-  
19 GRAMS.—In carrying out the activities under this  
20 section, the Director shall ensure awardees coordi-  
21 nate with, and avoid unnecessary duplication of, the  
22 activities carried out under this Section with the ac-  
23 tivities of the 21st Century Nanotechnology Re-  
24 search and Development Act (Public Law 108–153),  
25 the National Quantum Initiative Act (Public Law

1 115-368), and Division E of the William M. (Mac)  
2 Thornberry National Defense Authorization Act for  
3 Fiscal Year 2021, and other related programs, as  
4 appropriate.

5 (8) INTERAGENCY COORDINATION.—In carrying  
6 out activities under this section, the Director shall  
7 collaborate with the Subcommittee on Microelec-  
8 tronics Leadership of the National Science and  
9 Technology Council, established in subsection (a) of  
10 section 9906 of the William M. (Mac) Thornberry  
11 National Defense Authorization Act for Fiscal Year  
12 2021 and the National Semiconductor Technology  
13 Center established in subsection (c) of section 9906  
14 of such Act.

15 **SEC. 10319. INCORPORATION OF ART AND DESIGN INTO**  
16 **CERTAIN STEM EDUCATION.**

17 (a) NATIONAL SCIENCE FOUNDATION AUTHORIZA-  
18 TION ACT.—Section 9(a) of the National Science Founda-  
19 tion Authorization Act of 2002 (42 U.S.C. 1862n(a)) is  
20 amended in paragraph (3)—

21 (1) in subparagraph (M), by striking “and” at  
22 the end;

23 (2) by redesignating subparagraph (N) as sub-  
24 paragraph (O); and



1           (3) after subparagraph (M), by inserting the  
2 following new subparagraph:

3           “(N) developing science, technology, engi-  
4 neering, and mathematics educational cur-  
5 riculum that incorporates art and design to pro-  
6 mote creativity and innovation; and”.

7       (b) STEM EDUCATION ACT [LOG 169  
8 H10304(K)].—Section 3 of the STEM Education Act of  
9 2015 (42 U.S.C. 1862q) is amended—

10           (1) in subsection (a)—

11           (A) in paragraph (2), by striking “and” at  
12 the end;

13           (B) in paragraph (3), by striking the pe-  
14 riod and inserting “; and”; and

15           (C) by adding at the end the following:

16           “(4) the integration of art and design in STEM  
17 educational programs.”; and

18           (2) in subsection (b)—

19           (A) in paragraph (3), by striking “and” at  
20 the end;

21           (B) in paragraph (4), by striking the pe-  
22 riod and inserting “; and”; and

23           (C) by adding at the end the following:

1           “(5) design and testing of programming that  
2           integrates art and design in STEM education to pro-  
3           mote creativity and innovation.”.

4 **SEC. 10320. MANDATORY COST-SHARING.**

5           (a) **WAIVER.**—The cost-sharing requirements under  
6 section 7036(c) of the America Creating Opportunities to  
7 Meaningfully Promote Excellence in Technology, Edu-  
8 cation, and Science Act (42 U.S.C. 1862o-14(c)) for the  
9 Major Research Instrumentation Program and under sec-  
10 tion 10A(i) of the National Science Foundation Authoriza-  
11 tion Act of 2002 (42 U.S.C. 1862n-1a(i)) for teaching fel-  
12 lowships administered within the Robert Noyce Teacher  
13 Scholarship Program are waived for a period of 5 years  
14 following the date of enactment of this Act.

15           (b) **ASSESSMENT.**—Not later than 5 years following  
16 the date of enactment of this Act, the Director shall sub-  
17 mit to Congress an assessment, that includes feedback  
18 from the research community, of the impacts of the waiv-  
19 ers provided under subsection (a), including—

- 20           (1) programmatic and scientific goals;
- 21           (2) institutional commitment and stewardship  
22           of Federal resources;
- 23           (3) institutional strategic planning and adminis-  
24           trative burden;
- 25           (4) equity among recipient institutions; and

1           (5) recommendations for or against extending  
2           or making permanent such waivers.

3 **SEC. 10321. PROGRAMS TO ADDRESS THE STEM WORK-**  
4 **FORCE.**

5           (a) IN GENERAL.—The Director shall issue under-  
6 graduate scholarships, including at community colleges,  
7 graduate fellowships and traineeships, postdoctoral  
8 awards, and, as appropriate, other awards, to address  
9 STEM workforce gaps, including for programs that re-  
10 cruit, retain, and advance students to a bachelor’s degree  
11 in a STEM discipline concurrent with a secondary school  
12 diploma, such as through existing and new partnerships  
13 with State educational agencies.

14           (b) POSTDOCTORAL PROFESSIONAL DEVELOP-  
15 MENT.—In carrying out this section, the Director shall en-  
16 courage innovation in postdoctoral professional develop-  
17 ment, support the development and diversity of the STEM  
18 workforce, and study the impacts of such innovation and  
19 support. To do so, the Director may use postdoctoral  
20 awards established under subsection (a) or leveraged  
21 under subsection (d)(1) for fellowships or other temporary  
22 rotational postings of not more than 2 years. Such fellow-  
23 ships or temporary rotational postings shall be awarded—

24           (1) to qualified individuals who have a doctoral  
25           degree and received such degree not earlier than 5

1 years before the date that the fellowship or tem-  
2 porary rotational posting begins; and

3 (2) to carry out research at Federal, State,  
4 local, and Tribal government research facilities.

5 (c) DIRECT HIRE AUTHORITY.—

6 (1) IN GENERAL.—The head of any Federal  
7 agency may appoint, without regard to the provi-  
8 sions of subchapter I of chapter 33 of title 5, United  
9 States Code, other than sections 3303 and 3328 of  
10 that title, a qualified candidate described in para-  
11 graph (2) directly to a position in the competitive  
12 service with the Federal agency for which the can-  
13 didate meets Office of Personnel Management quali-  
14 fication standards.

15 (2) FELLOWSHIP OR TEMPORARY ROTATIONAL  
16 POSTING.—Paragraph (1) applies with respect to a  
17 former recipient of an award under this subsection  
18 who—

19 (A) earned a doctoral degree in a STEM  
20 field from an institution of higher education;  
21 and

22 (B) successfully fulfilled the requirements  
23 of the fellowship or temporary rotational post-  
24 ing within a Federal agency.

1           (3) LIMITATION.—The direct hire authority  
2           under this subsection shall be exercised with respect  
3           to a specific qualified candidate not later than 2  
4           years after the date that the candidate completed  
5           the requirements related to the fellowship or tem-  
6           porary rotational posting described under this sub-  
7           section.

8           (d) EXISTING PROGRAMS.—In carrying out this sec-  
9           tion, the Director may leverage existing programs, includ-  
10          ing programs that issue—

11           (1) postdoctoral awards;

12           (2) graduate fellowships and traineeships, inclu-  
13           sive of the NSF Research Traineeships and fellow-  
14           ships awarded under the Graduate Research Fellow-  
15           ship Program;

16           (3) scholarships, research experiences, and in-  
17           ternships, including—

18           (A) scholarships to attend community col-  
19           leges; and

20           (B) research experiences and internships  
21           under sections 513, 514, and 515 of the Amer-  
22           ica COMPETES Reauthorization Act of 2010  
23           (42 U.S.C. 1862p-5; 1862p-6; 42 U.S.C.  
24           1862p-7); and

1           (4) awards to institutions of higher education to  
2           enable the institutions to fund innovation in under-  
3           graduate and graduate education, increased edu-  
4           cational capacity, and the development and estab-  
5           lishment of new or specialized programs of study for  
6           graduate, undergraduate, or technical college stu-  
7           dents, and the evaluation of the effectiveness of the  
8           programs of study.

## 9                           **Subtitle C—Broadening** 10                           **Participation**

### 11   **SEC. 10321. PRESIDENTIAL AWARDS FOR EXCELLENCE IN** 12                           **MATHEMATICS AND SCIENCE.**

13           (a) IN GENERAL.—Section 117(a) of the National  
14   Science Foundation Authorization Act of 1988 (42 U.S.C.  
15   1881b(a)) is amended—

16           (1) in subparagraph (B)—

17                   (A) by striking “108” and inserting  
18                   “110”;

19                   (B) by striking clause (iv);

20                   (C) in clause (v), by striking the period at  
21                   the end and inserting “; and”;

22                   (D) by redesignating clauses (i), (ii), (iii),  
23                   and (v) as subclauses (I), (II), (III), and (IV),  
24                   respectively, and moving the margins of such

1 subclauses (as so redesignated) two ems to the  
2 right; and

3 (E) by striking “In selecting teachers” and  
4 all that follows through “two teachers—” and  
5 inserting the following:

6 “(C) In selecting teachers for an award au-  
7 thorized by this subsection, the President shall  
8 select—

9 “(i) at least two teachers—”; and  
10 (2) in subparagraph (C), as so designated by  
11 paragraph (1)(E) of this subsection, by adding at  
12 the end the following:

13 “(ii) at least one teacher—

14 “(I) from the Commonwealth of  
15 the Northern Mariana Islands;

16 “(II) from American Samoa;

17 “(III) from the Virgin Islands of  
18 the United States; and

19 “(IV) from Guam.”.

20 (b) EFFECTIVE DATE.—The amendments made by  
21 subsection (a) shall apply with respect to awards made on  
22 or after the date of the enactment of this Act.

1 **SEC. 10322. ROBERT NOYCE TEACHER SCHOLARSHIP PRO-**  
2 **GRAM UPDATE.**

3 (a) SENSE OF CONGRESS.—It is the sense of Con-  
4 gress that over the next five years the Foundation should  
5 increase the number of scholarships awarded under the  
6 Robert Noyce Teacher Scholarship program established  
7 under section 10 of the National Science Foundation Au-  
8 thorization Act of 2002 (42 U.S.C. 1862n–1) by 50 per-  
9 cent.

10 (b) OUTREACH.—To increase the diversity of partici-  
11 pants, the Director shall support symposia, forums, con-  
12 ferences, and other activities to expand and enhance out-  
13 reach to—

- 14 (1) historically Black colleges and universities;
- 15 (2) Tribal Colleges or Universities;
- 16 (3) minority-serving institutions;
- 17 (4) institutions of higher education that are lo-  
18 cated near or serve rural communities, including  
19 EPSCoR institutions;
- 20 (5) labor organizations;
- 21 (6) emerging research institutions; and
- 22 (7) higher education programs that serve or  
23 support veterans.



1 **SEC. 10323. NSF EDDIE BERNICE JOHNSON INCLUDES INI-**  
2 **TIATIVE.**

3 (a) IN GENERAL.—The Director shall make awards,  
4 on a competitive basis, to institutions of higher education  
5 or non-profit organizations (or consortia of such institu-  
6 tions or organizations) to carry out a comprehensive na-  
7 tional initiative to facilitate the development of networks  
8 and partnerships to build on and scale up effective prac-  
9 tices in broadening participation in STEM studies and ca-  
10 reers of groups historically underrepresented in such stud-  
11 ies and careers.

12 (b) CHANGE OF NAME.—The initiative under sub-  
13 section (a) shall be known as the “Eddie Bernice Johnson  
14 Inclusion across the Nation of Communities of Learners  
15 of Underrepresented Discoverers in Engineering and  
16 Science Initiative” or the “Eddie Bernice Johnson IN-  
17 CLUDES Initiative”.

18 **SEC. 10324. BROADENING PARTICIPATION ON MAJOR FA-**  
19 **CILITIES AWARDS.**

20 The Director shall require organizations seeking a co-  
21 operative agreement for the management of the operations  
22 and maintenance of a Foundation project to demonstrate  
23 prior experience and current capabilities in or to have a  
24 plan for employing best practices in broadening participa-  
25 tion in science and engineering and ensure implementation  
26 of such practices is considered in oversight of the award.

1 **SEC. 10325. EXPANDING GEOGRAPHIC AND INSTITUTIONAL**  
2 **DIVERSITY IN RESEARCH.**

3 (a) CONTINUING SUPPORT FOR EPSCoR.—

4 (1) SENSE OF CONGRESS.—It is the sense of  
5 Congress that—

6 (A) because maintaining the Nation’s sci-  
7 entific and economic leadership requires the  
8 participation of talented individuals nationwide,  
9 EPSCoR investments into State research and  
10 education capacities are in the Federal interest  
11 and should be sustained;

12 (B) EPSCoR should maintain its experi-  
13 mental component by supporting innovative  
14 methods for improving research capacity and  
15 competitiveness; and

16 (C) the Director should carry out this sub-  
17 section while maintaining or increasing proposal  
18 success rates at emerging research institutions  
19 throughout the United States and without pre-  
20 cluding access to awards for such institutions.

21 (2) UPDATE OF EPSCoR.—Section 517(f)(2) of  
22 the America COMPETES Reauthorization Act of  
23 2010 (42 U.S.C. 1862p–9(f)(2)) is amended—

24 (A) in subparagraph (A), by striking  
25 “and” at the end; and

26 (B) by adding at the end the following:

1           “(C) to increase the capacity of rural com-  
2           munities to provide quality STEM education  
3           and STEM workforce development program-  
4           ming to students, and teachers; and”.

5           (3) GEOGRAPHIC DIVERSITY AND INCLUSION.—

6           (A) IN GENERAL.—To the maximum ex-  
7           tent practicable, not less than—

8                   (i) 15.5 percent in fiscal year 2023,

9                   (ii) 16 percent in fiscal year 2024,

10                  (iii) 16.5 percent in fiscal year 2025,

11                  (iv) 17 percent in fiscal year 2026,

12                  (v) 18 percent in fiscal year 2027,

13                  (vi) 19 percent in fiscal year 2028,

14                  and

15                  (vii) 20 percent in fiscal year 2029,

16           of the amounts appropriated to the Foundation  
17           for research and related activities, and science,  
18           mathematics, and engineering education and  
19           human resources programs and activities, ex-  
20           cluding those amounts made available for polar  
21           research and operations support (and oper-  
22           ations and maintenance of research facilities),  
23           shall be awarded to EPSCoR institutions.

24           (B) SCHOLARSHIPS.—To the maximum ex-  
25           tent practicable, not less than—

1 (i) 16 percent in fiscal year 2023,  
2 (ii) 18 percent in fiscal year 2024,  
3 and  
4 (iii) 20 percent in each of fiscal years  
5 2025 through 2029,  
6 of the amounts appropriated to the Foundation  
7 for scholarships (including at community col-  
8 leges), graduate fellowships and traineeships,  
9 and postdoctoral awards shall be used to sup-  
10 port EPSCoR institutions.

11 (C) CONSIDERATIONS.—The Director shall  
12 consider prioritizing funding and activities that  
13 enable sustainable growth in the competitive-  
14 ness of EPSCoR jurisdictions, including—

15 (i) infrastructure investments to build  
16 research capacity in EPSCoR jurisdictions;

17 (ii) scholarships, fellowships, and  
18 traineeships within new and existing pro-  
19 grams, to promote the development of sus-  
20 tainable research and academic personnel;

21 (iii) partnerships between eligible or-  
22 ganizations in EPSCoR and non-EPSCoR  
23 jurisdictions, to develop administrative,  
24 grant management, and proposal writing  
25 capabilities in EPSCoR jurisdictions;

1 (iv) capacity building activities for  
2 emerging research institutions, historically  
3 Black colleges and universities, Tribal Col-  
4 leges or Universities, and minority serving  
5 institutions, consistent with this section  
6 and section 10524 of this division; and

7 (v) leveraging the Partnerships for In-  
8 novation program, as well as the Founda-  
9 tion coordination role in the Department of  
10 Commerce technology and innovation hub  
11 program under section 28 of the Steven-  
12 son-Wydler Technology Innovation Act of  
13 1980 as added by section 10621, to build  
14 sustainable innovation ecosystems in  
15 EPSCoR jurisdictions.

16 (D) MERIT REVIEW.—The Director shall  
17 achieve the percentages specified in this para-  
18 graph to the maximum extent practicable, con-  
19 sistent with the National Science Foundation  
20 merit review process.

21 (E) CONSORTIA.—In the case of an award  
22 to a consortium, the Director may count the en-  
23 tire award toward meeting the funding require-  
24 ments of subparagraph (A) if the lead entity of

1 the consortium is located in an EPSCoR insti-  
2 tution

3 (F) ANNUAL REPORTING.—Beginning with  
4 the fiscal year 2023, the Director shall submit  
5 to Congress a report describing—

6 (i) the Foundation’s implementation  
7 of this paragraph;

8 (ii) progress in building research ca-  
9 pacity, including both infrastructure and  
10 personnel, in EPSCoR jurisdictions, in-  
11 cluding at historically Black colleges and  
12 universities, Tribal Colleges or Univer-  
13 sities, minority-serving institutions, and  
14 emerging research institutions; and

15 (iii) if the Foundation does not meet  
16 the requirement described in subparagraph  
17 (A), an explanation relating thereto and a  
18 plan for compliance in the following fiscal  
19 year and remediation.

20 (G) ANALYSIS AND SUSTAINABILITY RE-  
21 PORT.—Not later than December 31, 2026, the  
22 Director shall submit to Congress a report con-  
23 taining an analysis of the impacts of the re-  
24 quirements under subparagraphs (A) and (B).  
25 The report shall include—

1 (i) an analysis of how the require-  
2 ments under this paragraph affected the  
3 balance of total funding awarded by the  
4 Foundation to states and territories across  
5 the United States;

6 (ii) an analysis of any changes in  
7 award success and total funding awarded  
8 to Historically black colleges and univer-  
9 sities, Tribal Colleges or Universities, mi-  
10 nority-serving institutions, and emerging  
11 research institutions between the date of  
12 enactment and December 31, 2026;

13 (iii) an analysis of the gains in aca-  
14 demic research capacity, quality, and com-  
15 petitiveness and in science and technology  
16 human resource development in EPSCoR  
17 jurisdictions made between the enactment  
18 of this Act and December 31, 2026;

19 (iv) an assessment of EPSCoR eligi-  
20 bility criteria and determination on wheth-  
21 er new eligibility criteria should be devel-  
22 oped based on the findings from clauses  
23 (i), (ii), and (iii); and

1 (v) a plan to sustain and grow im-  
2 provements in research capacity and com-  
3 petitiveness in EPSCoR jurisdictions.

4 (H) EPSCoR ELIGIBILITY.—

5 (i) IN GENERAL.—The Director shall  
6 ensure eligibility for current EPSCoR ju-  
7 risdictions for five years from the date of  
8 enactment of this Act, after which the Di-  
9 rector shall determine whether new eligi-  
10 bility criteria should be developed based on  
11 the findings in the report required under  
12 subparagraph (G).

13 (ii) REPORT.—Not later than Decem-  
14 ber 31, 2028, the Director shall report to  
15 Congress regarding any new eligibility cri-  
16 teria determined under clause (i), any  
17 changes to jurisdictional eligibility based  
18 on such criteria, and the necessity and  
19 practicality of continuing or modifying the  
20 requirement under subparagraph (A) given  
21 any such changes to eligibility. The report  
22 shall include an analysis of options to sup-  
23 port regions in non-EPSCoR jurisdictions,  
24 adjacent to EPSCoR jurisdictions, that  
25 historically receive disproportionately low



1 levels of funding from the Foundation, in-  
2 cluding, if appropriate, options to expand  
3 the EPSCoR program or to establish new  
4 programs.

5 (b) FOSTERING STEM RESEARCH DIVERSITY AND  
6 CAPACITY PROGRAM.—

7 (1) IN GENERAL.—The Director shall make  
8 awards on a competitive, merit-reviewed basis to eli-  
9 gible institutions to implement and study innovative  
10 approaches for building research capacity in order to  
11 engage and retain students from a range of institu-  
12 tions and diverse backgrounds in STEM.

13 (2) ELIGIBLE INSTITUTION DEFINED.—In this  
14 subsection the term “eligible institution” means an  
15 institution of higher education that, according to the  
16 data published by the National Center for Science  
17 and Engineering Statistics, is not, on average,  
18 among the top 100 institutions in Federal research  
19 and development expenditures during the 3-year pe-  
20 riod prior to the year of the award.

21 (3) PURPOSE.—The activities under this sub-  
22 section shall be focused on achieving simultaneous  
23 impacts at the student, faculty, and institutional lev-  
24 els by increasing the research capacity at eligible in-  
25 stitutions and the number of undergraduate and

1 graduate students pursuing STEM degrees from eli-  
2 gible institutions.

3 (4) REQUIREMENTS.—In carrying out this pro-  
4 gram, the Director shall—

5 (A) require eligible institutions seeking  
6 funding under this subsection to submit an ap-  
7 plication to the Director at such time, in such  
8 manner, containing such information and assur-  
9 ances as the Director may require. The applica-  
10 tion shall include, at a minimum a description  
11 of how the eligible institution plans to sustain  
12 the proposed activities beyond the duration of  
13 the award;

14 (B) require applicants to identify dis-  
15 ciplines and focus areas in which the eligible in-  
16 stitution can excel, and explain how the appli-  
17 cant will use the award to build capacity to bol-  
18 ster the institutional research competitiveness  
19 of eligible entities to support awards made by  
20 the Foundation and increase regional and na-  
21 tional capacity in STEM;

22 (C) require the awards funded under this  
23 subsection to support research and related ac-  
24 tivities, which may include—

1 (i) development or expansion of re-  
2 search programs in disciplines and focus  
3 areas in subparagraph (B);

4 (ii) faculty recruitment and profes-  
5 sional development in disciplines and focus  
6 areas in subparagraph (B), including for  
7 early-career researchers;

8 (iii) stipends for undergraduate and  
9 graduate students participating in research  
10 in disciplines and focus areas in subpara-  
11 graph (B);

12 (iv) acquisition of instrumentation  
13 necessary to build research capacity at an  
14 eligible institution in disciplines and focus  
15 areas in subparagraph (B);

16 (v) an assessment of capacity-building  
17 and research infrastructure needs;

18 (vi) administrative research develop-  
19 ment support; and

20 (vii) other activities necessary to build  
21 research capacity; and

22 (D) require that no eligible institution  
23 should receive more than \$10,000,000 in any  
24 single year of funds made available under this  
25 section.

1           (5) ADDITIONAL CONSIDERATIONS.—In making  
2           awards under this subsection, the Director may also  
3           consider—

4                   (A) the extent to which the applicant will  
5                   support students from diverse backgrounds, in-  
6                   cluding first-generation undergraduate stu-  
7                   dents;

8                   (B) the geographic and institutional diver-  
9                   sity of the applying institutions; and

10                   (C) how the applicants can leverage public-  
11                   private partnerships and existing partnerships  
12                   with Federal Research Agencies.

13           (6) DUPLICATION.—The Director shall ensure  
14           the awards made under this subsection are com-  
15           plementary and not duplicative of existing programs.

16           (7) REPORT.—The Director shall submit a re-  
17           port to Congress after the third year of the program  
18           that includes—

19                   (A) an assessment of the effectiveness of  
20                   the program for growing the geographic and in-  
21                   stitutional diversity of institutions of higher  
22                   education receiving research awards from the  
23                   Foundation;

24                   (B) an assessment of the quality, quantity,  
25                   and geographic and institutional diversity of in-

1           stitutions of higher education conducting  
2           Foundation- sponsored research since the estab-  
3           lishment of the program in this subsection;

4                   (C) an assessment of the quantity and di-  
5           versity of undergraduate and graduate students  
6           graduating from eligible institutions with  
7           STEM degrees; and

8                   (D) statistical summary data on the pro-  
9           gram, including the geographic and institutional  
10          allocation of award funding, the number and di-  
11          versity of supported graduate and under-  
12          graduate students, and how it contributes to ca-  
13          pacity building at eligible entities.

14          (8) AUTHORIZATION OF APPROPRIATIONS.—  
15          There is authorized to be appropriated to the Direc-  
16          tor \$150,000,000 for each of the fiscal years 2023  
17          through 2027 to carry out the activities under this  
18          subsection.

19          (c) PARTNERSHIPS WITH EMERGING RESEARCH IN-  
20          STITUTIONS.—

21                   (1) IN GENERAL.—The Director shall establish  
22          a five-year pilot program for awards to research  
23          partnerships that involve emerging research institu-  
24          tions and may involve institutions classified as very  
25          high research activity by the Carnegie Classification

1 of Institutions of Higher Education at the time of  
2 application.

3 (2) REQUIREMENTS.—In carrying out this pro-  
4 gram, the Director shall—

5 (A) require that each proposal submitted  
6 by a multi-institution collaboration for an  
7 award, including those under subtitle G of this  
8 title, that exceeds \$1,000,000, as appropriate,  
9 specify how the applicants will support sub-  
10 stantive, meaningful, sustainable, and mutually  
11 beneficial partnerships with one or more emerg-  
12 ing research institutions;

13 (B) require recipients funded under this  
14 subsection to direct no less than 35 percent of  
15 the total award to one or more emerging re-  
16 search institutions;

17 (C) require recipients funded under this  
18 subsection to report on the partnership activi-  
19 ties as part of the annual reporting require-  
20 ments of the Foundation; and

21 (D) solicit feedback on the partnership di-  
22 rectly from partner emerging research institu-  
23 tions, in such form as the Director deems ap-  
24 propriate.

1           (3) CAPACITY BUILDING.—Funds awarded to  
2           emerging research institutions under this subsection  
3           may be used to build research capacity, including  
4           through support for faculty salaries and training,  
5           field and laboratory research experiences for under-  
6           graduate and graduate students, and maintenance  
7           and repair of research equipment and instrumenta-  
8           tion.

9           (4) REPORT.—The Director shall submit a re-  
10          port to Congress after the third year of the pilot  
11          program that includes—

12                 (A) an assessment, drawing on feedback  
13                 from the research community and other sources  
14                 of information, of the effectiveness of the pilot  
15                 program for improving the quality of partner-  
16                 ships with emerging research institutions; and

17                 (B) if deemed effective, a plan for perma-  
18                 nent implementation of the pilot program.

19 **SEC. 10326. DIVERSITY IN TECH RESEARCH.**

20          The Director shall make awards, on a competitive  
21          basis, to institutions of higher education or nonprofit orga-  
22          nizations (or consortia of such institutions or organiza-  
23          tions) to support basic, applied, and use-inspired research  
24          that yields a scientific evidence base for improving the de-  
25          sign and emergence, development and deployment, and

1 management and ultimate effectiveness of entities involved  
2 in technology research, including research related to diver-  
3 sity and inclusion in the technology sector.

4 **SEC. 10327. CHIEF DIVERSITY OFFICER OF THE NSF.**

5 (a) CHIEF DIVERSITY OFFICER.—

6 (1) APPOINTMENT.—The Director shall appoint  
7 a senior agency official within the Office of the Di-  
8 rector as a Chief Diversity Officer.

9 (2) QUALIFICATIONS.—The Chief Diversity Of-  
10 ficer shall have significant experience, within the  
11 Federal Government and the science community,  
12 with diversity- and inclusion-related matters, includ-  
13 ing—

14 (A) civil rights compliance;

15 (B) harassment policy, reviews, and inves-  
16 tigations;

17 (C) equal employment opportunity; and

18 (D) disability policy.

19 (b) DUTIES.—The Chief Diversity Officer is respon-  
20 sible for providing advice on policy, oversight, guidance,  
21 and coordination with respect to matters of the Founda-  
22 tion related to diversity and inclusion, including ensuring  
23 the geographic diversity of the Foundation programs.  
24 Other duties may include—



1           (1) establishing and maintaining a strategic  
2           plan that publicly states a diversity definition, vision,  
3           and goals for the Foundation;

4           (2) defining a set of strategic metrics that  
5           are—

6                   (A) directly linked to key organizational  
7                   priorities and goals;

8                   (B) actionable; and

9                   (C) actively used to implement the stra-  
10           tegic plan under paragraph (1);

11           (3) advising in the establishment of a strategic  
12           plan for diverse participation by individuals and in-  
13           stitutions of higher education, including community  
14           colleges, historically Black colleges and universities,  
15           Tribal Colleges or Universities, minority serving in-  
16           stitutions, institutions of higher education with an  
17           established STEM capacity building program fo-  
18           cused on Native Hawaiians or Alaska Natives, and  
19           EPSCoR institutions);

20           (4) advising in the establishment of a strategic  
21           plan for outreach to, and recruiting from, untapped  
22           locations and underrepresented populations;

23           (5) advising on a diversity and inclusion strat-  
24           egy for the Foundation's portfolio of PreK–12  
25           STEM education focused programs and activities,

1 including goals for addressing barriers to participa-  
2 tion;

3 (6) advising on the application of the Founda-  
4 tion's broader impacts review criterion; and

5 (7) performing such additional duties and exer-  
6 cise such powers as the Director may prescribe.

7 (c) AUTHORIZATION OF APPROPRIATIONS.—To carry  
8 out this section, there are authorized to be appropriated  
9 \$5,000,000 for each of fiscal years 2023 through 2027.

10 **SEC. 10328. RESEARCH AND DISSEMINATION TO INCREASE**

11 **THE PARTICIPATION OF WOMEN AND UNDER-**

12 **REPRESENTED MINORITIES IN STEM FIELDS.**

13 (a) IN GENERAL.—The Director shall make awards  
14 on a competitive, merit-reviewed basis, to institutions of  
15 higher education or non-profit organizations (or consortia  
16 of such institutions or organizations), to enable such enti-  
17 ties to increase the participation of women and underrep-  
18 resented minorities in STEM studies and careers.

19 (b) USE OF FUNDS.—An eligible entity that receives  
20 an award under this subsection shall use such award funds  
21 to carry out one or more of the following activities de-  
22 signed to increase the participation of women or minorities  
23 historically underrepresented in STEM, or both:

24 (1) Research to analyze the record-level data  
25 collected under sections 10502 and 10504, con-

1       sistent with policies to ensure the privacy of individ-  
2       uals identifiable by such data.

3           (2) Research to study best practices for work-  
4       life accommodation.

5           (3) Research to study the impact of policies and  
6       practices that are implemented or are otherwise con-  
7       sistent with the purposes of this section.

8           (4) Mentoring programs that facilitate engage-  
9       ment of STEM professionals with students.

10          (5) Research experiences for undergraduate and  
11       graduate students in STEM fields.

12          (6) Outreach to elementary school and sec-  
13       ondary school students to provide opportunities to  
14       increase their exposure to STEM fields.

15       (c) DISSEMINATION ACTIVITIES.—The Director shall  
16       carry out dissemination activities consistent with the pur-  
17       poses of this section, including—

18           (1) collaboration with other Federal research  
19       agencies and professional associations to exchange  
20       best practices, harmonize work-life accommodation  
21       policies and practices, and overcoming common bar-  
22       riers to work-life accommodation; and

23           (2) collaboration with institutions of higher  
24       education in order to clarify and catalyze the adop-

1           tion of a coherent and consistent set of work-life ac-  
2           commodation policies and practices.

3           (d) AUTHORIZATION OF APPROPRIATIONS.—There  
4 are authorized to be appropriated to carry out this section  
5 \$5,000,000 for each of fiscal years 2023, 2024, 2025,  
6 2026, and 2027.

7 **SEC. 10329. ACTIVITIES TO EXPAND STEM OPPORTUNITIES.**

8           (a) NATIONAL SCIENCE FOUNDATION SUPPORT FOR  
9 INCREASING DIVERSITY AMONG STEM FACULTY AT IN-  
10 STITUTIONS OF HIGHER EDUCATION.—Section 305 of the  
11 American Innovation and Competitiveness Act (42 U.S.C.  
12 1862s-5) is amended—

13                   (1) by redesignating subsections (e) and (f) as  
14 subsections (g) and (h), respectively; and

15                   (2) by inserting after subsection (d) the fol-  
16 lowing:

17           “(e) SUPPORT FOR INCREASING DIVERSITY AMONG  
18 STEM FACULTY AT INSTITUTIONS OF HIGHER EDU-  
19 CATION.—

20                   “(1) IN GENERAL.—The Director of the Foun-  
21 dation shall make awards to institutions of higher  
22 education (or consortia thereof) for the development  
23 and assessment of innovative reform efforts designed  
24 to increase the recruitment, retention, and advance-  
25 ment of individuals from underrepresented minority

1 groups in academic STEM careers, which may in-  
2 clude implementing or expanding successful evi-  
3 dence-based practices.

4 “(2) MERIT REVIEW; COMPETITION.—Awards  
5 shall be made under this subsection on a merit-re-  
6 viewed, competitive basis.

7 “(3) USE OF FUNDS.—Activities supported by  
8 awards under this subsection may include—

9 “(A) institutional assessment activities,  
10 such as data analyses and policy review, in  
11 order to identify and address specific issues in  
12 the recruitment, retention, and advancement of  
13 faculty members from underrepresented minor-  
14 ity groups;

15 “(B) assessments of distribution of men-  
16 toring and advising responsibilities among fac-  
17 ulty, particularly for faculty from underrep-  
18 resented minority groups, that may detract  
19 from time spent on research, publishing papers,  
20 and other activities required to achieve tenure  
21 status or promotion (or equivalents for non-ten-  
22 ure track faculty) and run a productive re-  
23 search program;

24 “(C) development and assessment of train-  
25 ing courses for administrators and search com-

1           mittee members designed to ensure unbiased  
2           evaluation of candidates from underrepresented  
3           minority groups;

4           “(D) development and hosting of intra- or  
5           inter-institutional workshops to propagate best  
6           practices in recruiting, retaining, and advancing  
7           faculty members from underrepresented minor-  
8           ity groups;

9           “(E) professional development opportuni-  
10          ties for faculty members from underrepresented  
11          minority groups;

12          “(F) activities aimed at making under-  
13          graduate STEM students from underrep-  
14          resented minority groups aware of opportunities  
15          for academic careers in STEM fields; and

16          “(G) activities to identify and engage ex-  
17          ceptional graduate students and postdoctoral  
18          researchers from underrepresented minority  
19          groups at various stages of their studies and to  
20          encourage them to enter academic careers.

21          “(4) SELECTION PROCESS.—

22          “(A) APPLICATION.—An institution of  
23          higher education (or a consortium of such insti-  
24          tutions) seeking funding under this subsection  
25          shall submit an application to the Director of

1           the Foundation at such time, in such manner,  
2           and containing such information and assur-  
3           ances as such Director may require. The appli-  
4           cation shall include, at a minimum, a descrip-  
5           tion of—

6                       “(i) the reform effort that is being  
7                       proposed for implementation by the insti-  
8                       tution of higher education;

9                       “(ii) any available evidence of specific  
10                      difficulties in the recruitment, retention,  
11                      and advancement of faculty members from  
12                      underrepresented minority groups in  
13                      STEM academic careers within the institu-  
14                      tion of higher education submitting an ap-  
15                      plication, and how the proposed reform ef-  
16                      fort would address such issues;

17                      “(iii) support for the proposed reform  
18                      effort by administrators of the institution,  
19                      which may include details on previous or  
20                      ongoing reform efforts;

21                      “(iv) how the proposed reform effort  
22                      may contribute to change in institutional  
23                      culture and policy such that a greater  
24                      value is placed on the recruitment, reten-

1                   tion, and advancement of faculty members  
2                   from underrepresented minority groups;

3                   “(v) how the institution of higher edu-  
4                   cation submitting an application plans to  
5                   sustain the proposed reform effort beyond  
6                   the duration of the award, if the effort  
7                   proved successful; and

8                   “(vi) how the success and effective-  
9                   ness of the proposed reform effort will be  
10                  evaluated and assessed in order to con-  
11                  tribute to the national knowledge base  
12                  about models for catalyzing institutional  
13                  change.

14                  “(B) AWARD DISTRIBUTION.—The Direc-  
15                  tor of the Foundation shall ensure, to the ex-  
16                  tent practicable, that awards under this section  
17                  are made to a variety of types of institutions of  
18                  higher education.

19                  “(5) AUTHORIZATION OF APPROPRIATIONS.—  
20                  There are authorized to be appropriated to carry out  
21                  this subsection \$8,000,000 for each of fiscal years  
22                  2023 through 2027.”.

23                  (b) NATIONAL SCIENCE FOUNDATION SUPPORT FOR  
24                  BROADENING PARTICIPATION IN UNDERGRADUATE STEM  
25                  EDUCATION.—Section 305 of the American Innovation



1 and Competitiveness Act (42 U.S.C. 1862s-5), as amend-  
2 ed by subsection (b), is further amended by inserting after  
3 subsection (e) the following:

4 “(f) SUPPORT FOR BROADENING PARTICIPATION IN  
5 UNDERGRADUATE STEM EDUCATION.—

6 “(1) IN GENERAL.—The Director of the Foun-  
7 dation shall make awards to institutions of higher  
8 education (or a consortium of such institutions) to  
9 implement or expand research-based reforms in un-  
10 dergraduate STEM education for the purpose of re-  
11 cruiting and retaining students from minority  
12 groups who are underrepresented in STEM fields.

13 “(2) MERIT REVIEW; COMPETITION.—Awards  
14 shall be made under this subsection on a merit-re-  
15 viewed, competitive basis.

16 “(3) USE OF FUNDS.—Activities supported by  
17 awards under this subsection may include—

18 “(A) implementation or expansion of inno-  
19 vative, research-based approaches to broaden  
20 participation of underrepresented minority  
21 groups in STEM fields;

22 “(B) implementation or expansion of suc-  
23 cessful, research-based bridge, cohort, tutoring,  
24 or mentoring programs, including those involv-  
25 ing community colleges and technical schools,

1 designed to enhance the recruitment and reten-  
2 tion of students from underrepresented minor-  
3 ity groups in STEM fields;

4 “(C) implementation or expansion of out-  
5 reach programs linking institutions of higher  
6 education and PreK–12 school systems in order  
7 to heighten awareness among precollege stu-  
8 dents from underrepresented minority groups of  
9 opportunities in college-level STEM fields and  
10 STEM careers;

11 “(D) implementation or expansion of fac-  
12 ulty development programs focused on improv-  
13 ing retention of undergraduate STEM students  
14 from underrepresented minority groups;

15 “(E) implementation or expansion of  
16 mechanisms designed to recognize and reward  
17 faculty members who demonstrate a commit-  
18 ment to increasing the participation of students  
19 from underrepresented minority groups in  
20 STEM fields;

21 “(F) expansion of successful reforms  
22 aimed at increasing the number of STEM stu-  
23 dents from underrepresented minority groups  
24 beyond a single course or group of courses to  
25 achieve reform within an entire academic unit,

1 or expansion of successful reform efforts beyond  
2 a single academic unit or field to other STEM  
3 academic units or fields within an institution of  
4 higher education;

5 “(G) expansion of opportunities for stu-  
6 dents from underrepresented minority groups to  
7 conduct STEM research in industry, at Federal  
8 labs, and at international research institutions  
9 or research sites;

10 “(H) provision of stipends for students  
11 from underrepresented minority groups partici-  
12 pating in research;

13 “(I) development of research collaborations  
14 between research-intensive universities and pri-  
15 marily undergraduate historically Black colleges  
16 and universities, Tribal Colleges or Universities,  
17 and minority serving institutions;

18 “(J) support for graduate students and  
19 postdoctoral fellows from underrepresented mi-  
20 nority groups to participate in instructional or  
21 assessment activities at primarily under-  
22 graduate institutions, including primarily un-  
23 dergraduate historically Black colleges and uni-  
24 versities, Tribal Colleges or Universities, and

1 minority serving institutions and 2-year institu-  
2 tions of higher education; and

3 “(K) other activities consistent with para-  
4 graph (1), as determined by the Director of the  
5 Foundation.

6 “(4) SELECTION PROCESS.—

7 “(A) APPLICATION.—An institution of  
8 higher education (or a consortium thereof)  
9 seeking an award under this subsection shall  
10 submit an application to the Director of the  
11 Foundation at such time, in such manner, and  
12 containing such information and assurances as  
13 such Director may require. The application  
14 shall include, at a minimum—

15 “(i) a description of the proposed re-  
16 form effort;

17 “(ii) a description of the research  
18 findings that will serve as the basis for the  
19 proposed reform effort or, in the case of  
20 applications that propose an expansion of a  
21 previously implemented reform, a descrip-  
22 tion of the previously implemented reform  
23 effort, including data about the recruit-  
24 ment, retention, and academic achievement

1 of students from underrepresented minor-  
2 ity groups;

3 “(iii) evidence of an institutional com-  
4 mitment to, and support for, the proposed  
5 reform effort, including a long-term com-  
6 mitment to implement successful strategies  
7 from the current reform beyond the aca-  
8 demic unit or units included in the award  
9 proposal;

10 “(iv) a description of how the pro-  
11 posed reform effort may contribute to, or  
12 in the case of applications that propose an  
13 expansion of a previously implemented re-  
14 forms has contributed to, change in insti-  
15 tutional culture and policy such that a  
16 greater value is placed on the recruitment,  
17 retention and academic achievement of stu-  
18 dents from underrepresented minority  
19 groups;

20 “(v) a description of existing or  
21 planned institutional policies and practices  
22 regarding faculty hiring, promotion, ten-  
23 ure, and teaching assignment that reward  
24 faculty contributions to improving the edu-

1 cation of students from underrepresented  
2 minority groups in STEM; and

3 “(vi) how the success and effective-  
4 ness of the proposed reform effort will be  
5 evaluated and assessed in order to con-  
6 tribute to the national knowledge base  
7 about models for catalyzing institutional  
8 change,

9 “(B) AWARD DISTRIBUTION.—The Direc-  
10 tor of the Foundation shall ensure, to the ex-  
11 tent practicable, that awards under this sub-  
12 section are made to a variety of types of institu-  
13 tions of higher education, including historically  
14 Black colleges and universities, Tribal Colleges  
15 or Universities, minority serving institutions,  
16 and 2-year institutions of higher education.

17 “(5) EDUCATION RESEARCH.—

18 “(A) IN GENERAL.—All awards made  
19 under this subsection shall include an education  
20 research component that will support the design  
21 and implementation of a system for data collec-  
22 tion and evaluation of proposed reform efforts  
23 in order to build the knowledge base on prom-  
24 ising models for increasing recruitment and re-  
25 tention of students from underrepresented mi-

1           nority groups in STEM education at the under-  
2           graduate level across a diverse set of institu-  
3           tions.

4           “(B) DISSEMINATION.—The Director of  
5           the Foundation shall coordinate with the Com-  
6           mittee on STEM Education of the National  
7           Science and Technology Council in dissemi-  
8           nating the results of the research under this  
9           paragraph to ensure that best practices in  
10          broadening participation in STEM education at  
11          the undergraduate level are made readily avail-  
12          able to all institutions of higher education,  
13          other Federal agencies that support STEM pro-  
14          grams, non-Federal funders of STEM edu-  
15          cation, and the general public.

16          “(6) AUTHORIZATION OF APPROPRIATIONS.—  
17          There are authorized to be appropriated to carry out  
18          this subsection \$15,000,000 for each of fiscal years  
19          2023 through 2027.”.

20 **SEC. 10330. INTRAMURAL EMERGING RESEARCH INSTITU-**  
21 **TIONS PILOT PROGRAM.**

22          (a) ESTABLISHMENT.—The Director may conduct  
23          multiple pilot programs, including through existing pro-  
24          grams or other programs authorized in this division or di-  
25          vision A, within the Foundation to expand the number of

1 institutions of higher education (including such institu-  
2 tions that are community colleges), and other eligible enti-  
3 ties that the Director determines appropriate, that are  
4 able to successfully compete for Foundation awards.

5 (b) COMPONENTS.—Pilot programs under this sec-  
6 tion may include—

7 (1) a mentorship program;

8 (2) award application writing technical assist-  
9 ance;

10 (3) targeted outreach, including to a historically  
11 Black college or university, a Tribal college or uni-  
12 versity, or a minority-serving institution (including a  
13 Hispanic-serving institution or an institution of  
14 higher education with an established STEM capacity  
15 building program focused on Native Hawaiians or  
16 Alaska Natives);

17 (4) programmatic support or solutions for insti-  
18 tutions or entities that do not have an experienced  
19 award management office;

20 (5) an increase in the number of award pro-  
21 posal reviewers from institutions of higher education  
22 that have not traditionally received funds from the  
23 Foundation; or

24 (6) an increase of the term and funding, for a  
25 period of 3 years or less, as appropriate, for awards



1 with a first-time principal investigator, when paired  
2 with regular mentoring on the administrative aspects  
3 of award management.

4 (c) LIMITATION.—As appropriate, each pilot program  
5 under this section shall work to reduce administrative bur-  
6 dens for recipients and award personnel.

7 (d) AGENCY-WIDE PROGRAMS.—Not later than 5  
8 years after the date of enactment of this Act, the Director  
9 shall—

10 (1) review the results of the pilot programs  
11 under this section; and

12 (2) develop agencywide best practices from the  
13 pilot programs for implementation across the Foun-  
14 dation, in order to fulfill the requirement under sec-  
15 tion 3(e) of the National Science Foundation Act of  
16 1950 (42 U.S.C. 1862(e)).

## 17 **Subtitle D—NSF Research Security**

### 18 **SEC. 10331. OFFICE OF RESEARCH SECURITY AND POLICY.**

19 The Director shall maintain a Research Security and  
20 Policy office within the Office of the Director with not  
21 fewer than four full-time equivalent positions, in addition  
22 to the Chief of Research Security established pursuant to  
23 section 10332. The functions of the Research Security and  
24 Policy office shall be to coordinate all research security  
25 policy issues across the Foundation, including by—

1           (1) consulting and coordinating with the Foun-  
2           dation Office of Inspector General, with other Fed-  
3           eral research agencies, and intelligence and law en-  
4           forcement agencies, and the National Science and  
5           Technology Council, as appropriate, in accordance  
6           with the authority provided under section 1746 of  
7           the National Defense Authorization Act for Fiscal  
8           Year 2020 (Public Law 116–92; 42 U.S.C. 6601  
9           note), to identify and address potential security risks  
10          that threaten research integrity and other risks to  
11          the research enterprise and to develop research secu-  
12          rity policy and best practices, taking into account  
13          the policy guidelines to be issued by the Director of  
14          the Office of Science and Technology Policy under  
15          section 10631 of this division;

16          (2) serving as a resource at the Foundation for  
17          all issues related to the security and integrity of the  
18          conduct of Foundation-supported research;

19          (3) conducting outreach and education activities  
20          for recipients on research policies and potential secu-  
21          rity risks and on policies and activities to protect in-  
22          tellectual property and information about critical  
23          technologies relevant to national security, consistent  
24          with the controls relevant to the grant or award;

1           (4) educating Foundation program managers  
2           and other directorate staff on evaluating Foundation  
3           awards and recipients for potential security risks;

4           (5) communicating reporting and disclosure re-  
5           quirements to recipients and applicants for funding;

6           (6) performing risk assessments, in consulta-  
7           tion, as appropriate, with other Federal agencies, of  
8           Foundation proposals and awards using analytical  
9           tools to assess nondisclosures of required informa-  
10          tion;

11          (7) establishing policies and procedures for  
12          identifying, communicating, and addressing security  
13          risks that threaten the integrity of Foundation-sup-  
14          ported research and development, working in con-  
15          sultation, as appropriate, with other Federal agen-  
16          cies, to ensure compliance with National Security  
17          Presidential Memorandum-33 (relating to strength-  
18          ening protections of United States Government-sup-  
19          ported research and development against foreign  
20          government interference and exploitation) or a suc-  
21          cessor policy document; and

22          (8) in accordance with relevant policies of the  
23          agency, conducting or facilitating due diligence with  
24          regard to applications for research and development

1 awards from the Foundation prior to making such  
2 awards.

3 **SEC. 10332. CHIEF OF RESEARCH SECURITY.**

4 The Director shall appoint a senior agency official  
5 within the Office of the Director as a Chief of Research  
6 Security, whose primary responsibility shall be to manage  
7 the office established under section 10331.

8 **SEC. 10333. REPORTING TO CONGRESS.**

9 (a) REPORT ON RESOURCE NEEDS.—Not later than  
10 180 days after the date of the enactment of this Act, the  
11 Director shall provide a report to the Committee on  
12 Science, Space, and Technology of the House of Rep-  
13 resentatives, the Committee on Commerce, Science, and  
14 Transportation of the Senate, the Committee on Appro-  
15 priations of the House of Representatives, and the Com-  
16 mittee on Appropriations of the Senate on the resources  
17 and the number of full time employees needed to carry  
18 out the functions of the office established in section  
19 10331.

20 (b) ANNUAL REPORT ON OFFICE ACTIVITIES.—

21 (1) IN GENERAL.—Not later than one year  
22 after the date of the enactment of this Act and an-  
23 nually thereafter, the Director shall submit to Con-  
24 gress a report on the activities carried out by the  
25 Office of Research Security, detailing—

1 (A) a description of the activities con-  
2 ducted by the Office, including administrative  
3 actions taken;

4 (B) such recommendations as the Director  
5 may have for legislative or administrative action  
6 relating to improving research security;

7 (C) identification and discussion of the  
8 gaps in legal authorities that need to be im-  
9 proved to enhance the security of institutions of  
10 higher education performing research supported  
11 by the Foundation; and

12 (D) information on Foundation Inspector  
13 General cases, as appropriate, relating to undue  
14 influence and security threats to research and  
15 development activities funded by the Founda-  
16 tion, including theft of property or intellectual  
17 property relating to a project funded by the  
18 Foundation at an institution of higher edu-  
19 cation.

20 (2) FORM.—The report submitted under para-  
21 graph (1) shall be submitted in both unclassified and  
22 classified formats, as appropriate.

23 **SEC. 10334. ONLINE RESOURCE.**

24 The Director shall develop an online resource hosted  
25 on the Foundation's website containing up-to-date infor-

1 mation, tailored for institutions and individual research-  
2 ers, including—

3 (1) an explanation of Foundation research secu-  
4 rity policies;

5 (2) unclassified guidance on potential security  
6 risks that threaten research integrity and other risks  
7 to the research enterprise;

8 (3) examples of beneficial international collabo-  
9 rations and how such collaborations differ from for-  
10 eign government interference efforts that threaten  
11 research integrity;

12 (4) best practices for mitigating security risks  
13 that threaten research integrity; and

14 (5) additional reference materials, including  
15 tools that assist organizations seeking Foundation  
16 funding and awardees in information disclosure to  
17 the Foundation.

18 **SEC. 10335. RESEARCH AWARDS.**

19 The Director shall continue to make awards, on a  
20 competitive basis, to institutions of higher education or  
21 non-profit organizations (or consortia of such institutions  
22 or organizations) to support research on the conduct of  
23 research and the research environment, including research  
24 on research misconduct or breaches of research integrity  
25 and detrimental research practices.

1 **SEC. 10336. AUTHORITIES.**

2 In addition to existing authorities for preventing  
3 waste, fraud, abuse, and mismanagement of Federal  
4 funds, the Director, acting through the Office of Research  
5 Security and Policy and in coordination with the Founda-  
6 tion’s Office of Inspector General, shall have the authority  
7 to conduct risk assessments, including through the use of  
8 open-source analysis and analytical tools, of research and  
9 development award applications and disclosures to the  
10 Foundation.

11 **SEC. 10337. RESPONSIBLE CONDUCT IN RESEARCH TRAIN-**  
12 **ING.**

13 Section 7009 of the America Creating Opportunities  
14 to Meaningfully Promote Excellence in Technology, Edu-  
15 cation, and Science Act (42 U.S.C. 1862o–1) is amended  
16 by—

17 (1) striking “and postdoctoral researchers” and  
18 inserting “postdoctoral researchers, faculty, and  
19 other senior personnel”; and

20 (2) by striking the period and inserting the fol-  
21 lowing: “, including—

22 “(1) mentor training and mentorship;

23 “(2) training to raise awareness of potential re-  
24 search security threats; and

25 “(3) Federal export control, disclosure, and re-  
26 porting requirements.”.

1 **SEC. 10338. RESEARCH SECURITY AND INTEGRITY INFOR-**  
2 **MATION SHARING ANALYSIS ORGANIZATION.**

3 (a) ESTABLISHMENT.—The Director shall enter into  
4 an agreement with a qualified independent organization  
5 to establish a research security and integrity information  
6 sharing analysis organization (referred to in this section  
7 as the “RSI-ISAO”), which shall include members de-  
8 scribed in subsection (d) and carry out the duties de-  
9 scribed in subsection (b).

10 (b) DUTIES.—The RSI-ISAO shall—

11 (1) serve as a clearinghouse for information to  
12 help enable the members and other entities in the  
13 research community to understand the context of  
14 their research and identify improper or illegal efforts  
15 by foreign entities to obtain research results, know  
16 how, materials, and intellectual property;

17 (2) develop a set of standard risk assessment  
18 frameworks and best practices, relevant to the re-  
19 search community, to assess research security risks  
20 in different contexts;

21 (3) share information concerning security  
22 threats and lessons learned from protection and re-  
23 sponse efforts through forums and other forms of  
24 communication;



1           (4) provide timely reports on research security  
2 risks to provide situational awareness tailored to the  
3 research and STEM education community;

4           (5) provide training and support, including  
5 through webinars, for relevant faculty and staff em-  
6 ployed by institutions of higher education on topics  
7 relevant to research security risks and response;

8           (6) enable standardized information gathering  
9 and data compilation, storage, and analysis for com-  
10 piled incident reports;

11           (7) support analysis of patterns of risk and  
12 identification of bad actors and enhance the ability  
13 of members to prevent and respond to research secu-  
14 rity risks; and

15           (8) take other appropriate steps to enhance re-  
16 search security.

17       (c) FUNDING.—The Foundation may provide initial  
18 funds toward the RSI-ISAO but shall seek to have the  
19 fees authorized in subsection (d)(2) cover the costs of op-  
20 erations at the earliest practicable time.

21       (d) MEMBERSHIP.—

22           (1) IN GENERAL.—The RSI-ISAO shall serve  
23 and include members representing institutions of  
24 higher education, nonprofit research institutions,  
25 and small and medium-sized businesses.

1           (2) FEES.—As soon as practicable, members of  
2           the RSI-ISAO shall be charged an annual rate to  
3           enable the RSI-ISAO to cover its costs. Rates shall  
4           be set on a sliding scale based on research and de-  
5           velopment expenditures to ensure that membership  
6           is accessible to a diverse community of stakeholders  
7           and ensure broad participation. The RSI-ISAO shall  
8           develop a plan to sustain the RSI-ISAO without  
9           Federal funding, as practicable.

10          (e) BOARD OF DIRECTORS.—The RSI-ISAO may es-  
11         tablish a board of directors to provide guidance for poli-  
12         cies, legal issues, and plans and strategies of the entity’s  
13         operations. The board shall include a diverse group of  
14         stakeholders representing the research community, includ-  
15         ing academia, industry, and experienced research security  
16         administrators.

17          (f) STAKEHOLDER ENGAGEMENT.—In establishing  
18         the RSI-ISAO under this section, the Director shall take  
19         necessary steps to ensure the services provided are aligned  
20         with the needs of the research community, including by—

21                 (1) convening a series of workshops or other  
22                 multi-stakeholder events; or

23                 (2) publishing a description of the services the  
24                 RSI-ISAO intends to provide and the requirements  
25                 for membership in the Federal Register and provide

1 an opportunity for submission of public comments  
2 for a period of not less than 60 days.

3 **SEC. 10339. PLAN WITH RESPECT TO CONTROLLED INFOR-**  
4 **MATION AND BACKGROUND SCREENING.**

5 (a) IN GENERAL.—Not later than 180 days after the  
6 enactment of this Act, the Director, in consultation with  
7 the Director of National Intelligence and, as appropriate,  
8 other Federal agencies, shall develop a plan to—

9 (1) identify research areas supported by the  
10 Foundation, including in the key technology focus  
11 areas, that may involve access to controlled unclassi-  
12 fied or classified information, including in the key  
13 technology focus areas; and

14 (2) exercise due diligence in granting access, as  
15 appropriate, to the CUI or classified information  
16 identified under paragraph (1) to individuals work-  
17 ing on such research who are employees of the  
18 Foundation or covered individuals on research and  
19 development awards funded by the Foundation.

20 (b) DEFINITIONS.—In this section:

21 (1) CLASSIFIED INFORMATION.—The term  
22 “classified information” means any information that  
23 has been determined pursuant to Executive Order  
24 13526, any predecessor or successor order, or sec-  
25 tions 1-274, 275-321, and 1001-3115 of the Atomic

1 Energy Act of 1954 (42 U.S.C. 2011-2021, 2022-  
2 2286i, 2296a-2297h-13) to require protection  
3 against unauthorized disclosure and that is so des-  
4 ignated.

5 (2) CONTROLLED UNCLASSIFIED INFORMA-  
6 TION.—The term “controlled unclassified informa-  
7 tion” or “CUI” means information described as  
8 “Controlled Unclassified Information” under Execu-  
9 tive Order 13556 or any successor order, to require  
10 protection against unauthorized disclosure and that  
11 is so designated.

12 **SEC. 10339A. FOUNDATION FUNDING TO INSTITUTIONS**  
13 **HOSTING OR SUPPORTING CONFUCIUS INSTI-**  
14 **TUTES.**

15 (a) CONFUCIUS INSTITUTE DEFINED.—In this sec-  
16 tion the term “Confucius Institute” means a cultural insti-  
17 tute established as a partnership between a United States  
18 institution of higher education and a Chinese institution  
19 of higher education to promote and teach Chinese lan-  
20 guage and culture that is funded, directly or indirectly,  
21 by the Government of the People’s Republic of China.

22 (b) RESTRICTIONS OF CONFUCIUS INSTITUTES.—Ex-  
23 cept as provided in subsection (d), none of the funds made  
24 available to the Foundation under this division or division  
25 A, or an amendment made by this division or division A,

1 may be obligated or expended to an institution of higher  
2 education that maintains a contract or agreement between  
3 the institution and a Confucius Institute, unless the Direc-  
4 tor, after consultation with the National Academies, deter-  
5 mines such a waiver is appropriate in accordance with sub-  
6 section (c).

7 (c) WAIVER.—The Director, after consultation with  
8 the National Academies, may issue a waiver for an institu-  
9 tion of higher education that maintains a contract or  
10 agreement between the institution and a Confucius Insti-  
11 tute if such contract or agreement includes clear provi-  
12 sions that—

13 (1) protect academic freedom at the institution;

14 (2) prohibit the application of any foreign law  
15 on any campus of the institution;

16 (3) grant full managerial authority of the Con-  
17 fucius Institute to the institution, including full con-  
18 trol over what is being taught, the activities carried  
19 out, the research awards that are made, and who is  
20 employed at the Confucius Institute; and

21 (4) prohibit co-location with the institution's  
22 Chinese language, history, and cultural programs  
23 and require separate promotional materials.

24 (d) SPECIAL RULE.—

1           (1) IN GENERAL.—Notwithstanding any other  
2           provision of this section, this section shall not apply  
3           to an institution of higher education if that institu-  
4           tion has fulfilled the requirements for a waiver from  
5           the Department of Defense as described under sec-  
6           tion 1062 of the National Defense Authorization Act  
7           for Fiscal Year 2021 (Public Law 116–283).

8           (2) EXCEPTION.—Notwithstanding any other  
9           provision of this section, the prohibition under sub-  
10          section (b) shall not apply to amounts provided to  
11          students as educational assistance.

12          (e) EFFECTIVE DATE.—The limitation under sub-  
13          section (b) shall apply with respect to the first fiscal year  
14          that begins after the date that is two years after the date  
15          of the enactment of this Act and to any subsequent fiscal  
16          year subject to subsection (f).

17          (f) SUNSET.—This section shall cease to be effective  
18          on the date that is five years after the date of the enact-  
19          ment of this Act.

20   **SEC. 10339B. FOREIGN FINANCIAL SUPPORT.**

21          (a) IN GENERAL.—The Director shall request, on an  
22          annual basis, from a recipient institution of higher edu-  
23          cation a disclosure, in the form of a summary document,  
24          from the institution, a foundation of the institution, and  
25          related entities such as any educational, cultural, or lan-

1 guage entity, of the current financial support, the value  
2 of which is \$50,000 or more, including gifts and contracts,  
3 received directly or indirectly from a foreign source (as  
4 such term is defined in section 117 of the Higher Edu-  
5 cation Act of 1965 (20 U.S.C. 1011f(h)(2))) associated  
6 with a foreign country of concern.

7 (b) RECORDS.—Each disclosure to the Director  
8 under this section shall be made on the condition that the  
9 institution will maintain a true copy of the relevant  
10 records subject to the disclosure requirement until the lat-  
11 est of—

12 (1) the date that is four years after the date of  
13 the agreement;

14 (2) the date on which the agreement termi-  
15 nates; or

16 (3) the last day of any period that applicable  
17 State public record law requires a true copy of such  
18 agreement to be maintained.

19 (c) DOCUMENTATION.—Upon review of the disclo-  
20 sures under this section, the Director may request that  
21 a recipient institution provide true copies of any contracts,  
22 agreements, or documentation of financial transactions as-  
23 sociated with disclosures made under this section.

24 (d) OFFICE OF THE INSPECTOR GENERAL.—The Di-  
25 rector, acting through the Office of Research Security and

1 Policy in coordination with the Foundation’s Office of In-  
2 spector General and in consultation with the recipient in-  
3 stitution, may reduce the award funding amount or sus-  
4 pend or terminate the award if the Director determines—

5 (1) such institution fails to comply with the  
6 records retention requirement in subsection (b) or  
7 fails to provide information requested under this sec-  
8 tion; or

9 (2) the Chief of Research Security determines  
10 the disclosures under this section indicate a threat  
11 to research security.

12 **SEC. 10339C. AUTHORIZATION OF APPROPRIATIONS.**

13 From any amounts appropriated for the Foundation  
14 for each of fiscal years 2023 through 2027, the Director  
15 shall allocate \$6,000,000 to carry out the activities under  
16 this subtitle.

17 **Subtitle E—Fundamental Research**

18 **SEC. 10341. BROADER IMPACTS.**

19 (a) ASSESSMENT.—Not later than 120 days after the  
20 date of enactment of this Act, the Director shall enter into  
21 an agreement with a qualified independent organization  
22 to assess how the Broader Impacts review criterion is ap-  
23 plied across the Foundation and make recommendations  
24 for improving the effectiveness for meeting the goals es-  
25 tablished in section 526 of the America Creating Opportu-



1 nities to Meaningfully Promote Excellence in Technology,  
2 Education, and Science Reauthorization Act of 2010 (42  
3 U.S.C. 1862p–14).

4 (b) ACTIVITIES.—The Director shall make awards on  
5 a competitive basis, to institutions of higher education or  
6 non-profit organizations (or consortia of such institutions  
7 or organizations) to support activities to increase the effi-  
8 ciency, effectiveness, and availability of resources for im-  
9 plementing the Broader Impacts review criterion, includ-  
10 ing—

11 (1) training and workshops for program offi-  
12 cers, merit review panelists, award office administra-  
13 tors, faculty, and students to improve understanding  
14 of the goals and the full range of potential broader  
15 impacts available to researchers to satisfy this cri-  
16 terion;

17 (2) repositories and clearinghouses for sharing  
18 best practices and facilitating collaboration; and

19 (3) tools for evaluating and documenting soci-  
20 etal impacts of research.

21 **SEC. 10342. SENSE OF CONGRESS.**

22 It is the sense of Congress that the Director should  
23 continue to identify opportunities to reduce the adminis-  
24 trative burden on researchers.

1 **SEC. 10343. RESEARCH ETHICS.**

2 (a) SENSE OF CONGRESS.—It is the sense of Con-  
3 gress that—

4 (1) a number of emerging areas of research  
5 have potential ethical, social, safety, and security im-  
6 plications that might be apparent as early as the  
7 basic research stage;

8 (2) the incorporation of ethical, social, safety,  
9 and security considerations into the research design  
10 and review process for Federal awards, may help  
11 mitigate potential harms before they happen;

12 (3) the Foundation’s agreement with the Na-  
13 tional Academies to conduct a study and make rec-  
14 ommendations with respect to governance of re-  
15 search in emerging technologies is a positive step to-  
16 ward accomplishing this goal; and

17 (4) the Foundation should continue to work  
18 with stakeholders to promote best practices for gov-  
19 ernance of research in emerging technologies at  
20 every stage of research.

21 (b) INCORPORATION OF ETHICS CONSIDERATIONS.—  
22 Drawing on stakeholder input, not later than 24 months  
23 after the date of enactment of this Act, the Director shall  
24 revise proposal instructions to require that ethical and so-  
25 cietal considerations are to be included as part of a pro-  
26 posal for funding prior to making the award, where such

1 considerations are applicable. Such considerations shall be  
2 evaluated by the Director in the review of proposals, tak-  
3 ing into account any relevant input from the peer-review-  
4 ers for the proposal, and shall factor into award decisions,  
5 as deemed necessary by the Director. When incorporating  
6 such considerations, proposers may include, as appro-  
7 priate—

8           (1)(A) any readily foreseeable or quantifiable  
9 risks to society, including how the research could en-  
10 able products, technologies, or other outcomes that  
11 could intentionally or unintentionally cause signifi-  
12 cant societal harm; or

13           (B) an assertion that no readily foreseeable po-  
14 tential ethical, social, safety, or security implications  
15 are apparent;

16           (2) how technical or social solutions can miti-  
17 gate such risks and, as appropriate, a plan to imple-  
18 ment such mitigation measures; and

19           (3) how partnerships and collaborations in the  
20 research can help mitigate potential harm and am-  
21 plify potential societal benefits.

22           (c) GUIDANCE.—The Director shall solicit stake-  
23 holder input to develop clear guidance on what constitutes  
24 a readily foreseeable or quantifiable risk as described in  
25 subsection (b)(1), and to the extent practicable harmonize

1 this policy with existing ethical policies or related require-  
2 ments for human subjects.

3 (d) RESEARCH.—The Director shall make awards, on  
4 a competitive basis, to institutions of higher education or  
5 non-profit organizations (or consortia of such institutions  
6 or organizations) to support—

7 (1) research to assess the potential ethical and  
8 societal implications of Foundation- supported re-  
9 search and products or technologies enabled by such  
10 research, including the benefits and risks identified  
11 pursuant to subsection (b)(1); and

12 (2) the development and verification of ap-  
13 proaches to proactively mitigate foreseeable risks to  
14 society, including the technical and social solutions  
15 identified pursuant to subsection (b)(1).

16 (e) ANNUAL REPORT.—The Director shall encourage  
17 recipients to update their consideration of potential risks  
18 and benefits as appropriate as part of the annual reports  
19 required by all awardees under the award terms and condi-  
20 tions.

21 **SEC. 10344. RESEARCH REPRODUCIBILITY AND**  
22 **REPLICABILITY.**

23 (a) IN GENERAL.—Consistent with existing Federal  
24 law for privacy, intellectual property, and security, the Di-  
25 rector shall facilitate public access to research products,

1 including data, software, and code, developed as part of  
2 Foundation-supported projects.

3 (b) DATA MANAGEMENT PLANS.—

4 (1) IN GENERAL.—The Director shall require  
5 that every proposal for funding for research include  
6 a machine-readable data management plan that in-  
7 cludes a description of how the awardee will archive  
8 and preserve public access to data, software, and  
9 code developed as part of the proposed project.

10 (2) REQUIREMENTS.—In carrying out the re-  
11 quirement in paragraph (1), the Director shall—

12 (A) provide necessary resources, including  
13 trainings and workshops, to educate researchers  
14 and students on how to develop and review high  
15 quality data management plans;

16 (B) ensure program officers and merit re-  
17 view panels are equipped with the resources and  
18 training necessary to review the quality of data  
19 management plans; and

20 (C) ensure program officers and merit re-  
21 view panels treat data management plans as es-  
22 sential elements of award proposals, where ap-  
23 propriate.

24 (c) OPEN REPOSITORIES.—The Director shall—

1           (1) consult with the heads of other Federal re-  
2           search agencies, as appropriate, and solicit input  
3           from the scientific community, to develop and widely  
4           disseminate a set of criteria for trusted open reposi-  
5           tories to be used by Foundation-funded researchers,  
6           accounting for discipline-specific needs and nec-  
7           essary protections for sensitive information;

8           (2) work with stakeholders to identify signifi-  
9           cant gaps in available repositories meeting the cri-  
10          teria developed under paragraph (1) and options for  
11          supporting the development of additional or en-  
12          hanced repositories;

13          (3) make awards on a competitive basis to insti-  
14          tutions of higher education or non-profit organiza-  
15          tions (or consortia of such institutions or organiza-  
16          tions) for the development, upgrades, and mainte-  
17          nance of open data repositories that meet the cri-  
18          teria developed under paragraph (1);

19          (4) work with stakeholders and build on exist-  
20          ing models, where appropriate, to establish a single,  
21          public, web-based point of access to help users locate  
22          repositories storing data, software, and code result-  
23          ing from or used in Foundation-supported projects;

24          (5) work with stakeholders to establish the nec-  
25          essary policies and procedures and allocate the nec-

1        essary resources to ensure, as practicable, data un-  
2        derlying published findings resulting from Founda-  
3        tion-supported projects are deposited in repositories  
4        meeting the criteria developed under paragraph (1)  
5        at the time of publication;

6                (6) incentivize the deposition of data, software,  
7        and code into repositories that meet the criteria de-  
8        veloped under paragraph (1); and

9                (7) coordinate with the scientific publishing  
10       community and the heads of other relevant Federal  
11       departments and agencies to support the develop-  
12       ment of voluntary consensus standards around data  
13       archiving and sharing.

14       (d) RESEARCH, DEVELOPMENT, AND EDUCATION.—  
15       The Director shall make awards, on a competitive basis  
16       to institutions of higher education or non-profit organiza-  
17       tions (or consortia of such institutions or organizations)  
18       to—

19                (1) support research and development of open  
20       source, sustainable, usable tools and infrastructure  
21       that support reproducibility for a broad range of  
22       studies across different disciplines;

23                (2) support research on computational repro-  
24       ducibility, including the limits of reproducibility and  
25       the consistency of computational results in the devel-

1       opment of new computation hardware, tools, and  
2       methods; and

3               (3) support the education and training of stu-  
4       dents, faculty, and researchers on computational  
5       methods, tools, and techniques to improve the qual-  
6       ity and sharing of data, code, and supporting  
7       metadata to produce reproducible research.

8   **SEC. 10345. CLIMATE CHANGE RESEARCH.**

9       The Director shall make awards, on a competitive  
10      basis, to institutions of higher education or non-profit or-  
11      ganizations (or consortia of such institutions or organiza-  
12      tions) to support research to improve our understanding  
13      of the climate system and related human and environ-  
14      mental systems.

15   **SEC. 10346. SOCIAL, BEHAVIORAL, AND ECONOMIC**  
16                                   **SCIENCES.**

17      The Director shall—

18               (1) actively communicate opportunities and so-  
19      licit proposals for social, behavioral, and economic  
20      science researchers to participate in cross-cutting  
21      and interdisciplinary programs, including the Con-  
22      vergence Accelerator and agency priority activities,  
23      and the Mid-Scale Research Infrastructure program;  
24      and



1           (2) ensure social, behavioral, and economic  
2           science researchers are represented on relevant merit  
3           review panels for such activities.

4 **SEC. 10347. MEASURING IMPACTS OF FEDERALLY FUNDED**  
5 **RESEARCH AND DEVELOPMENT.**

6           The Director shall make awards on a competitive,  
7 merit-reviewed basis to institutions of higher education or  
8 non-profit organizations (or consortia of such institutions  
9 or organizations) to support research and development of  
10 data, models, indicators, and associated analytical tools to  
11 improve our understanding of the impacts of Federally  
12 funded research on society, the economy, and the work-  
13 force, including domestic job creation.

14 **SEC. 10348. FOOD-ENERGY-WATER RESEARCH.**

15           The Director shall make awards on a competitive  
16 basis to institutions of higher education or non-profit or-  
17 ganizations (or consortia of such institutions or organiza-  
18 tions) to—

19           (1) support research to significantly advance  
20           our understanding of the food-energy-water system  
21           through quantitative and computational modeling,  
22           including support for relevant cyberinfrastructure;

23           (2) develop real-time, cyber-enabled interfaces  
24           that improve understanding of the behavior of food-

1 energy-water systems and increase decision support  
2 capability;

3 (3) support research that will lead to innovative  
4 solutions to critical food-energy-water system prob-  
5 lems; and

6 (4) grow the scientific workforce capable of  
7 studying and managing the food-energy-water sys-  
8 tem, through education and other professional devel-  
9 opment.

10 **SEC. 10349. BIOLOGICAL FIELD STATIONS AND MARINE**  
11 **LABORATORIES.**

12 The Director shall continue to support enhancing, re-  
13 pairing and maintaining research instrumentation, labora-  
14 tories, telecommunications and housing at biological field  
15 stations and marine laboratories.

16 **SEC. 10350. SUSTAINABLE CHEMISTRY RESEARCH AND**  
17 **EDUCATION.**

18 In accordance with section 263 of the National De-  
19 fense Authorization Act for Fiscal Year 2021, the Director  
20 shall carry out activities in support of sustainable chem-  
21 istry, including—

22 (1) establishing a program to make awards, on  
23 a competitive basis, to institutions of higher edu-  
24 cation or non-profit organizations (or consortia of  
25 such institutions or organizations) to support—

1 (A) individual investigators and teams of  
2 investigators, including to the extent prac-  
3 ticable, early career investigators for research  
4 and development;

5 (B) collaborative research and development  
6 partnerships among universities, industry, and  
7 non-profit organizations;

8 (C) integrating sustainable chemistry prin-  
9 ciples into elementary, secondary, under-  
10 graduate, and graduate chemistry and chemical  
11 engineering curriculum and research training,  
12 as appropriate to that level of education and  
13 training; and

14 (2) incorporating sustainable chemistry into ex-  
15 isting Foundation research and development pro-  
16 grams.

17 **SEC. 10351. RISK AND RESILIENCE RESEARCH.**

18 The Director shall make awards on a competitive  
19 basis to institutions of higher education or non-profit or-  
20 ganizations (or consortia of such institutions or organiza-  
21 tions) to advance knowledge of risk assessment and pre-  
22 dictability and to support the creation of tools and tech-  
23 nologies, including advancing data analytics and utiliza-  
24 tion of artificial intelligence, for increased resilience  
25 through—

1           (1) improvements in our ability to understand,  
2           model, and predict extreme events and natural haz-  
3           ards;

4           (2) the creation of novel engineered systems so-  
5           lutions for resilient complex infrastructures, particu-  
6           larly those that address critical interdependence  
7           among infrastructures and leverage the growing in-  
8           fusion of cyber-physical-social components into the  
9           infrastructures;

10          (3) development of equipment and instrumenta-  
11          tion for innovation in resilient engineered infrastruc-  
12          tures;

13          (4) multidisciplinary research on the behaviors  
14          individuals and communities engage in to detect,  
15          perceive, understand, predict, assess, mitigate, and  
16          prevent risks and to improve and increase resilience;  
17          and

18          (5) advancements in multidisciplinary wildfire  
19          science, including those related to air quality im-  
20          pacts, human behavior, and early detection and  
21          warning.

22 **SEC. 10352. UNMANNED AIRCRAFT SYSTEMS TECH-**  
23 **NOLOGIES.**

24          In coordination with the Administrator of the Federal  
25          Aviation Administration and the Administrator of the Na-

1 tional Aeronautics and Space Administration, the Director  
2 shall carry out a program of research and related activities  
3 related to unmanned aircraft system technologies, which  
4 may include a prize competition pursuant to section 24  
5 of the Stevenson-Wydler Technology Innovation Act of  
6 1980 (15 U.S.C. 3719) and support for undergraduate  
7 and graduate curriculum development.

8 **SEC. 10353. ACCELERATING UNMANNED MARITIME SYS-**  
9 **TEMS TECHNOLOGIES.**

10 (a) IN GENERAL.—In order to support advances in  
11 marine science, maritime domain awareness, and national  
12 security the Director, in consultation with the Under Sec-  
13 retary of Commerce for Oceans and Atmosphere and the  
14 Commandant of the Coast Guard, shall issue awards, on  
15 a competitive basis, to institutions of higher education or  
16 nonprofit organizations (or consortia of such institutions  
17 or organizations) to support research that will accelerate  
18 innovation to advance unmanned maritime systems for the  
19 purpose of providing greater maritime domain awareness  
20 to the Nation.

21 (b) COORDINATION.—In implementing this section,  
22 the Director shall coordinate with the Coast Guard, the  
23 Department of Defense, the National Oceanic and Atmos-  
24 pheric Administration, and other Federal agencies, includ-  
25 ing those established under the Commercial Engagement

1 Through Ocean Technology Act of 2018 (Public Law 115–  
2 394).

3 **SEC. 10354. LEVERAGING INTERNATIONAL EXPERTISE IN**  
4 **RESEARCH.**

5 The Director shall explore and advance opportunities  
6 for leveraging international capabilities and resources that  
7 align with the Foundation and United States research  
8 community priorities and have the potential to benefit  
9 United States prosperity, security, health, and well-being,  
10 including through binational research and development or-  
11 ganizations and foundations and by sending teams of  
12 Foundation scientific staff for site visits of scientific facili-  
13 ties and agencies in other countries. The Director shall  
14 establish and implement policies, including through any  
15 research security training requirements, to mitigate the  
16 potential risks of such interactions, including risks to the  
17 protection of intellectual property and the risk of undue  
18 foreign influence on research.

19 **SEC. 10355. BIOLOGICAL RESEARCH COLLECTIONS.**

20 (a) IN GENERAL.—The Director shall continue to  
21 support databases, tools, methods, and other activities  
22 that secure and improve existing physical and digital bio-  
23 logical research collections, improve the accessibility of col-  
24 lections and collection-related data for research and edu-  
25 cational purposes, develop capacity for curation and collec-

1 tion management, and to transfer ownership of collections  
2 that are significant to the biological research community,  
3 including to museums and universities.

4 (b) SPECIMEN MANAGEMENT PLAN.—In consultation  
5 with other relevant Federal research agencies, and as the  
6 Director determines is appropriate, the Director shall re-  
7 quire that proposals submitted to the Foundation for  
8 funding for research that involves collecting or generating  
9 specimens include, as part of the data management plan  
10 under section 10344, a description of how the specimens  
11 and associated data will be accessioned into and main-  
12 tained in an established biological collection.

13 (c) ACTION CENTER FOR BIOLOGICAL COLLEC-  
14 TIONS.—In coordination with other relevant Federal re-  
15 search agencies, as appropriate, the Director shall make  
16 awards on a competitive basis to institutions of higher  
17 education or non-profit organizations (or consortia of such  
18 institutions or organizations) to facilitate coordination and  
19 data sharing among communities of practice for research,  
20 education, workforce training, evaluation, and business  
21 model development, including by establishing an Action  
22 Center for Biological Collections.

1 **SEC. 10356. CLEAN WATER RESEARCH AND TECHNOLOGY**  
2 **ACCELERATION.**

3 The Director shall make awards on a competitive,  
4 merit-reviewed basis to institutions of higher education or  
5 non-profit organizations (or consortia of such institutions  
6 or organizations) to—

7 (1) support transdisciplinary research to signifi-  
8 cantly advance our understanding of water avail-  
9 ability, quality, and dynamics and the impact of  
10 human activity and a changing climate on urban and  
11 rural water and wastewater systems, including in  
12 low-income, underserved, and disadvantaged commu-  
13 nities;

14 (2) develop, pilot, and deploy innovative tech-  
15 nologies, systems, and other approaches to identi-  
16 fying and addressing challenges that affect water  
17 availability, quality, and security, including through  
18 direct engagement with affected communities and  
19 partnerships with the private sector, State, terri-  
20 torial, Tribal, and local governments, non-profit or-  
21 ganizations and water management professionals;  
22 and

23 (3) grow the scientific workforce capable of  
24 studying and managing water and wastewater sys-  
25 tems and of conducting wastewater surveillance,



1 through education, training, and other professional  
2 development.

3 **SEC. 10357. TECHNOLOGY AND BEHAVIORAL SCIENCE RE-**  
4 **SEARCH.**

5 (a) IN GENERAL.—The Director shall make awards  
6 on a merit-reviewed, competitive basis for research and de-  
7 velopment to—

8 (1) increase understanding of social media and  
9 consumer technology access and use patterns and re-  
10 lated mental health, behavioral, and substance use  
11 disorder issues, particularly for children and adoles-  
12 cents; and

13 (2) explore the role of social media and con-  
14 sumer technology in rising rates of mental health  
15 and substance use disorder issues, including within  
16 communities experiencing long-term economic dis-  
17 tress.

18 (b) COORDINATION TO AVOID DUPLICATION.—In  
19 making awards under this subsection, the Director shall,  
20 for purposes of avoiding duplication of activities and re-  
21 search, consult, collaborate, and coordinate with the heads  
22 of other relevant Federal departments and agencies, in-  
23 cluding the Department of Health and Human Services.

1 **SEC. 10358. MANUFACTURING RESEARCH AMENDMENT.**

2 Section 506(a) of the America COMPETES Reau-  
3 thorization Act of 2010 (42 U.S.C. 1862p–1(a)) is amend-  
4 ed—

5 (1) in paragraph (5), by striking “and” at the  
6 end;

7 (2) in paragraph (6)—

8 (A) by striking “and” before “virtual man-  
9 ufacturing”; and

10 (B) by striking the period at the end and  
11 inserting “; and artificial intelligence and ma-  
12 chine learning; and”; and

13 (3) by adding at the end the following:

14 “(7) additive manufacturing, including new ma-  
15 terial designs, complex materials, rapid printing  
16 techniques, and real-time process controls.”.

17 **SEC. 10359. CRITICAL MINERALS MINING RESEARCH AND**  
18 **DEVELOPMENT.**

19 (a) **CRITICAL MINERALS MINING RESEARCH AND**  
20 **DEVELOPMENT AT THE FOUNDATION.—**

21 (1) **IN GENERAL.—**In order to support supply  
22 chain resiliency, the Director shall make awards, on  
23 a competitive basis, to institutions of higher edu-  
24 cation or nonprofit organizations (or consortia of  
25 such institutions or organizations) to support basic  
26 research that will accelerate innovation to advance

1 critical minerals mining strategies and technologies  
2 for the purpose of making better use of domestic re-  
3 sources and eliminating national reliance on min-  
4 erals and mineral materials that are subject to sup-  
5 ply disruptions.

6 (2) USE OF FUNDS.—Activities funded by an  
7 award under this section may include—

8 (A) advancing mining research and devel-  
9 opment activities to develop new mapping and  
10 mining technologies and techniques, including  
11 advanced critical mineral extraction and pro-  
12 duction, separation, alloying, or processing tech-  
13 niques and technologies that can decrease en-  
14 ergy intensity to improve existing or to develop  
15 new supply chains of critical minerals, and to  
16 yield more efficient, economical, and environ-  
17 mentally benign mining practices;

18 (B) advancing critical mineral processing  
19 research activities to improve separation,  
20 alloying, manufacturing, or recycling techniques  
21 and technologies that can decrease the energy  
22 intensity, waste, potential environmental im-  
23 pact, and costs of those activities;

24 (C) conducting long-term earth observation  
25 of reclaimed mine sites, including the study of

1 the evolution of microbial diversity at such  
2 sites;

3 (D) examining the application of artificial  
4 intelligence for geological exploration of critical  
5 minerals, including what size and diversity of  
6 data sets would be required;

7 (E) examining the application of machine  
8 learning for detection and sorting of critical  
9 minerals, including what size and diversity of  
10 data sets would be required;

11 (F) conducting detailed isotope studies of  
12 critical minerals and the development of more  
13 refined geologic models;

14 (G) improved understanding of the geologi-  
15 cal and geochemical processes through which  
16 critical minerals form and are concentrated into  
17 economically viable deposits; or

18 (H) providing training and research oppor-  
19 tunities to undergraduate and graduate stu-  
20 dents to prepare the next generation of mining  
21 engineers and researchers.

22 (3) EXISTING PROGRAMS.—The Director shall  
23 ensure awards made under this subsection are com-  
24 plementary and not duplicative of existing programs  
25 across the Foundation and Federal Government.

1 (b) CRITICAL MATERIALS INTERAGENCY SUB-  
2 COMMITTEE.—

3 (1) IN GENERAL.—The Critical Minerals Sub-  
4 committee of the National Science and Technology  
5 Council (referred to in this section as the “Sub-  
6 committee”), shall coordinate Federal science and  
7 technology efforts to ensure secure, reliable, and en-  
8 vironmentally sustainable supplies of critical mate-  
9 rials to the United States.

10 (2) PURPOSES.—The purposes of the Sub-  
11 committee shall be—

12 (A) to advise and assist the National  
13 Science and Technology Council, including the  
14 Committee on Homeland and National Security,  
15 on United States policies, procedures, and plans  
16 as it relates to critical materials, including—

17 (i) Federal research, development, and  
18 commercial application efforts to minimize  
19 the environmental impacts of methods for  
20 extractions, concentration, separation and  
21 purification of conventional, secondary,  
22 and unconventional sources of critical ma-  
23 terials;

24 (ii) efficient use, substitution, and  
25 reuse of critical materials;

1 (iii) the critical materials workforce of  
2 the United States; and

3 (iv) United States private industry in-  
4 vestments in innovation and technology  
5 transfer from federally funded science and  
6 technology;

7 (B) to identify emerging opportunities,  
8 stimulate international cooperation, and foster  
9 the development of secure and reliable supply  
10 chains of critical materials and establish sce-  
11 nario modeling systems for supply problems of  
12 critical materials and energy critical materials;

13 (C) to ensure the transparency of informa-  
14 tion and data related to critical materials; and

15 (D) to provide recommendations on coordi-  
16 nation and collaboration among the research,  
17 development, and deployment programs and ac-  
18 tivities of Federal agencies to promote a secure  
19 and reliable supply of critical materials nec-  
20 essary to maintain national security, economic  
21 well-being, public health, and industrial produc-  
22 tion.

23 (3) RESPONSIBILITIES.—In carrying out this  
24 subsection, the Subcommittee may, taking into ac-

1 count the findings and recommendations of relevant  
2 advisory committees—

3 (A) provide recommendations on how Fed-  
4 eral agencies may improve the topographic, geo-  
5 logic, and geophysical mapping of the United  
6 States and improve the discoverability, accessi-  
7 bility, and usability of the resulting and existing  
8 data, to the extent permitted by law and subject  
9 to appropriate limitation for purposes of privacy  
10 and security;

11 (B) assess the progress towards developing  
12 critical materials recycling and reprocessing  
13 technologies, and technological alternatives to  
14 critical materials;

15 (C) establish a mechanism for the coordi-  
16 nation and evaluation of Federal programs with  
17 critical material needs, including Federal pro-  
18 grams involving research and development, in a  
19 manner that complements related efforts car-  
20 ried out by the private sector and other domes-  
21 tic and international agencies and organiza-  
22 tions;

23 (D) examine options for accessing and de-  
24 veloping critical materials through investment

1 and trade with our allies and partners and pro-  
2 vide recommendations;

3 (E) evaluate and provide recommendations  
4 to incentivize the development and use of ad-  
5 vances in science and technology in the private  
6 industry;

7 (F) assess the need for and make rec-  
8 ommendations to address the challenges the  
9 United States critical materials supply chain  
10 workforce faces, including aging and retiring  
11 personnel and faculty, and foreign competition  
12 for United States talent;

13 (G) develop, and update as necessary, a  
14 strategic plan to guide Federal programs and  
15 activities to enhance scientific and technical ca-  
16 pabilities across critical material supply chains,  
17 including a roadmap that identifies key re-  
18 search and development needs and coordinates  
19 on-going activities for source diversification,  
20 more efficient use, recycling, and substitution  
21 for critical materials; as well as cross-cutting  
22 mining science, data science techniques, mate-  
23 rials science, manufacturing science and engi-  
24 neering, computational modeling, and environ-



1           mental health and safety research and develop-  
2           ment;

3           (H) assess the need for, and make rec-  
4           ommendations concerning, the availability and  
5           adequacy of the supply of technically trained  
6           personnel necessary for critical materials re-  
7           search, development, extraction, and industrial  
8           production, with a particular focus on the prob-  
9           lem of attracting and maintaining high-quality  
10          professionals for maintaining an adequate sup-  
11          ply of energy critical materials; and

12          (I) report to the appropriate Congressional  
13          committees on activities and findings under this  
14          section.

15          (c) **DEFINITIONS OF CRITICAL MINERAL AND CRIT-**  
16 **ICAL MINERAL OR METAL.**—In this section, the terms  
17 “critical mineral” and “critical mineral or metal” include  
18 any host mineral of a critical mineral (within the meaning  
19 of those terms in section 7002 of title VII of division Z  
20 of the Consolidated Appropriations Act, 2021 (Public Law  
21 116–260)).

22 **SEC. 10360. STUDY OF AI RESEARCH CAPACITY.**

23          (a) **IN GENERAL.**—The Director shall conduct a  
24 study or support the development of a study by a qualified  
25 independent organization as determined by the Director,

1 on artificial intelligence research capacity at United States  
2 institutions of higher education.

3 (b) STUDY CONTENTS.—The Director shall ensure  
4 that, at a minimum, the study under subsection (a) ad-  
5 dresses the following topics:

6 (1) Which universities are putting out signifi-  
7 cant peer-reviewed artificial intelligence research, in-  
8 cluding based on quantity and number of citations.

9 (2) For each of the universities described in  
10 paragraph (1), what specific factors enable their AI  
11 research, including computing power, data set avail-  
12 ability, specialized curriculum, faculty and graduate  
13 students, sources of Federal and non-Federal re-  
14 search funding, and industry and other partnerships.

15 (3) Promising practices at universities described  
16 in paragraph (1) for advancing diversity, equity, and  
17 inclusion in AI research programs.

18 (4) Geographic diversity across the country of  
19 universities with the factors identified in paragraph  
20 (2).

21 (5) How universities not included in paragraph  
22 (1) could implement the factors in paragraph (2) to  
23 produce AI research, as well as case studies that  
24 universities can look to as examples and potential  
25 pilot programs that the Federal Government could

1       develop or support to help universities produce AI  
2       research.

3       (c) WORKSHOPS.—The Director may support work-  
4 shops to help inform the study required under this sub-  
5 section.

6       (d) PUBLICATION.—The Director shall ensure that  
7 the study carried out under this subsection is made pub-  
8 licly available not later than 12 months after the date of  
9 enactment of this Act.

10       (e) AVOID DUPLICATION.—The Director shall ensure  
11 that the activities carried out under this section are not  
12 duplicative of activities supported by other parts of the  
13 Foundation or other relevant Federal agencies, including  
14 but not limited to the activities of the National AI Re-  
15 search Resource Task Force.

16 **SEC. 10361. ADVANCING IOT FOR PRECISION AGRICULTURE**  
17 **CAPABILITIES ACT.**

18       (a) SHORT TITLE.—This section may be cited as the  
19 “Advancing IoT for Precision Agriculture Act of 2021”.

20       (b) PURPOSE.—It is the purpose of this section to  
21 promote scientific research and development opportunities  
22 for connected technologies that advance precision agri-  
23 culture capabilities.

24       (c) FOUNDATION DIRECTIVE ON AGRICULTURAL  
25 SENSOR RESEARCH.—In making awards under the sensor

1 systems and networked systems programs of the Founda-  
2 tion, the Director shall include in consideration of portfolio  
3 balance research and development on sensor connectivity  
4 in environments of intermittent connectivity and intermit-  
5 tent computation—

6 (1) to improve the reliable use of advance sens-  
7 ing systems in rural and agricultural areas; and

8 (2) that considers—

9 (A) direct gateway access for locally stored  
10 data;

11 (B) attenuation of signal transmission;

12 (C) loss of signal transmission; and

13 (D) at-scale performance for wireless  
14 power.

15 (d) UPDATING CONSIDERATIONS FOR PRECISION AG-  
16 RICULTURE TECHNOLOGY WITHIN THE NSF ADVANCED  
17 TECHNICAL EDUCATION PROGRAM.—Section 3 of the Sci-  
18 entific and Advanced-Technology Act of 1992 (42 U.S.C.  
19 1862i), as amended by section 10312, is further amend-  
20 ed—

21 (1) in subsection (d)(2), by adding at the end  
22 the following:

23 “(G) applications that incorporate distance  
24 learning tools and approaches.”; and

25 (2) in subsection (e)(3)—

1 (A) in subparagraph (C), by striking  
2 “and” after the semicolon;

3 (B) in subparagraph (D), by striking the  
4 period at the end and inserting “; and”; and

5 (C) by adding at the end the following:

6 “(E) applications that incorporate distance  
7 learning tools and approaches.”.

8 (e) GAO REVIEW.—Not later than 18 months after  
9 the date of enactment of this section, the Comptroller  
10 General of the United States shall provide—

11 (1) a technology assessment of precision agri-  
12 culture technologies, such as the existing use of—

13 (A) sensors, scanners, radio-frequency  
14 identification, and related technologies that can  
15 monitor soil properties, irrigation conditions,  
16 and plant physiology;

17 (B) sensors, scanners, radio-frequency  
18 identification, and related technologies that can  
19 monitor livestock activity and health;

20 (C) network connectivity and wireless com-  
21 munications that can securely support digital  
22 agriculture technologies in rural and remote  
23 areas;

24 (D) aerial imagery generated by satellites  
25 or unmanned aerial vehicles;

1 (E) ground-based robotics;

2 (F) control systems design and  
3 connectivity, such as smart irrigation control  
4 systems;

5 (G) Global Positioning System-based appli-  
6 cations; and

7 (H) data management software and ad-  
8 vanced analytics that can assist decision mak-  
9 ing and improve agricultural outcomes; and

10 (2) a review of Federal programs that provide  
11 support for precision agriculture research, develop-  
12 ment, adoption, education, or training, in existence  
13 on the date of enactment of this section.

14 **SEC. 10362. ASTRONOMY AND SATELLITE CONSTELLA-**  
15 **TIONS.**

16 The Director shall support research into and the de-  
17 sign, development, and testing of mitigation measures to  
18 address the potential impact of satellite constellations on  
19 Foundation scientific programs by—

20 (1) making awards on a competitive basis to  
21 support study of the potential impacts of satellite  
22 constellations on ground-based optical, infrared, and  
23 radio astronomy, including through existing pro-  
24 grams such Spectrum and Wireless Innovation en-

1       abled by Future Technologies (SWIFT) and the  
2       Spectrum Innovation Initiative;

3           (2) supporting research on potential satellite  
4       impacts and benefits and mitigation strategies to be  
5       carried out at one or more Foundation supported  
6       Federally Funded Research and Development Cen-  
7       ters or major multiuser research facilities as defined  
8       in section 110(g) of the American Innovation and  
9       Competitiveness Act (42 U.S.C. 1862s-2(g)), as ap-  
10      propriate; and

11           (3) supporting workshops related to the poten-  
12      tial impact of satellite constellations on scientific re-  
13      search and how those constellations could be used to  
14      improve scientific research.

15   **SEC. 10363. RESEARCH ON THE IMPACT OF INFLATION.**

16      (a) IN GENERAL.—The Director may make awards,  
17      on a competitive merit-reviewed basis, to institutions of  
18      higher education or nonprofit organizations (or consortia  
19      of such institutions or organizations) to support research  
20      to improve our understanding of the impact of inflation.

21      (b) USE OF FUNDS.—Activities funded by an award  
22      under this section may include—

23           (1) measuring the economic impact of inflation  
24      on the American people, including an analysis of  
25      cost-of-living and wage impacts;

1           (2) considering the impact of inflation on Amer-  
2           ican international competitiveness;

3           (3) evaluating the impact of inflation on rural  
4           and underserved communities throughout the coun-  
5           try;

6           (4) assessing the ways inflation could impact  
7           future American generations; and

8           (5) evaluating the impact of policymaking on  
9           inflation, including the impact of further Govern-  
10          ment spending.

11          (c) COORDINATION TO AVOID DUPLICATION.—In  
12          making awards under this section, the Director shall, for  
13          purposes of avoiding duplication of activities and research,  
14          consult, collaborate, and coordinate with the programs and  
15          policies of other relevant Federal agencies.

16          **SEC. 10364. MICROGRAVITY UTILIZATION POLICY.**

17          (a) SENSE OF CONGRESS.—It is the sense of Con-  
18          gress that space technology and the utilization of the  
19          microgravity environment for science, engineering, and  
20          technology development is critical to long-term competi-  
21          tiveness with near-peer competitors, including China.

22          (b) POLICY.—To the extent appropriate during an  
23          award period, the Foundation shall facilitate access by re-  
24          cipients of Foundation awards to the microgravity envi-  
25          ronment, including in private sector platforms, for the de-



1 velopment of science, engineering, and technology relevant  
2 to the award.

3 (c) REPORT.—Not later than 180 days after the date  
4 of enactment of this Act, the Director shall provide to the  
5 appropriate committees of Congress a report on the Foun-  
6 dation’s plan for facilitating awardee access to the micro-  
7 gravity environment.

8 **SEC. 10365. RECOGNITION OF THE ARECIBO OBSERVATORY.**

9 (a) FINDINGS.—Congress finds the following:

10 (1) The Department of Defense began devel-  
11 oping the Arecibo Observatory located in Barrio  
12 Esperanza, Arecibo, Puerto Rico, during the 1950s,  
13 and its characteristic instrument, a large radio tele-  
14 scope of 305 meters in diameter was completed in  
15 1963.

16 (2) The facility was later owned by the National  
17 Science Foundation, and supported by the National  
18 Aeronautics and Space Administration and various  
19 university partners.

20 (3) The Arecibo Observatory’s 305-meter fixed  
21 spherical radio telescope, was the world’s largest sin-  
22 gle-dish radio telescope until the Five-Hundred-  
23 Meter Aperture Spherical Radio Telescope located in  
24 Gizhou, China, began observing in 2016.

1           (4) The 305-meter radio telescope made unpar-  
2           alleled contributions to the fields of radio astronomy,  
3           planetary, and atmospheric sciences, and played a  
4           role in inspiring thousands of students in Puerto  
5           Rico, the Nation, and the world to pursue careers in  
6           STEM fields through the Arecibo Observatory Edu-  
7           cation and Public Outreach Programs.

8           (5) The radio telescope significantly advanced  
9           the field of radio astronomy, including the first indi-  
10          rect detection of gravitational waves, the first detec-  
11          tion of extrasolar planets, innumerable contributions  
12          to the field of time domain astronomy and the study  
13          of the interstellar medium, and played a key role in  
14          the search for extraterrestrial intelligence.

15          (6) The Arecibo Observatory had the best plan-  
16          etary radar system in the world, used by the Na-  
17          tional Aeronautics and Space Administration for  
18          near-Earth object detection and was an essential  
19          part of the agency's planetary defense program.

20          (7) The planetary radar at the Arecibo Observ-  
21          atory has contributed fundamentally and signifi-  
22          cantly to the knowledge of the solar system.

23          (8) The Arecibo Observatory's Incoherent Scat-  
24          ter Radar and supporting facilities have provided  
25          fundamental understanding of the ionosphere and

1 upper atmosphere, and the interface between the at-  
2 mosphere and space that protects the planet from  
3 solar wind, meteors, and other potential threats.

4 (9) December 1, 2021, marks the 1-year anni-  
5 versary of the uncontrolled collapse sustained by the  
6 radio telescope after a series of cable failures in  
7 tower 4.

8 (b) SENSE OF CONGRESS.—It is the sense of Con-  
9 gress that the Congress—

10 (1) acknowledges the loss of the Arecibo Ob-  
11 servatory’s radio telescope due to its collapse and its  
12 implications for the loss of a unique world-class mul-  
13 tidisciplinary science facility which conducted re-  
14 search in the areas of space and atmospheric  
15 sciences, radar astronomy and planetary sciences,  
16 astronomy, and astrophysics;

17 (2) acknowledges that the uncontrolled collapse  
18 of the 305-meter radio telescope represents a loss of  
19 astronomical observation capabilities, scientific re-  
20 search and development, planetary defense capabili-  
21 ties, and applied science capabilities for the United  
22 States;

23 (3) recognizes the rich scientific, educational,  
24 and economic benefits that the Arecibo Telescope

1 has made to the people of Puerto Rico, the Nation,  
2 and the world;

3 (4) recognizes the work and contributions made  
4 by the thousands of dedicated staff who have sup-  
5 ported the Arecibo Observatory for close to 6 dec-  
6 ades;

7 (5) commends the National Science Foundation  
8 for convening a virtual workshop in June 2021, to  
9 explore ideas for future scientific and educational ac-  
10 tivities at the Arecibo Observatory; and

11 (6) encourages the National Science Founda-  
12 tion, in consultation with other Federal agencies, to  
13 explore opportunities for strengthening and expand-  
14 ing the role of the Arecibo Observatory in Puerto  
15 Rico through education, outreach, and diversity pro-  
16 grams, and future research capabilities and tech-  
17 nology at the site.

## 18 **Subtitle F—Research**

### 19 **Infrastructure**

#### 20 **SEC. 10371. FACILITY OPERATION AND MAINTENANCE.**

21 (a) IN GENERAL.—The Director shall continue the  
22 Facility Operation Transition pilot program for a total of  
23 5 years.

24 (b) COST SHARING.—The Facility Operation Transi-  
25 tion program shall provide funding for 10 to 50 percent

1 of the operations and maintenance costs for major re-  
2 search facilities that are within the first five years of oper-  
3 ation, where the share is determined based on—

4 (1) the operations and maintenance costs of the  
5 major research facility; and

6 (2) the capacity of the managing directorate or  
7 division to absorb such costs.

8 (c) REPORT.—After the fifth year of the pilot pro-  
9 gram, the Director shall transmit a report to Congress  
10 that includes—

11 (1) an assessment, that includes feedback from  
12 the research community, of the effectiveness of the  
13 pilot program for—

14 (A) supporting research directorates and  
15 divisions in balancing investments in research  
16 grants and funding for the initial operation and  
17 maintenance of major facilities;

18 (B) incentivizing the development of new  
19 world-class facilities;

20 (C) facilitating interagency and inter-  
21 national partnerships;

22 (D) funding core elements of multi-discipli-  
23 nary facilities; and

24 (E) supporting facility divestment costs;  
25 and

1           (2) if deemed effective, a plan for permanent  
2           implementation of the pilot program.

3 **SEC. 10372. REVIEWS.**

4           The Director shall periodically carry out reviews with-  
5 in each of the directorates and divisions to assess the cost  
6 and benefits of extending the operations of research facili-  
7 ties that have exceeded their planned operational lifespan.

8 **SEC. 10373. HELIUM CONSERVATION.**

9           (a) MAJOR RESEARCH INSTRUMENTATION SUP-  
10 PORT.—

11           (1) IN GENERAL.—The Director shall support,  
12 through the Major Research Instrumentation pro-  
13 gram, proposal requests that include the purchase,  
14 installation, operation, and maintenance of equip-  
15 ment and instrumentation to reduce consumption of  
16 helium.

17           (2) COST SHARING.—The Director may waive  
18 the cost-sharing requirement for helium conservation  
19 measures for non-Ph.D.-granting institutions of  
20 higher education and Ph.D.-granting institutions of  
21 higher education that are not ranked among the top  
22 100 institutions receiving Federal research and de-  
23 velopment funding, as documented by the National  
24 Center for Science and Engineering Statistics.

1 (b) ANNUAL REPORT.—No later than 1 year after  
2 the date of enactment of this Act and annually for the  
3 subsequent two years, the Director shall submit an annual  
4 report to Congress on the use of funding awarded by the  
5 Foundation for the purchase and conservation of helium.

6 The report should include—

7 (1) the volume and price of helium purchased;

8 (2) changes in pricing and availability of he-  
9 lium; and

10 (3) any supply disruptions impacting a substan-  
11 tial number of institutions.

12 **SEC. 10374. ADVANCED COMPUTING.**

13 (a) COMPUTING NEEDS.—To gather information  
14 about the computational needs of Foundation-funded  
15 projects, the Director shall require award proposals sub-  
16 mitted to the Foundation, as appropriate, to include esti-  
17 mates of computational resource needs for projects that  
18 require use of advanced computing. The Director shall en-  
19 courage and provide access to tools that facilitate the in-  
20 clusion of these measures, including those identified in the  
21 2016 National Academies report entitled “Future Direc-  
22 tions for NSF Advanced Computing Infrastructure to  
23 Support U.S. Science and Engineering in 2017–2020”.

24 (b) REPORTS.—The Director shall document and  
25 publish every two years a summary of the amount and

1 types of advanced computing capabilities that are needed  
2 to fully meet the Foundation's project needs as identified  
3 under subsection (a).

4 (c) ROADMAP.—To set priorities and guide strategic  
5 decisions regarding investments in advanced computing  
6 capabilities, the Director shall develop, publish, and regu-  
7 larly update a 5-year advanced computing roadmap that—

8 (1) describes the advanced computing resources  
9 and capabilities that would fully meet anticipated  
10 project needs, including through investments in the  
11 Mid-Scale Research Infrastructure program and the  
12 Major Research Equipment and Facilities Construc-  
13 tion account;

14 (2) draws on community input, information  
15 contained in research proposals, allocation requests,  
16 insights from Foundation-funded cyber-infrastruc-  
17 ture operators, and Foundation-wide information  
18 gathering regarding community needs;

19 (3) considers computational needs of planned  
20 major facilities;

21 (4) reflects anticipated technology trends;

22 (5) informs users and potential partners about  
23 future facilities and services;

24 (6) addresses the needs of groups historically  
25 underrepresented in STEM and geographic regions



1 with low availability and high demand for advanced  
2 computing resources;

3 (7) considers how Foundation-supported ad-  
4 vanced computing capabilities can be leveraged for  
5 activities through the Directorate for Technology,  
6 Innovation, and Partnerships; and

7 (8) provides an update to Congress about the  
8 level of funding necessary to fully meet computa-  
9 tional resource needs for the research community.

10 (d) SECURING AMERICAN RESEARCH FROM CYBER  
11 THEFT.—

12 (1) NETWORKING AND INFORMATION TECH-  
13 NOLOGY RESEARCH AND DEVELOPMENT UPDATE.—  
14 Section 101(a)(1) of the High-Performance Com-  
15 puting Act of 1991 (15 U.S.C. 5511) is amended—

16 (A) by moving the margins of subpara-  
17 graph (D) and each of subparagraphs (J)  
18 through (O) two ems to the left;

19 (B) by redesignating subparagraphs (J)  
20 through (O) as subparagraphs (K) through (P),  
21 respectively; and

22 (C) by inserting after subparagraph (I) the  
23 following:

24 “(J) provide for improving the security, re-  
25 liability, and resiliency of computing and net-

1 working systems used by institutions of higher  
2 education and other nonprofit research institu-  
3 tions for the processing, storage and trans-  
4 mission of sensitive federally funded research  
5 and associated data;”.

6 (2) COMPUTING ENCLAVE PILOT PROGRAM.—

7 (A) IN GENERAL.—The Director, in con-  
8 sultation with the Director of the National In-  
9 stitute of Standards and Technology and the  
10 Secretary of Energy, and the heads of other rel-  
11 evant Federal departments and agencies, shall  
12 establish a pilot program to make awards to en-  
13 sure the security of federally supported research  
14 data and to assist regional institutions of high-  
15 er education and their researchers in compli-  
16 ance with regulations regarding the safe-  
17 guarding of sensitive information and other rel-  
18 evant regulations and Federal guidelines.

19 (B) STRUCTURE.—In carrying out the  
20 pilot program established pursuant to subpara-  
21 graph (A), the Director shall select, for the de-  
22 velopment, installation, maintenance, or  
23 sustainment of secure computing enclaves, three  
24 institutions of higher education that have an es-  
25 tablished graduate student program and a dem-

1           onstrated history of working with secure infor-  
2           mation, consistent with appropriate security  
3           protocols.

4           (C) REGIONALIZATION.—

5           (i) IN GENERAL.—In selecting univer-  
6           sities pursuant to subparagraph (B), the  
7           Director shall give preference to institu-  
8           tions of higher education with the capa-  
9           bility of serving other regional universities.

10          (ii) GEOGRAPHIC DISPERSAL.—The  
11          enclaves should be geographically dispersed  
12          to better meet the needs of regional inter-  
13          ests.

14          (D) PROGRAM ELEMENTS.—The Director  
15          shall work with institutions of higher education  
16          selected pursuant to subparagraph (B) to—

17           (i) develop an approved design blue-  
18           print for compliance with Federal data  
19           protection protocols;

20           (ii) develop a comprehensive and con-  
21           fidential list, or a bill of materials, of each  
22           binary component of the software,  
23           firmware, or product that is required to  
24           deploy additional secure computing en-  
25           claves;

1 (iii) develop templates for all policies  
2 and procedures required to operate the se-  
3 cure computing enclave in a research set-  
4 ting;

5 (iv) develop a system security plan  
6 template; and

7 (v) develop a process for managing a  
8 plan of action and milestones for the se-  
9 cure computing enclave.

10 (E) SUSTAINABILITY.—In reviewing appli-  
11 cations for awards, the Director shall review  
12 and consider plans and prospects of the appli-  
13 cant institution of higher education to ensure  
14 long-term sustainability of the computing en-  
15clave, beyond the availability of Federal funds.

16 (F) DURATION.—Subject to other avail-  
17 ability of appropriations, the pilot program es-  
18 tablished pursuant to subparagraph (A) shall  
19 operate for not less than 3 years.

20 (G) REPORT.—

21 (i) IN GENERAL.—The Director shall  
22 report to Congress not later than 6 months  
23 after the completion of the pilot program  
24 under subparagraph (A).

1 (ii) CONTENTS.—The report required  
2 under clause (i) shall include—

3 (I) an assessment of the pilot  
4 program under subparagraph (A), in-  
5 cluding an assessment of the security  
6 benefits provided by such secure com-  
7 puting enclaves;

8 (II) recommendations related to  
9 the value of expanding the network of  
10 secure computing enclaves; and

11 (III) recommendations on the ef-  
12 ficacy of the use of secure computing  
13 enclaves by other Federal agencies in  
14 a broader effort to expand security of  
15 Federal research.

16 (H) AUTHORIZATION OF APPROPRIA-  
17 TIONS.—There is authorized to be appropriated  
18 to the Director, \$38,000,000 for fiscal years  
19 2023 through 2025, to carry out the activities  
20 outlined in this paragraph.

21 **SEC. 10375. NATIONAL SECURE DATA SERVICE.**

22 (a) IN GENERAL.—The Director, in consultation with  
23 the Director of the Office of Management and Budget and  
24 the interagency committee established under section 5103  
25 of the National Artificial Intelligence Initiative Act of

1 2020 (15 U.S.C. 9415), shall establish a demonstration  
2 project to develop, refine, and test models to inform the  
3 full implementation of the Commission on Evidence-Based  
4 Policymaking recommendation for a governmentwide data  
5 linkage and access infrastructure for statistical activities  
6 conducted for statistical purposes, as defined in chapter  
7 35 of title 44, United States Code.

8 (b) ESTABLISHMENT.—Not later than one year after  
9 the date of enactment of this Act, the Director shall estab-  
10 lish a National Secure Data Service demonstration  
11 project. The National Secure Data Service demonstration  
12 project shall be—

13 (1) aligned with the principles, best practices,  
14 and priority actions recommended by the Advisory  
15 Committee on Data for Evidence Building, to the ex-  
16 tent feasible; and

17 (2) operated directly by or via a contract that  
18 is managed by the National Center for Science and  
19 Engineering Statistics.

20 (c) DATA.—In carrying out this section, the Director  
21 shall engage with Federal and State agencies to collect,  
22 acquire, analyze, report, and disseminate statistical data  
23 in the United States and other nations to support govern-  
24 mentwide evidence-building activities consistent with the

1 Foundations for Evidence-Based Policymaking Act of  
2 2018.

3 (d) VOLUNTARY PARTICIPATION.—Participation in  
4 the National Secure Data Service demonstration project  
5 by Federal and State agencies shall be voluntary.

6 (e) PRIVACY AND CONFIDENTIALITY PROTEC-  
7 TIONS.—If the Director issues a management contract  
8 under subsection (b), the recipient shall be designated as  
9 an “agent” under subchapter III of chapter 35 of title  
10 44, United States Code, with all requirements and obliga-  
11 tions for protecting confidential information delineated in  
12 the Confidential Information Protection and Statistical  
13 Efficiency Act of 2018 and the Privacy Act of 1974.

14 (f) TECHNOLOGY AND PRIVACY STANDARDS.—In  
15 carrying out this subsection, the Director shall—

16 (1) consider application and use only of systems  
17 and technologies that incorporate protection meas-  
18 ures to reasonably ensure confidential data and sta-  
19 tistical products are protected in accordance with ob-  
20 ligations under subchapter III of chapter 35 of title  
21 44, United States Code, including systems and tech-  
22 nologies that ensure—

23 (A) raw data and other sensitive inputs are  
24 not accessible to recipients of statistical outputs

1 from the National Secure Data Service dem-  
2 onstration project;

3 (B) no individual entity's data or informa-  
4 tion is revealed by the National Secure Data  
5 Service demonstration project platform to any  
6 other party in an identifiable form;

7 (C) no information about the data assets  
8 used in the National Secure Data Service dem-  
9 onstration project is revealed to any other  
10 party, except as incorporated into the final sta-  
11 tistical output;

12 (D) the National Secure Data Service  
13 demonstration project permits only authorized  
14 analysts to perform statistical queries necessary  
15 to answer approved project questions, and pro-  
16 hibits any other queries; and

17 (E) the National Secure Data Service dem-  
18 onstration project conducts privacy risk assess-  
19 ments to minimize the privacy risks to indi-  
20 vidual entities whose data has been made avail-  
21 able by a reporting entity, including those pri-  
22 vacy risks that could result from data breaches  
23 of any system operated by the reporting entity,  
24 as well as for determining approved project  
25 questions under subparagraph (D) to minimize



1           the privacy risks to individuals affected by uses  
2           of the statistical output; and

3           (2) the National Secure Data Service dem-  
4           onstration project shall implement reasonable meas-  
5           ures commensurate with the risks to individuals' pri-  
6           vacy to achieve the outcomes under subparagraphs  
7           (A) through (E) of paragraph (1), which may in-  
8           clude the appropriate application of privacy-enhanc-  
9           ing technologies and appropriate measures to mini-  
10          mize or prevent reidentification risks consistent with  
11          any applicable guidance or regulations issued under  
12          subchapter III of chapter 35 of title 44, United  
13          States Code.

14          (g) **TRANSPARENCY.**—The National Secure Data  
15          Service established under subsection (b) shall maintain a  
16          public website with up-to-date information on supported  
17          projects.

18          (h) **REPORT.**—Not later than 2 years after the date  
19          of enactment of this Act, the National Secure Data Serv-  
20          ice demonstration project established under subsection (b)  
21          shall submit a report to Congress that includes—

22                  (1) a description of policies for protecting data,  
23                  consistent with applicable Federal law;

24                  (2) a comprehensive description of all completed  
25                  or active data linkage activities and projects;

1           (3) an assessment of the effectiveness of the  
2 demonstration project for mitigating risks and re-  
3 moving barriers to a sustained implementation of  
4 the National Secure Data Service as recommended  
5 by the Commission on Evidence-Based Policy-  
6 making; and

7           (4) if deemed effective by the Director, a plan  
8 for scaling up the demonstration project to facilitate  
9 data access for evidence building while ensuring  
10 transparency and privacy.

11       (i) AUTHORIZATION OF APPROPRIATIONS.—There  
12 are authorized to be appropriated to the Director to carry  
13 out this subsection \$9,000,000 for each of fiscal years  
14 2023 through 2027.

15 **Subtitle G—Directorate for Tech-**  
16 **nology, Innovation, and Part-**  
17 **nerships**

18 **SEC. 10381. ESTABLISHMENT.**

19       There is established within the Foundation the Direc-  
20 torate for Technology, Innovation, and Partnerships to ad-  
21 vance research and development, technology development,  
22 and related solutions to address United States societal, na-  
23 tional, and geostrategic challenges, for the benefit of all  
24 Americans.

1 **SEC. 10382. PURPOSES.**

2 The purposes of the Directorate established under  
3 section 10381 are to—

4 (1) support use-inspired and translational re-  
5 search and accelerate the development and use of  
6 federally funded research;

7 (2) strengthen United States competitiveness by  
8 accelerating the development of key technologies;  
9 and

10 (3) grow the domestic workforce in key tech-  
11 nology focus areas, and expand the participation of  
12 United States students and researchers in areas of  
13 societal, national, and geostrategic importance, at all  
14 levels of education.

15 **SEC. 10383. ACTIVITIES.**

16 Subject to the availability of appropriated funds, the  
17 Director shall achieve the purposes described in section  
18 10382 by making awards through the Directorate that—

19 (1) support transformational advances in use-  
20 inspired and translational research and technology  
21 development, including through diverse funding  
22 mechanisms and models at different scales, to in-  
23 clude convergence accelerators and projects designed  
24 to achieve specific technology metrics or objectives;

25 (2) encourage the translation of research into  
26 innovations, processes, and products, including by—

1 (A) engaging researchers on topics relevant  
2 to United States societal, national, and  
3 geostrategic challenges, including by educating  
4 researchers on engaging with end users and the  
5 public;

6 (B) advancing novel approaches and reduc-  
7 ing barriers to technology transfer, including  
8 through intellectual property frameworks be-  
9 tween academia and industry, nonprofit enti-  
10 ties, venture capital communities, and ap-  
11 proaches to technology transfer for applications  
12 with public benefit that may not rely on tradi-  
13 tional commercialization tools; and

14 (C) establishing partnerships that connect  
15 researchers and research products to busi-  
16 nesses, accelerators, and incubators that enable  
17 research uptake, prototype development and  
18 scaling, entrepreneurial education, and the for-  
19 mation and growth of new companies;

20 (3) develop mutually-beneficial research and  
21 technology development partnerships and collabora-  
22 tions among institutions of higher education, includ-  
23 ing historically Black colleges and universities, Trib-  
24 al Colleges or Universities, minority-serving institu-  
25 tions, emerging research institutions, EPSCoR insti-

1        tutions, and nonprofit organizations, labor organiza-  
2        tions, businesses and other for-profit entities, Fed-  
3        eral or State agencies, local or Tribal governments,  
4        civil society organizations, other Foundation direc-  
5        torates, national labs, field stations and marine lab-  
6        oratories, and, as appropriate, international entities  
7        and binational research and development founda-  
8        tions and funds, excluding foreign entities of con-  
9        cern;

10            (4) partner with other directorates and offices  
11        of the Foundation for specific projects or research  
12        areas including—

13            (A) to pursue basic questions about nat-  
14        ural, human, and physical phenomena that  
15        could enable advances in the challenges and key  
16        technology focus areas under section 10387;

17            (B) to study questions that could affect  
18        the design (including human interfaces), safety,  
19        security, operation, deployment, or the social  
20        and ethical consequences of technologies and in-  
21        novations in the challenges and key technology  
22        focus areas under section 10387, including the  
23        development of technologies and innovations  
24        that complement or enhance the abilities of

1 workers and impact of specific innovations on  
2 domestic jobs and equitable opportunity; and

3 (C) to further the creation of a domestic  
4 workforce capable of advancing, using, and  
5 adapting to the key technology focus areas;

6 (5) build capacity and infrastructure for use-in-  
7 spired and translational research at institutions of  
8 higher education across the United States, including  
9 by making awards to support administrative activi-  
10 ties that advance development, operation, integra-  
11 tion, deployment, and sharing of innovation;

12 (6) support the education, mentoring, and  
13 training of undergraduate students, graduate stu-  
14 dents, and postdoctoral researchers, to both advance  
15 use-inspired and translational research and to ad-  
16 dress workforce challenges, through scholarships, fel-  
17 lowships, and traineeships; and

18 (7) identify social, behavioral, and economic  
19 drivers and consequences of technological innova-  
20 tions that could enable advances in the challenges  
21 and key technology focus areas under section 10387.

22 **SEC. 10384. REQUIREMENTS.**

23 In carrying out the activities under the Directorate,  
24 the Director shall ensure the programmatic work of the  
25 Directorate and Foundation—

1           (1) utilizes the full potential of the United  
2 States workforce by avoiding undue geographic con-  
3 centration of research and development and edu-  
4 cation funding across the United States, and encour-  
5 ages broader participation in the key technology  
6 focus area workforce by populations historically  
7 underrepresented in STEM; and

8           (2) incorporates a worker perspective through  
9 participation by labor organizations and workforce  
10 training organizations.

11 **SEC. 10385. ASSISTANT DIRECTOR.**

12       (a) IN GENERAL.—The Director shall appoint an As-  
13 sistant Director responsible for the management of the Di-  
14 rectorate established under this subtitle, in the same man-  
15 ner as other Assistant Directors of the Foundation are  
16 appointed.

17       (b) QUALIFICATIONS.—The Assistant Director shall  
18 be an individual, who by reason of professional back-  
19 ground and experience, is specially qualified to—

20           (1) advise the Director on all matters per-  
21 taining to use-inspired and translational research,  
22 development, and commercialization at the Founda-  
23 tion, including partnership with the private sector  
24 and other users of Foundation funded research; and

1           (2) develop and implement the necessary poli-  
2           cies and procedures to promote a culture of use-in-  
3           spired and translational research within the Direc-  
4           torate and across the Foundation and carry out the  
5           responsibilities under subsection (c).

6           (c) RESPONSIBILITIES.—The responsibilities of the  
7           Assistant Director shall include—

8           (1) advising the Director on all matters per-  
9           taining to use-inspired and translational research  
10          and development activities at the Foundation, in-  
11          cluding effective practices for convergence research,  
12          and the potential impact of Foundation research on  
13          United States societal, national and geostrategic  
14          challenges;

15          (2) identifying opportunities for and facilitating  
16          coordination and collaboration, where appropriate,  
17          on use-inspired and translational research, develop-  
18          ment, adoption, and commercialization—

19                 (A) among the offices, directorates, and di-  
20                 visions within the Foundation; and

21                 (B) between the Foundation and stake-  
22                 holders in academia, the private sector, includ-  
23                 ing non-profit entities, labor organizations, Fed-  
24                 eral or State agencies, and international enti-  
25                 ties, as appropriate;



1           (3) ensuring that the activities carried out  
2           under this subtitle do not substantially and unneces-  
3           sarily duplicate activities supported by other parts of  
4           the Foundation or other relevant Federal agencies;

5           (4) approving all new programs within the Di-  
6           rectorate;

7           (5) developing and testing diverse merit-review  
8           models and mechanisms for selecting and providing  
9           awards for use-inspired and translational research  
10          and development at different scales, from individual  
11          investigator awards to large multi-institution collabo-  
12          rations;

13          (6) assessing the success of programs;

14          (7) administering awards to achieve the pur-  
15          poses described in section 10382; and

16          (8) performing other such duties pertaining to  
17          the purposes in section 10382 as are required by the  
18          Director.

19          (d) RELATIONSHIP TO THE DIRECTOR.—The Assist-  
20          ant Director shall report to the Director.

21          (e) RELATIONSHIP TO OTHER PROGRAMS.—No other  
22          directorates within the Foundation shall report to the As-  
23          sistant Director.

1 **SEC. 10386. ADVISORY COMMITTEE.**

2 (a) IN GENERAL.—In accordance with the Federal  
3 Advisory Committee Act (5 U.S.C. App.) the Director  
4 shall establish an advisory committee to assess, and make  
5 recommendations regarding, the activities carried out  
6 under this subtitle.

7 (b) MEMBERSHIP.—The advisory committee mem-  
8 bers shall—

9 (1) be individuals with relevant experience or  
10 expertise, including individuals from industry and  
11 national labs, educators, academic subject matter ex-  
12 perts, including individuals with knowledge of key  
13 technology focus areas and their impact on United  
14 States national security and geostrategic leadership,  
15 the technical and social dimensions of science and  
16 technology, technology transfer experts, labor orga-  
17 nizations, representatives of civil society, and other  
18 nongovernmental organizations; and

19 (2) consist of at least 10 members broadly rep-  
20 resentative of stakeholders, including no less than 3  
21 members from the private sector, none of whom  
22 shall be an employee of the Federal Government,  
23 and no less than 1 member with significant expertise  
24 in United States national security and economic  
25 competitiveness.

1 (c) RESPONSIBILITIES.—The Committee’s respon-  
2 sibilities shall include—

3 (1) reviewing and advising on activities carried  
4 out under this subtitle;

5 (2) proposing strategies for fulfilling the pur-  
6 poses in section 10382;

7 (3) proposing potential areas of research, par-  
8 ticularly as relevant to United States societal, na-  
9 tional, and geostrategic challenges; and

10 (4) other relevant issues as determined by the  
11 Director.

12 **SEC. 10387. CHALLENGES AND FOCUS AREAS.**

13 (a) IN GENERAL.—In consultation with the Assistant  
14 Director, the Board, and the interagency working group  
15 established under subtitle F of title VI, the Director shall  
16 identify, and annually review and update as appropriate,  
17 a list of—

18 (1) not more than 5 United States societal, na-  
19 tional, and geostrategic challenges that may be ad-  
20 dressed by technology to guide activities under this  
21 subtitle; and

22 (2) not more than 10 key technology focus  
23 areas to guide activities under this subtitle.

1 (b) INITIAL LIST OF SOCIETAL, NATIONAL, AND  
2 GEOSTRATEGIC CHALLENGES.—The initial list of societal,  
3 national, and geostrategic challenges are the following:

4 (1) United States national security.

5 (2) United States manufacturing and industrial  
6 productivity.

7 (3) United States workforce development and  
8 skills gaps.

9 (4) Climate change and environmental sustain-  
10 ability.

11 (5) Inequitable access to education, oppor-  
12 tunity, or other services.

13 (c) INITIAL LIST OF KEY TECHNOLOGY FOCUS  
14 AREAS.—The initial list of key technology focus areas are  
15 the following:

16 (1) Artificial intelligence, machine learning, au-  
17 tonomy, and related advances.

18 (2) High performance computing, semiconduc-  
19 tors, and advanced computer hardware and software.

20 (3) Quantum information science and tech-  
21 nology.

22 (4) Robotics, automation, and advanced manu-  
23 facturing.

24 (5) Natural and anthropogenic disaster preven-  
25 tion or mitigation.

1           (6) Advanced communications technology and  
2           immersive technology.

3           (7) Biotechnology, medical technology,  
4           genomics, and synthetic biology.

5           (8) Data storage, data management, distributed  
6           ledger technologies, and cybersecurity, including bio-  
7           metrics.

8           (9) Advanced energy and industrial efficiency  
9           technologies, such as batteries and advanced nuclear  
10          technologies, including but not limited to for the  
11          purposes of electric generation (consistent with sec-  
12          tion 15 of the National Science Foundation Act of  
13          1950 (42 U.S.C. 1874).

14          (10) Advanced materials science, including com-  
15          posites 2D materials, other next-generation mate-  
16          rials, and related manufacturing technologies.

17          (d) RELATIONSHIP BETWEEN UNITED STATES SOCI-  
18          ETAL, NATIONAL, AND GEOSTRATEGIC CHALLENGES AND  
19          KEY TECHNOLOGY FOCUS AREAS.—

20               (1) In updating the list under subsection (a)(1),  
21               the Director shall evaluate national and global tech-  
22               nology trends.

23               (2) In updating the list under subsection (a)(2),  
24               the Director shall consider the impact of the selected

1 technologies on United States societal, national, and  
2 geostrategic challenges.

3 (3) The list under subsection (a)(2) may, but is  
4 not required to, align directly with the list under  
5 subsection (a)(1).

6 (4) Nothing under this section shall prevent the  
7 Director from making limited investments in tech-  
8 nologies or areas not identified in subsection (a)(1)  
9 or subsection (a)(2).

10 (e) REVIEW AND UPDATES.—The Director, in coordi-  
11 nation with the interagency working group established  
12 under subtitle F of title VI and in consultation with the  
13 Director of National Intelligence and the Director of the  
14 Federal Bureau of Investigation, shall annually review and  
15 update as appropriate, the list of key technology focus  
16 areas for purposes of this division. As part of the annual  
17 review, the Director—

18 (1) shall consider input from relevant industries  
19 and stakeholders;

20 (2) may consider the challenges and rec-  
21 ommendations identified in the reports required by  
22 sections 206 and 206B of the National Science and  
23 Technology Policy, Organization, and Priorities Act  
24 of 1976, as added by section 10611 and 10613 of  
25 this division and in other relevant reports, such as

1 technology and global trend reports from the defense  
2 and intelligence communities;

3 (3) shall consider the potential impact of the  
4 key technology focus areas on addressing societal,  
5 national, and geostrategic challenges; and

6 (4) subject to the limitation under subsection  
7 (a), may add or delete key technology focus areas in  
8 light of shifting national needs or competitive  
9 threats to the United States (including for reasons  
10 of the United States or other countries having ad-  
11 vanced or fallen behind in a technological area).

12 (f) REPORTING.—At the conclusion of the annual re-  
13 view and update process required by subsection (e), the  
14 Director, in consultation with other Federal research  
15 agencies, as appropriate, shall deliver a report to Congress  
16 detailing—

17 (1) the key technology focus areas and rationale  
18 for their selection;

19 (2) the societal, national, and geostrategic chal-  
20 lenges and rationale for their selection;

21 (3) the role of the Foundation in advancing the  
22 key technology focus areas;

23 (4) the impact, including to the academic re-  
24 search community, of any changes to the key tech-  
25 nology focus areas; and

1           (5) the activities and partnerships between the  
2           Directorate and the private sector.

3           (g) DETAILED DESCRIPTION.—The National Science  
4           Foundation shall, in coordination with the Office of Man-  
5           agement and Budget, submit as part of their annual budg-  
6           et requests to Congress, a detailed description of the ac-  
7           tivities to be funded under this subtitle, including an ex-  
8           planation of how the requested funding is complementary  
9           and not redundant of programs, efforts, and infrastruc-  
10          ture undertaken or supported by other relevant Federal  
11          agencies.

12          (h) NATIONAL ACADEMIES.—Not later than 5 years  
13          after the date of enactment of this Act, the Director shall  
14          contract with the National Academies to conduct a review  
15          of the key technology focus areas and the societal, na-  
16          tional, and geostrategic challenges, including—

17                 (1) an assessment of their selection process;

18                 (2) an assessment of their relevance to the pur-  
19                 poses of the Directorate, including to solving chal-  
20                 lenges with social, economic, health, scientific, and  
21                 national security implications;

22                 (3) a review of whether Federal investment in  
23                 the key technology focus areas have resulted in new  
24                 domestic manufacturing capacity and job creation;



1 (4) an assessment of any critical, new emerging  
2 areas;

3 (5) an assessment of Federal investments in  
4 education and workforce development to support the  
5 key technology focus areas; and

6 (6) an assessment of relative balance in leader-  
7 ship in addressing the key technology focus areas be-  
8 tween the United States, allied and partner coun-  
9 tries, and the People's Republic of China.

10 **SEC. 10388. REGIONAL INNOVATION ENGINES.**

11 (a) IN GENERAL.—From amounts made available to  
12 the Directorate, the Director shall make awards to eligible  
13 entities for the planning, establishment, and support of  
14 Regional Innovation Engines.

15 (b) PURPOSE.—The purpose of the Regional Innova-  
16 tion Engines shall be to—

17 (1) advance multidisciplinary, collaborative, use-  
18 inspired and translational research, technology devel-  
19 opment, in key technology focus areas;

20 (2) address regional, national, societal, or  
21 geostrategic challenges;

22 (3) leverage the expertise of multi-disciplinary  
23 and multi- sector partners, including partners from  
24 private industry, nonprofit organizations, and civil  
25 society organizations; and

1           (4) support the development of scientific, inno-  
2           vation, entrepreneurial, and STEM educational ca-  
3           pacity within the region of the Regional Innovation  
4           Engine to grow and sustain regional innovation.

5           (c) USES OF FUNDS.—Funds awarded under this  
6           section may be used by a Regional Innovation Engine to—

7           (1) conduct use-inspired and translational re-  
8           search and technology development to advance inno-  
9           vation in at least one of the key technology focus  
10          areas and to help solve a compelling regional, na-  
11          tional, societal, or geostrategic challenge;

12          (2) further the development, adoption, and com-  
13          mercialization of innovations in key technology focus  
14          areas, including through support for proof-of-concept  
15          development, and through partnership with other  
16          Federal agencies and Federal laboratories, industry,  
17          including startup companies, labor organizations,  
18          civil society organizations, and State, territorial,  
19          local, and Tribal governments;

20          (3) develop and manage, or facilitate access to,  
21          test beds and instrumentation, which may include  
22          fabrication facilities and cyberinfrastructure, to ad-  
23          vance the development, integration, and demonstra-  
24          tion of new, innovative technologies, including hard-  
25          ware or software;

1           (4) establish traineeship programs for graduate  
2 students who pursue degrees and research related to  
3 the key technology focus areas leading to a masters  
4 or doctorate degree by providing funding and other  
5 assistance, and opportunities for research experi-  
6 ences in government or industry related to the stu-  
7 dents' studies;

8           (5) engage in outreach and engagement in the  
9 region to broaden participation in the activities of  
10 the Regional Innovation Engine; and

11           (6) reimburse, in part or in whole, the cost of  
12 instrumentation, technology transfer, and commer-  
13 cialization activities, including patenting and licens-  
14 ing, and for operations and staff, as the Director de-  
15 termines appropriate.

16       (d) **SELECTION PROCESS.**—In making awards under  
17 this subtitle, the Director shall consider, in addition to the  
18 scientific and technical merit of the proposal, the extent  
19 to which the activities and locations proposed—

20           (1) have the potential to create an innovation  
21 ecosystem, or enhance existing ecosystems and con-  
22 tribute to job creation in a region;

23           (2) demonstrate a capacity to engage and part-  
24 ner with multiple types of institutions of higher edu-  
25 cation, industry, labor, nonprofit organizations, civil

1 society organizations, other Federal agencies, Fed-  
2 eral laboratories, State, local, and Tribal govern-  
3 ments, and other appropriate organizations, includ-  
4 ing to inform research directions and account for  
5 ethical, societal, safety, and security implications rel-  
6 evant to the potential applications of the research;

7 (3) demonstrate a capacity to broaden partici-  
8 pation of populations historically underrepresented  
9 in STEM in the activities of the Regional Innovation  
10 Engine; and

11 (4) demonstrate a plan and capability to pre-  
12 vent the inappropriate use or dissemination of the  
13 research and technology, including research results,  
14 data, and intellectual property, as appropriate and  
15 consistent with the requirements of the relevant  
16 award.

17 (e) REQUIREMENTS.—

18 (1) ELIGIBILITY.—For the purposes of this sec-  
19 tion, an “eligible entity” means an institution of  
20 higher education, a nonprofit organization, a private  
21 sector entity, or a consortium thereof.

22 (2) PARTNERSHIPS.—To be eligible for an  
23 award under this section an eligible entity—

24 (A) shall include in its proposal partner-  
25 ship with 1 or more institution that is—

1 (i) a historically Black college or uni-  
2 versity;

3 (ii) a Tribal College or University;

4 (iii) a minority-serving institution;

5 (iv) an EPSCoR institution;

6 (v) an emerging research institution;

7 or

8 (vi) a community college;

9 (B) may include partnership with 1 or  
10 more—

11 (i) additional entities described in  
12 paragraph (2)(A);

13 (ii) industry entities, including  
14 startups, small businesses, and public-pri-  
15 vate partnerships;

16 (iii) economic development organiza-  
17 tions or venture development organiza-  
18 tions, as such terms are defined in section  
19 28(a) of the Stevenson-Wydler Technology  
20 Innovation Act of 1980 (15 U.S.C. 13701  
21 et seq.), as added by section 10621 of this  
22 division;

23 (iv) National Laboratories;

24 (v) Federal laboratories, as defined in  
25 section 4 of the Stevenson-Wydler Tech-

1 nology Innovation Act of 1980 (15 U.S.C.  
2 3703);

3 (vi) Federal research facilities;

4 (vii) labor organizations;

5 (viii) entities described in paragraph  
6 (1) or (2) from allied or partner countries;

7 (ix) other entities to be vital to the  
8 success of the program, as determined by  
9 the Director;

10 (x) binational research and develop-  
11 ment foundations and funds, excluding  
12 those affiliated with foreign entities of con-  
13 cern, as defined in section 10612; and

14 (xi) Engineer Research and Develop-  
15 ment Center laboratories of the Army  
16 Corps of Engineers; and

17 (C) shall include as part of its proposal a  
18 plan for—

19 (i) establishing a sustained partner-  
20 ship that is jointly developed and managed,  
21 draws from the capacities of each institu-  
22 tion, and is mutually beneficial; and

23 (ii) documents governance and man-  
24 agement plans, financial contributions  
25 from non-Federal sources, and plans for

1 ownership and use of any intellectual prop-  
2 erty.

3 (3) PROMOTING PARTNERSHIPS.—In making  
4 awards under this section, the Director shall encour-  
5 age applicants for a Regional Innovation Engine  
6 that include multiple regional partners as described  
7 in subsection (e)(2).

8 (4) GEOGRAPHIC DISTRIBUTION.—In making  
9 awards under this section, the Director shall take  
10 into consideration the extent to which the proposals  
11 expand the geographic distribution of the Regional  
12 Innovation Engines, including by giving special con-  
13 sideration to rural-serving institutions of higher edu-  
14 cation.

15 (5) RESOURCE AVAILABILITY.—The Director  
16 shall ensure that any eligible entity receiving an  
17 award under this section shall—

18 (A) provide information on relevant cur-  
19 rently existing resources available to the pro-  
20 posing team from all internal and external  
21 sources, including all partner organizations; and

22 (B) include letters of collaboration from  
23 partner organizations that include information  
24 on resource contributions committed by such  
25 partners.

1 (f) COLLABORATION WITH REGIONAL TECHNOLOGY  
2 HUBS.—Each Regional Innovation Engine established  
3 under this section may collaborate and participate in, as  
4 appropriate, the activities of any regional technology hub  
5 designated under section 28 of the Stevenson-Wydler  
6 Technology Innovation Act of 1980 (15 U.S.C. 3701 et  
7 seq.), as added by section 10621.

8 (g) DURATION.—

9 (1) INITIAL PERIOD.—An award under this sec-  
10 tion shall be for an initial period of 5 years.

11 (2) RENEWAL.—An established Regional Inno-  
12 vation Engine may apply for, and the Director may  
13 award, extended funding for periods of 5 years on  
14 a merit-reviewed basis.

15 (h) COMPETITIVE, MERIT-REVIEW.—In making  
16 awards under this section, the Director shall—

17 (1) use a competitive, merit review process that  
18 includes peer review by a diverse group of individ-  
19 uals with relevant expertise from both the private  
20 and public sectors; and

21 (2) ensure the focus areas of the Regional Inno-  
22 vation Engines do not substantially and unneces-  
23 sarily duplicate the efforts of any other Regional In-  
24 novation Engine or any other similar effort at an-  
25 other Federal agency.



1 (i) COLLABORATION.—In making awards under this  
2 section, the Director may collaborate with Federal depart-  
3 ments and agencies whose missions contribute to or are  
4 affected by the technology focus area of the institute.

5 **SEC. 10389. TRANSLATION ACCELERATOR.**

6 (a) IN GENERAL.—The Director shall establish  
7 Translation Accelerators to further the research, develop-  
8 ment, and commercialization of innovation in the key tech-  
9 nology focus areas.

10 (b) PARTNERSHIPS.—

11 (1) IN GENERAL.—Each Translation Accel-  
12 erator shall be comprised of a partnership including  
13 2 or more of the following entities:

14 (A) An institution of higher education.

15 (B) A for-profit company.

16 (C) A nonprofit organization.

17 (D) A Federal agency.

18 (E) Another entity, if that entity is deter-  
19 mined by the Director to be vital to the success  
20 of the program.

21 (2) INSTITUTIONAL OR ORGANIZATIONAL  
22 LEVEL.—The Director shall work to ensure that  
23 such partnerships exist at the institutional or orga-  
24 nization level, rather than solely at the principal in-  
25 vestigator level.

1           (3) COST SHARE.—Not less than 25 percent of  
2           the funding for an institute shall be provided by  
3           non-Federal entities.

4           (4) NUMBER OF CENTERS AND INSTITUTES ES-  
5           TABLISHED.—The Director shall endeavor to estab-  
6           lish a balance in the number of Regional Innovation  
7           Engines and Translation Accelerators.

8           (c) AUTHORIZATION OF APPROPRIATIONS.—From  
9           within funds authorized for the Directorate for Tech-  
10          nology, Innovation, and Partnerships, there are authorized  
11          to carry out the activities under this section and section  
12          10388 \$6,500,000,000 for fiscal years 2023 through  
13          2027.

14       **SEC. 10390. TEST BEDS.**

15          (a) PROGRAM AUTHORIZED.—

16               (1) IN GENERAL.—From amounts made avail-  
17               able for the Directorate, the Director, in coordina-  
18               tion with the Director of the National Institute of  
19               Standards and Technology, the Secretary of Energy,  
20               and other Federal agencies, as determined appro-  
21               priate by the Director, shall establish a program in  
22               the Directorate to make awards, on a competitive  
23               basis, to institutions of higher education, nonprofit  
24               organizations, or consortia thereof to establish and  
25               operate test beds, which may include fabrication fa-

1 facilities and cyberinfrastructure, to advance the devel-  
2 opment, operation, integration, deployment, and, as  
3 appropriate, demonstration of new, innovative crit-  
4 ical technologies, which may include hardware or  
5 software.

6 (2) COORDINATION.—In establishing new test  
7 beds under this section, the Director shall ensure co-  
8 ordination with other test beds supported by the  
9 Foundation or other Federal agencies to avoid dupli-  
10 cation and maximize the use of Federal resources.

11 (b) PROPOSALS.—An applicant for an award under  
12 this section shall submit a proposal to the Director, at  
13 such time, in such manner, and containing such informa-  
14 tion as the Director may reasonably require. The proposal  
15 shall, at a minimum, describe—

16 (1) the technology or technologies that will be  
17 the focus of the test bed;

18 (2) the goals of the work to be done at the test  
19 bed;

20 (3) how the applicant will assemble a workforce  
21 with the skills needed to operate the test bed;

22 (4) how the applicant will ensure broad access  
23 to the test bed;

24 (5) how the applicant will collaborate with firms  
25 in critical technologies, including through coordi-

1 nated research and development and funding, to en-  
2 sure that work in the test bed will contribute to the  
3 commercial viability of any technologies and will in-  
4 clude collaboration from industry and labor organi-  
5 zations;

6 (6) how the applicant will encourage the partici-  
7 pation of inventors and entrepreneurs and the devel-  
8 opment of new businesses;

9 (7) how the applicant will increase participation  
10 by populations that are underrepresented in STEM;

11 (8) how the applicant will demonstrate that the  
12 commercial viability of any new technologies will  
13 support the creation of high-quality domestic jobs;

14 (9) how the test bed will operate after Federal  
15 funding has ended;

16 (10) how the test bed will disseminate lessons  
17 and other technical information to United States en-  
18 tities or allied or partner country entities in the  
19 United States; and

20 (11) how the applicant plans to take measures  
21 to prevent the inappropriate use of research results,  
22 data, and intellectual property, as applicable and  
23 consistent with the requirements of the award.

24 (c) AUTHORIZED USE OF FUNDS.—A recipient of an  
25 award under this section may, consistent with the pur-

1 poses of this section, use the award for the purchase of  
2 equipment and for the support of students, faculty and  
3 staff, and postdoctoral researchers.

4 (d) GEOGRAPHIC DIVERSITY.—In selecting award re-  
5 cipients under this section, the Director shall consider the  
6 extent to which proposals would expand the geographic di-  
7 versity of test beds.

8 **SEC. 10391. PLANNING AND CAPACITY BUILDING AWARDS.**

9 (a) IN GENERAL.—Under the program established in  
10 section 508 of the America COMPETES Reauthorization  
11 Act of 2010 (42 U.S.C. 1862p–2) and the activities au-  
12 thorized under this section, from amounts made available  
13 to the Directorate, the Director, in coordination with other  
14 Federal agencies as determined appropriate by the Direc-  
15 tor, shall make awards, on a competitive basis, to eligible  
16 entities to advance the development, adoption, and com-  
17 mercialization of technologies, consistent with the pur-  
18 poses of the Directorate under section 10382.

19 (b) ELIGIBLE ENTITY.—To be eligible to receive an  
20 award under this section, an entity shall be—

21 (1) an institution of higher education, which  
22 may be a community college (or a consortium of  
23 such institutions);

24 (2) a nonprofit organization that is either affili-  
25 ated with an institution of higher education or de-

1 signed to support technology development or entre-  
2 preneurship; or

3 (3) a consortium that includes—

4 (A) an entity described in paragraph (1) or  
5 (2) as the lead award recipient; and

6 (B) one or more additional individuals or  
7 entities, which shall be—

8 (i) an economic development organiza-  
9 tion or similar entity that is focused pri-  
10 marily on improving science, technology,  
11 innovation, or entrepreneurship;

12 (ii) an industry organization or firm  
13 in a relevant technology or innovation sec-  
14 tor;

15 (iii) an industry-experienced executive  
16 with entrepreneurship experience that is  
17 focused primarily on de-risking tech-  
18 nologies from both a scientific and a busi-  
19 ness perspective; or

20 (iv) an individual or entity with indus-  
21 try and startup expertise, including a men-  
22 tor network, across relevant technology or  
23 innovation sectors.

1           (c) USE OF FUNDS.—In addition to activities listed  
2 under section 10383, an eligible entity receiving an award  
3 under this section may use funds to—

4           (1) identify academic research with the poten-  
5 tial for technology transfer and commercialization,  
6 particularly as relevant to the purposes of the Direc-  
7 torate under section 10382;

8           (2) ensure the availability of staff, including  
9 technology transfer professionals, entrepreneurs in  
10 residence, and other mentors as required to accom-  
11 plish the purpose of this section;

12           (3) help offset the costs of patenting and licens-  
13 ing research products, both domestically and inter-  
14 nationally;

15           (4) revise institution policies, including policies  
16 related to intellectual property and faculty entrepre-  
17 neurship, and taking other necessary steps to imple-  
18 ment relevant best practices for academic technology  
19 transfer;

20           (5) develop local, regional, and national part-  
21 nerships among institutions of higher education and  
22 between institutions of higher education and private  
23 sector entities and other relevant organizations, in-  
24 cluding investors, with the purpose of building net-  
25 works, expertise, and other capacity to identify

1 promising research that may have potential market  
2 value and enable researchers to pursue further devel-  
3 opment and transfer of their ideas into possible com-  
4 mercial or other use;

5 (6) develop seminars, courses, and other edu-  
6 cational opportunities for students, post-doctoral re-  
7 searchers, faculty, and other relevant staff at insti-  
8 tutions of higher education to increase awareness  
9 and understanding of entrepreneurship, patenting,  
10 business planning, research security, and other areas  
11 relevant to technology transfer, and connect students  
12 and researchers to relevant resources, including  
13 mentors in the private sector; and

14 (7) create, support, or fund entities or competi-  
15 tions to allow entrepreneurial students and faculty  
16 to illustrate the commercialization potential of their  
17 ideas, including through venture funds of institution  
18 of higher education.

19 (d) LIMITATIONS ON FUNDING.—

20 (1) Awards made under this section shall be at  
21 least 3 years in duration and shall not exceed  
22 \$1,000,000 per fiscal year.

23 (2) Awards made under this section shall not  
24 support the development or operation of capital in-  
25 vestment funds.



1 (e) APPLICATION.—An eligible entity seeking funding  
2 under this section shall submit an application to the Direc-  
3 tor at such time, in such manner, and containing such  
4 information and assurances as such Director may require.  
5 The application shall include, at a minimum, a description  
6 of—

7 (1) how the eligible entity submitting an appli-  
8 cation plans to sustain the proposed activities be-  
9 yond the duration of the award;

10 (2) the steps the applicant will take to enable  
11 technology transfer and adoption and why such steps  
12 are likely to be effective;

13 (3) how the applicant will encourage the train-  
14 ing and participation of students and potential en-  
15 trepreneurs and the transition of research results to  
16 practice, including the development of new busi-  
17 nesses;

18 (4) as relevant, potential steps to drive eco-  
19 nomic growth in a particular region, by collaborating  
20 with industry, venture capital entities, non-profit or-  
21 ganizations, and State and local governments within  
22 that region; and

23 (5) background information that the Director  
24 determines is relevant to demonstrate the success of  
25 the innovation and entrepreneurship support models

1 proposed by the applicant to commercialize tech-  
2 nologies.

3 (f) COLLABORATIVE INNOVATION RESOURCE CEN-  
4 TER PROGRAM.—

5 (1) IN GENERAL.—The Director shall make  
6 awards under this section to eligible entities to es-  
7 tablish collaborative innovation resource centers that  
8 promote regional technology transfer and technology  
9 development activities available to more than one in-  
10 stitution of higher education and to other entities in  
11 a region.

12 (2) USE OF FUNDS.—An eligible entity that re-  
13 ceives an award under this subsection shall use  
14 award funds to carry out one or more of the fol-  
15 lowing activities, to the benefit of the region in  
16 which the center is located:

17 (A) Providing start-ups and small business  
18 concerns (as defined in section 3 of the Small  
19 Business Act (15 U.S.C. 632)) within the re-  
20 gion with access to facilities, scientific infra-  
21 structure, personnel, and other assets as re-  
22 quired for technology maturation.

23 (B) Supporting entrepreneurial training  
24 for start-up and small business personnel.

1           (3) Providing engineering and entrepreneurial  
2           experiences and hands-on training for students en-  
3           rolled in participating institutions of higher edu-  
4           cation.

5           (g) REPORTING ON COMMERCIALIZATION  
6 METRICS.—The Director shall establish—

7           (1) metrics related to commercialization for an  
8           award under this section; and

9           (2) a reporting schedule for recipients of such  
10          awards that takes into account both short- and long-  
11          term goals of the programs under this section.

12          (h) GEOGRAPHIC DIVERSITY.—The Director shall en-  
13          sure regional and geographic diversity in issuing awards  
14          under this section.

15          (i) AUTHORIZATION OF APPROPRIATIONS.—From  
16          within funds authorized for the Directorate for Tech-  
17          nology, Innovation, and Partnerships, there are authorized  
18          to carry out the activities under this section  
19          \$3,100,000,000 for fiscal years 2023 through 2027.

20 **SEC. 10392. ENTREPRENEURIAL FELLOWSHIPS.**

21          (a) IN GENERAL.—The Director, acting through the  
22          Directorate for Technology, Innovation, and Partnerships,  
23          shall award fellowships to scientists and engineers to help  
24          develop leaders capable of maturing promising ideas and  
25          technologies from lab to market or other use and forge

1 connections between academic research and the govern-  
2 ment, industry, financial sectors, and other end users.

3 (b) APPLICATION.—An applicant for a fellowship  
4 under this section shall submit to the Director an applica-  
5 tion at such time, in such manner, and containing such  
6 information as the Director may require. At a minimum,  
7 the Director shall require that applicants—

8 (1) have completed a doctoral degree in a  
9 STEM field no more than 5 years prior to the date  
10 of the application, or have otherwise demonstrated  
11 significant postbaccalaureate scientific research ex-  
12 perience and are considered early career, according  
13 to requirements established by the Director; and

14 (2) have included in the application a proposal  
15 for how the fellow will be embedded in a host insti-  
16 tution's research environment.

17 (c) OUTREACH.—The Director shall conduct program  
18 outreach to recruit fellowship applicants—

19 (1) from diverse research institutions;

20 (2) from all regions of the country; and

21 (3) from groups historically underrepresented in  
22 STEM fields.

23 (d) ADMINISTRATION AGREEMENTS.—The Director  
24 may enter into an agreement with a qualified third-party

1 entity to administer the fellowships, subject to the provi-  
2 sions of this section.

3 (e) AUTHORIZATION OF APPROPRIATIONS.—There  
4 are authorized to be appropriated to the Director a total  
5 of \$125,000,000 for fiscal years 2023 through 2027, to  
6 carry out the activities outlined in this section.

7 **SEC. 10393. SCHOLARSHIPS AND FELLOWSHIPS.**

8 (a) IN GENERAL.—The Director, acting through the  
9 Directorate, shall fund undergraduate scholarships (in-  
10 cluding at community colleges), graduate fellowships and  
11 traineeships, and postdoctoral awards in the key tech-  
12 nology focus areas.

13 (b) IMPLEMENTATION.—The Director may carry out  
14 subsection (a) by making awards—

15 (1) directly to students; and

16 (2) to institutions of higher education or con-  
17 sortia of institutions of higher education, including  
18 those institutions or consortia involved in operating  
19 Regional Innovation Engines established under sec-  
20 tion 10388.

21 (c) BROADENING PARTICIPATION.—In carrying out  
22 this section, the Director shall take steps to increase the  
23 participation of populations that are underrepresented in  
24 STEM, which may include—

1           (1) establishing or augmenting programs tar-  
2           geted at populations that are underrepresented in  
3           STEM;

4           (2) supporting traineeships or other relevant  
5           programs at historically Black colleges and univer-  
6           sities, Tribal Colleges or Universities, and minority-  
7           serving institutions;

8           (3) enabling low-income populations to pursue  
9           associate, undergraduate, or graduate level degrees  
10          in STEM;

11          (4) addressing current and expected gaps in the  
12          availability or skills of the STEM workforce, or ad-  
13          dressing needs of the STEM workforce, including by  
14          increasing educational capacity at institutions and  
15          by prioritizing awards to United States citizens, per-  
16          manent residents, and individuals that will grow the  
17          domestic workforce; and

18          (5) addressing geographic diversity in the  
19          STEM workforce.

20          (d) ENCOURAGING INNOVATION.—In carrying out  
21          this section, the Director shall encourage innovation in  
22          graduate education, including through encouraging insti-  
23          tutions of higher education to offer graduate students op-  
24          portunities to gain experience in industry or Government  
25          as part of their graduate training, and through support

1 for students in professional master's programs related to  
2 the key technology focus areas or to the societal, national,  
3 and geostrategic challenges.

4 (e) AREAS OF FUNDING SUPPORT.—Subject to the  
5 availability of funds to carry out this section, the Director  
6 shall—

7 (1) issue—

8 (A) postdoctoral awards,

9 (B) graduate fellowships and traineeships,  
10 inclusive of the NSF Research Traineeships  
11 and fellowships awarded under the Graduate  
12 Research Fellowship Program; and

13 (C) scholarships, including undergraduate  
14 scholarships, research experiences, and intern-  
15 ships, including—

16 (i) scholarships to attend community  
17 colleges; and

18 (ii) research experiences and intern-  
19 ships under sections 513, 514, and 515 of  
20 the America COMPETES Reauthorization  
21 Act of 2010 (42 U.S.C. 1862p-5; 1862p-  
22 6; 1862p-7);

23 (2) ensure that not less than 10 percent of the  
24 funds made available to carry out this section are  
25 used to support additional awards that focus on

1 community college training, education, and teaching  
2 programs that increase the participation of popu-  
3 lations that are historically underrepresented in  
4 STEM, including technical programs through pro-  
5 grams such as the Advanced Technological Edu-  
6 cation program; and

7 (3) if funds remain after carrying out para-  
8 graphs (1) and (2) make awards to institutions of  
9 higher education to enable the institutions to fund  
10 the development and establishment of new or spe-  
11 cialized programs of study for graduate, under-  
12 graduate, or technical college students and the eval-  
13 uation of the effectiveness of those programs of  
14 study.

15 (f) LOW-INCOME SCHOLARSHIP PROGRAM.—

16 (1) IN GENERAL.—The Director shall award  
17 scholarships to low-income individuals to enable such  
18 individuals to pursue associate, undergraduate, or  
19 graduate level degrees in STEM fields.

20 (2) ELIGIBILITY.—

21 (A) IN GENERAL.—To be eligible to receive  
22 a scholarship under this subsection, an indi-  
23 vidual—

24 (i) must be a citizen of the United  
25 States, a national of the United States (as



1 defined in section 1101(a) of title 8), an  
2 alien admitted as a refugee under section  
3 1157 of title 8, or an alien lawfully admit-  
4 ted to the United States for permanent  
5 residence;

6 (ii) shall prepare and submit to the  
7 Director an application at such time, in  
8 such manner, and containing such infor-  
9 mation as the Director may require; and

10 (iii) shall certify to the Director that  
11 the individual intends to use amounts re-  
12 ceived under the scholarship to enroll or  
13 continue enrollment at an institution of  
14 higher education (as defined in section  
15 1001(a) of title 20) in order to pursue an  
16 associate, undergraduate, or graduate level  
17 degree in STEM fields designated by the  
18 Director.

19 (B) ABILITY.—Awards of scholarships  
20 under this subsection shall be made by the Di-  
21 rector solely on the basis of the ability of the  
22 applicant, except that in any case in which 2 or  
23 more applicants for scholarships are deemed by  
24 the Director to be possessed of substantially  
25 equal ability, and there are not sufficient schol-

1 arships available to award one to each of such  
2 applicants, the available scholarship or scholar-  
3 ships shall be awarded to the applicants in a  
4 manner that will tend to result in a geographi-  
5 cally wide distribution throughout the United  
6 States recipients' places of permanent resi-  
7 dence.

8 (3) SCHOLARSHIP AMOUNT AND RENEWAL.—  
9 Section 414(d) of the American Competitiveness and  
10 Workforce Improvement Act of 1998 (42 U.S.C.  
11 1869e) is amended in paragraph (3) by—

12 (A) striking “, except that the Director  
13 shall not award a scholarship in an amount ex-  
14 ceeding \$10,000 per year”; and

15 (B) striking “4 years” and inserting “5  
16 years”.

17 (4) AUTHORIZATION.—Of amounts authorized  
18 for the Directorate for Technology, Innovation, and  
19 Partnerships, \$100,000,000 shall be authorized to  
20 carry out this subsection.

21 (g) EXISTING PROGRAMS.—The Director may use or  
22 augment existing STEM education programs of the Foun-  
23 dation and leverage education or entrepreneurial partners  
24 to carry out this section.

1 **SEC. 10394. RESEARCH AND DEVELOPMENT AWARDS.**

2 (a) IN GENERAL.—From amounts made available for  
3 the Directorate, the Director shall make awards, on a  
4 competitive basis, for research and technology develop-  
5 ment within the key technology focus areas, including in-  
6 vestments that advance solutions to the challenges under  
7 section 10387.

8 (b) PURPOSE.—The purpose of the awards under this  
9 section shall be to accelerate technological advances and  
10 technology adoption in the key technology focus areas.

11 (c) RECIPIENTS.—Recipients of funds under this sec-  
12 tion may include institutions of higher education, research  
13 institutions, non-profit organizations, private sector enti-  
14 ties, consortia, or other entities as defined by the Director.

15 (d) METRICS.—The Director may set metrics, includ-  
16 ing goals and deadlines, for the development and dem-  
17 onstration of technology as determined in the terms of the  
18 award, and may use such metrics to determine whether  
19 an award recipient shall be eligible for continued or follow-  
20 on funding.

21 (e) SHORT TERM TECHNOLOGY DEPLOYMENT.—The  
22 Director shall also make awards, including through the  
23 SBIR and STTR programs (as defined in section 9(e) of  
24 the Small Business Act (15 U.S.C. 638(e)), to expedite  
25 short-term technology deployment within a period of no  
26 longer than 24 months.

1 (f) SELECTION CRITERIA.—In selecting recipients for  
2 an award under this section, the Director shall consider,  
3 at a minimum—

4 (1) the relevance of the project to the chal-  
5 lenges and the key technology focus areas under sec-  
6 tion 10387, and the potential of the project to result  
7 in transformational advances for such challenges and  
8 the key technology focus areas;

9 (2) the current status of similar technology, the  
10 limits of current practice, and the novelty and risks  
11 of the proposed project;

12 (3) the ethical, societal, safety, and security im-  
13 plications relevant to the application of the tech-  
14 nology;

15 (4) the appropriateness of quantitative goals  
16 and metrics for evaluating the project and a plan for  
17 evaluating those metrics; and

18 (5) the path for developing and, as appropriate,  
19 commercializing the technology into products and  
20 processes in the United States.

21 (g) AUTHORIZATION OF APPROPRIATIONS.—From  
22 within funds authorized for the Directorate for Tech-  
23 nology, Innovation, and Partnerships, there are authorized  
24 to carry out the activities under this section  
25 \$1,000,000,000 for fiscal years 2023 through 2027.

1 **SEC. 10395. SCALING INNOVATIONS IN PREK-12 STEM EDU-**  
2 **CATION.**

3 (a) IN GENERAL.—Taking into consideration the rec-  
4 ommendations under section 10311(a)(4) of subtitle B,  
5 the Director shall make awards, on a competitive, merit-  
6 reviewed basis, to establish multidisciplinary Centers for  
7 Transformative Education Research and Translation (in  
8 this section referred to as “Centers”) to support research  
9 and development on widespread and sustained implemen-  
10 tation of STEM education innovations.

11 (b) ELIGIBILITY.—The entity seeking an award for  
12 a Center under this section must be an institution of high-  
13 er education, a nonprofit organization, or a consortium of  
14 such institutions or organizations, which may include a  
15 STEM ecosystem .

16 (c) APPLICATION.—An eligible entity under sub-  
17 section (b) seeking an award under this section shall sub-  
18 mit an application to the Director at such time, in such  
19 manner, and containing such information as the Director  
20 may require. The application shall include, at a minimum,  
21 a description of how the proposed Center will be used to—

22 (1) establish partnerships among academic in-  
23 stitutions, local or State educational agencies, and  
24 other relevant stakeholders in supporting programs  
25 and activities to facilitate the widespread and sus-  
26 tained implementation of promising, evidence-based

1 STEM education practices, models, programs, cur-  
2 riculum, and technologies;

3 (2) support enhanced STEM education infra-  
4 structure, including cyberlearning technologies, to  
5 facilitate the widespread adoption of promising, evi-  
6 dence-based practices;

7 (3) support research and development on scal-  
8 ing practices, partnerships, and alternative models to  
9 current approaches, including approaches sensitive  
10 to the unique combinations of capabilities, resources,  
11 and needs of varying localities, educators, and learn-  
12 ers;

13 (4) include a focus on the learning needs of  
14 under-resourced schools and learners in low-resource  
15 or underachieving local educational agencies in  
16 urban and rural communities and the development  
17 of high-quality curriculum that engages these learn-  
18 ers in the knowledge and practices of STEM fields;

19 (5) include a focus on the learning needs and  
20 unique challenges facing students with disabilities;

21 (6) support research, development, or education  
22 on one or more of the key technology focus areas;

23 (7) support research and development on scal-  
24 ing practices and models to support and sustain

1 highly-qualified STEM educators in urban and rural  
2 communities; and

3 (8) at the discretion of the Director, any other  
4 requirements recommended in the study commis-  
5 sioned under section 10311(a) of subtitle B.

6 (d) ADDITIONAL CONSIDERATIONS.—In making an  
7 award under this section, the Director may also consider  
8 the extent to which the proposed Center will—

9 (1) leverage existing collaborations, tools, and  
10 strategies supported by the Foundation, including  
11 NSF INCLUDES and the Convergence Accelera-  
12 tors;

13 (2) support research on and the development  
14 and scaling of innovative approaches to distance  
15 learning and education for various student popu-  
16 lations;

17 (3) support education innovations that leverage  
18 new technologies or deepen understanding of the im-  
19 pact of technology on educational systems; and

20 (4) include a commitment from local or State  
21 education administrators to making the proposed re-  
22 forms and activities a priority.

23 (e) PARTNERSHIP.—In carrying out the program  
24 under this section, the Director shall explore opportunities

1 to partner with the Department of Education, including  
2 through jointly funding activities under this section.

3 (f) DURATION.—Each award made under this section  
4 shall be for a duration of no more than 5 years.

5 (g) ANNUAL MEETING.—The Director shall encour-  
6 age and facilitate an annual meeting of the Centers, as  
7 appropriate, to foster collaboration among the Centers and  
8 to further disseminate the results of the Centers' sup-  
9 ported activities.

10 (h) EXISTING PROGRAMS.—The Director may use ex-  
11 isting NSF programs to establish and execute this section.

12 (i) REPORT.—Not later than 5 years after the date  
13 of enactment of this Act, the Director shall submit to Con-  
14 gress and make widely available to the public a report that  
15 includes—

16 (1) a description of the focus and proposed  
17 goals of each Center;

18 (2) an assessment, based on a common set of  
19 benchmarks and tools, of the Centers' success in  
20 helping to promote scalable solutions in PreK–12  
21 STEM education; and

22 (3) any recommendations for administrative  
23 and legislative action that could optimize the effec-  
24 tiveness of the Centers established under this sec-  
25 tion.



1 **SEC. 10396. AUTHORITIES.**

2 In addition to existing authorities available to the  
3 Foundation, the Director may exercise the following au-  
4 thorities in carrying out the activities under this subtitle:

5 (1) AWARDS.—In carrying out this subtitle, the  
6 Director may provide awards in the form of grants,  
7 contracts, cooperative agreements, cash prizes, and  
8 other transactions.

9 (2) PROGRAM DIRECTORS.—

10 (A) DESIGNATION.—The Director may  
11 designate individuals to serve as program direc-  
12 tors for the programs established within the Di-  
13 rectorate pursuant to the responsibilities estab-  
14 lished under subparagraph (B). The Director  
15 shall ensure that program directors—

16 (i) have expertise in one or more of  
17 the challenges and key technology focus  
18 areas under section 10387; and

19 (ii) come from a variety of back-  
20 grounds, including industry, and from a  
21 variety of institutions of higher education.

22 (B) RESPONSIBILITIES.—A program direc-  
23 tor of a program of the Directorate, in con-  
24 sultation with the Assistant Director, shall be  
25 responsible for—

1 (i) establishing research and develop-  
2 ment goals for the program, including  
3 through the convening of workshops, con-  
4 ferring with a broad range of stakeholders  
5 and outside experts, taking into account  
6 relevant expert reports, and publicizing the  
7 goals of the program to the public and pri-  
8 vate sectors;

9 (ii) surveying a wide range of institu-  
10 tions of higher education, nonprofit organi-  
11 zations, and private entities to identify  
12 emerging trends in the challenges and key  
13 technology focus areas under section  
14 10387, and, as appropriate, soliciting pro-  
15 posals from such entities to conduct re-  
16 search in areas of particular promise that  
17 the private sector is the not likely to un-  
18 dertake independently.

19 (iii) facilitating research collabora-  
20 tions in the challenges and key technology  
21 focus areas under section 10387, including  
22 connecting academic researchers with po-  
23 tential end-users of technology, including  
24 industry, labor organizations, nonprofit or-



1 (A) PROGRAM AUTHORIZED.—The Foun-  
2 dation may carry out a program of personnel  
3 management authority provided under subpara-  
4 graph (B) in order to facilitate recruitment of  
5 eminent experts in science or engineering for  
6 research and development projects and to en-  
7 hance the administration and management of  
8 the Foundation.

9 (B) PERSONNEL MANAGEMENT AUTHOR-  
10 ITY.—Under the program under subparagraph  
11 (A), the Foundation may—

12 (i) without regard to any provision of  
13 title 5, United States Code, governing the  
14 appointment of employees in the competi-  
15 tive service, appoint individuals to a total  
16 of not more than 70 positions in the Foun-  
17 dation, of which not more than 5 such po-  
18 sitions may be positions of administration  
19 or management of the Foundation;

20 (ii) prescribe the rates of basic pay for  
21 positions to which employees are appointed  
22 under clause (i)—

23 (I) in the case of employees ap-  
24 pointed pursuant to clause (i) to any  
25 of 5 positions designated by the Foun-

1                    dation for purposes of this clause, at  
2                    rates not in excess of a rate equal to  
3                    150 percent of the maximum rate of  
4                    basic pay authorized for positions at  
5                    level I of the Executive Schedule  
6                    under section 5312 of title 5, United  
7                    States Code; and

8                    (II) in the case of any other em-  
9                    ployee appointed pursuant to clause  
10                    (i), at rates not in excess of the max-  
11                    imum rate of basic pay authorized for  
12                    senior-level positions under section  
13                    5376 of title 5, United States Code;  
14                    and

15                    (iii) pay any employee appointed  
16                    under subparagraph (A), other than an  
17                    employee appointed to a position des-  
18                    ignated as described in clause (ii)(I), pay-  
19                    ments in addition to basic pay within the  
20                    limit applicable to the employee under sub-  
21                    paragraph (D).

22                    (C) LIMITATION ON TERM OF APPOINT-  
23                    MENT.—

24                    (i) IN GENERAL.—Except as provided  
25                    in clause (ii), the service of an employee

1 under an appointment under subparagraph  
2 (B)(i) may not exceed 4 years.

3 (ii) EXTENSION.—The Director may,  
4 in the case of a particular employee under  
5 the program under subparagraph (A), ex-  
6 tend the period to which service is limited  
7 under clause (i) by up to 2 years if the Di-  
8 rector determines that such action is nec-  
9 essary to promote the efficiency of the  
10 Foundation.

11 (D) MAXIMUM AMOUNT OF ADDITIONAL  
12 PAYMENTS PAYABLE.—Notwithstanding any  
13 other provision of this subsection or section  
14 5307 of title 5, United States Code, no addi-  
15 tional payments may be paid to an employee  
16 under subparagraph (B)(iii) in any calendar  
17 year if, or to the extent that, the employee's  
18 total annual compensation in such calendar  
19 year will exceed the maximum amount of total  
20 annual compensation payable at the salary set  
21 in accordance with section 104 of title 3,  
22 United States Code.

23 (4) HIGHLY QUALIFIED EXPERTS IN NEEDED  
24 OCCUPATIONS.—

1           (A) IN GENERAL.—The Foundation may  
2           carry out a program using the authority pro-  
3           vided in subparagraph (B) in order to attract  
4           highly qualified experts in needed occupations,  
5           as determined by the Foundation. Individuals  
6           hired by the Director through such authority  
7           may include individuals with expertise in busi-  
8           ness creativity, innovation management, design  
9           thinking, entrepreneurship, venture capital, and  
10          related fields.

11          (B) AUTHORITY.—Under the program, the  
12          Foundation may—

13               (i) appoint personnel from outside the  
14               civil service and uniformed services (as  
15               such terms are defined in section 2101 of  
16               title 5, United States Code) to positions in  
17               the Foundation without regard to any pro-  
18               vision of title 5, United States Code, gov-  
19               erning the appointment of employees in the  
20               competitive service;

21               (ii) prescribe the rates of basic pay for  
22               positions to which employees are appointed  
23               under clause (i) at rates not in excess of  
24               the maximum rate of basic pay authorized

1 for senior-level positions under section  
2 5376 of title 5, United States Code; and

3 (iii) pay any employee appointed  
4 under clause (i) payments in addition to  
5 basic pay within the limits applicable to  
6 the employee under subparagraph (D).

7 (C) LIMITATION ON TERM OF APPOINT-  
8 MENT.—

9 (i) IN GENERAL.—Except as provided  
10 in clause (ii), the service of an employee  
11 under an appointment made pursuant to  
12 this subsection may not exceed 5 years.

13 (ii) EXTENSION.—The Foundation  
14 may, in the case of a particular employee,  
15 extend the period to which service is lim-  
16 ited under clause (i) by up to 1 additional  
17 year if the Foundation determines that  
18 such action is necessary to promote the  
19 Foundation's national security missions.

20 (D) LIMITATIONS ON ADDITIONAL PAY-  
21 MENTS.—

22 (i) TOTAL AMOUNT.—The total  
23 amount of the additional payments paid to  
24 an employee under this subsection for any  
25 12-month period may not exceed the max-



1           imum amount of total compensation pay-  
2           able at the salary set in accordance with  
3           section 104 of title, United States Code.

4                   (ii) ELIGIBILITY FOR PAYMENTS.—An  
5           employee appointed under this subsection  
6           is not eligible for any bonus, monetary  
7           award, or other monetary incentive for  
8           service, except for payments authorized  
9           under this subsection.

10                   (E) LIMITATION ON NUMBER OF HIGHLY  
11           QUALIFIED EXPERTS.—The number of highly  
12           qualified experts appointed and retained by the  
13           Foundation under sub (B)(i) shall not exceed  
14           70 at any time.

15                   (F) SAVINGS PROVISIONS.—In the event  
16           that the Foundation terminates the program  
17           under this paragraph, in the case of an em-  
18           ployee who, on the day before the termination  
19           of the program, is serving in a position pursu-  
20           ant to an appointment under this paragraph—

21                           (i) the termination of the program  
22           does not terminate the employee's employ-  
23           ment in that position before the expiration  
24           of the lesser of—

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1 (I) the period for which the em-  
2 ployee was appointed; or

3 (II) the period to which the em-  
4 ployee's service is limited under sub-  
5 paragraph (C), including any exten-  
6 sion made under this paragraph be-  
7 fore the termination of the program;  
8 and

9 (ii) the rate of basic pay prescribed  
10 for the position under this paragraph may  
11 not be reduced as long as the employee  
12 continues to serve at an acceptable level of  
13 performance in the position without a  
14 break in service.

15 (5) ADDITIONAL HIRING AUTHORITY.—To the  
16 extent needed to carry out the duties under para-  
17 graph (1)(A), the Director is authorized to utilize  
18 hiring authorities under section 3372 of title 5,  
19 United States Code, to staff the Foundation with  
20 employees from other Federal agencies, State and  
21 local governments, Indian Tribes and Tribal organi-  
22 zations, institutions of higher education, and other  
23 organizations, as described in that section, in the  
24 same manner and subject to the same conditions,

1       that apply to such individuals utilized to accomplish  
2       other missions of the Foundation.

3               (6) NATIONAL ACADEMY OF PUBLIC ADMINIS-  
4       TRATION.—

5               (A) STUDY.—Not later than 30 days after  
6       the date of enactment of this Act, the Director  
7       shall contract with the National Academy of  
8       Public Administration to conduct a study on  
9       the organizational and management structure  
10      of the Foundation, to—

11              (i) evaluate and make recommenda-  
12              tions to efficiently and effectively imple-  
13              ment the Directorate for Technology, Inno-  
14              vation, and Partnerships; and

15              (ii) evaluate and make recommenda-  
16              tions to ensure coordination of the Direc-  
17              torate for Technology, Innovation, and  
18              Partnerships with other directorates and  
19              offices of the Foundation and other Fed-  
20              eral agencies.

21              (B) REVIEW.—Upon completion of the  
22       study under subparagraph (A), the Foundation  
23       shall review the recommendations from the Na-  
24       tional Academy of Public Administration and  
25       provide a briefing to Congress on the plans of

1           the Foundation to implement any such rec-  
2           ommendations.

3           (7) PROVIDING AUTHORITY TO DISSEMINATE  
4           INFORMATION.—Section 11 of the National Science  
5           Foundation Act of 1950 (42 U.S.C. 1870) is amend-  
6           ed—

7                   (A) in subsection (j), by striking “and”  
8                   after the semicolon;

9                   (B) in subsection (k), by striking the pe-  
10                  riod at the end and inserting “; and”; and

11                  (C) by adding at the end the following:

12                  “(l) to provide for the widest practicable and appro-  
13                  priate dissemination of information within the United  
14                  States concerning the Foundation’s activities and the re-  
15                  sults of those activities.”.

16   **SEC. 10397. COORDINATION OF ACTIVITIES.**

17           (a) IN GENERAL.—In carrying out the activities of  
18           the Directorate, the Director shall coordinate and collabo-  
19           rate as appropriate with the Secretary of Energy, the Di-  
20           rector of the National Institute of Standards and Tech-  
21           nology, and the heads of other Federal research agencies,  
22           as appropriate, to further the goals of this subtitle.

23           (b) AVOID DUPLICATION.—The Director shall en-  
24           sure, to the greatest extent practicable, that activities car-  
25           ried out by the Directorate are not duplicative of activities

1 supported by other parts of the Foundation or other rel-  
2 evant Federal agencies. In carrying out the activities pre-  
3 scribed by this division, the Director shall coordinate with  
4 the interagency working group established under subtitle  
5 F of title VI and heads of other Federal research agencies  
6 to ensure these activities enhance and complement, but do  
7 not constitute unnecessary duplication of effort and to en-  
8 sure the responsible stewardship of funds.

9 (c) **EMERGING TECHNOLOGIES.**—After completion of  
10 the studies regarding emerging technologies conducted by  
11 the Secretary of Commerce under title XV of division FF  
12 of the Consolidated Appropriations Act, 2021 (Public Law  
13 116–260), the Director shall consider the results of such  
14 studies in carrying out the activities of the Directorate.

15 **SEC. 10398. ETHICAL, LEGAL, AND SOCIETAL CONSIDER-**  
16 **ATIONS.**

17 The Director shall engage, as appropriate, experts in  
18 the social dimensions of science and technology and set  
19 up formal avenues for public input, as appropriate, to en-  
20 sure that ethical, legal, and societal considerations are  
21 taken into account in the priorities and activities of the  
22 Directorate, including in the selection of the challenges  
23 and key technology focus areas under section 10387 and  
24 the award-making process, and throughout all stages of  
25 supported projects.

1 **SEC. 10399. REPORTS AND ROADMAPS.**

2 (a) ANNUAL REPORT.—The Director shall provide to  
3 the relevant authorizing and appropriations committees of  
4 Congress an annual report describing projects supported  
5 by the Directorate during the previous year.

6 (b) ROADMAP.—Not later than 1 year after the date  
7 of enactment of this Act, the Director shall provide to the  
8 relevant authorizing and appropriations committees of  
9 Congress a roadmap describing the strategic vision that  
10 the Directorate will use to guide investment decisions over  
11 the following 3 years.

12 (c) REPORTS.—Not later than 1 year after the date  
13 of enactment of this Act and every 3 years thereafter, the  
14 Director, in consultation with the heads of relevant Fed-  
15 eral agencies, shall prepare and submit to Congress—

16 (1) a strategic vision for the next 5 years for  
17 the Directorate, including a description of how the  
18 Foundation will increase funding for research and  
19 education for populations underrepresented in  
20 STEM and geographic areas; and

21 (2) a description of the planned activities of the  
22 Directorate to secure federally funded science and  
23 technology pursuant to section 1746 of the National  
24 Defense Authorization Act for Fiscal Year 2020  
25 (Public Law 116–92; 42 U.S.C. 6601 note) and sec-  
26 tion 223 of William M. (Mac) Thornberry National

1 Defense Authorization Act for Fiscal Year 2021  
2 (Public Law 116–283) and the requirements under  
3 subtitle D of this title and subtitle E of title VI .

4 (d) **SELECTION CRITERIA REPORT.**—Not later than  
5 24 months after the establishment of the Directorate, the  
6 Director shall prepare and submit a report to Congress  
7 regarding the use of alternative methods for the selection  
8 of award recipients and the distribution of funding to re-  
9 cipients, as compared to the traditional peer review proc-  
10 ess.

11 **SEC. 10399A. EVALUATION.**

12 (a) **IN GENERAL.**—After the Directorate has been in  
13 operation for 6 years, the Director shall enter into an  
14 agreement with the National Academies to provide an  
15 evaluation of how well the Directorate is achieving the  
16 purposes identified in section 10382.

17 (b) **INCLUSIONS.**—The evaluation shall include—

18 (1) an assessment of the impact of Directorate  
19 activities on the Foundation’s primary science mis-  
20 sion;

21 (2) an assessment of the Directorate’s impact  
22 on the challenges and key technology focus areas  
23 under section 10387;

1           (3) an assessment of efforts to ensure coordina-  
2           tion between the Directorate and other Federal  
3           agencies, and with external entities;

4           (4) a description of lessons learned from oper-  
5           ation of the Directorate; and

6           (5) recommended funding levels for the Direc-  
7           torate;

8           (c) AVAILABILITY.—On completion of the evaluation,  
9           the evaluation shall be made available to Congress and the  
10          public.

## 11           **Subtitle H—Administrative** 12           **Amendments**

### 13          **SEC. 10399D. SUPPORTING VETERANS IN STEM CAREERS.**

14          Section 3(c) of the Supporting Veterans in STEM  
15          Careers Act (42 U.S.C. 1862t) is amended by striking  
16          “annual” and inserting “biennial”.

### 17          **SEC. 10399E. SUNSHINE ACT COMPLIANCE.**

18          Section 15(a) of the National Science Foundation  
19          Authorization Act of 2002 (42 U.S.C. 1862n–5(a)) is  
20          amended—

21                 (1) so that paragraph (3) reads as follows:

22                 “(3) COMPLIANCE REVIEW.—The Inspector  
23                 General of the Foundation shall conduct a review of  
24                 the compliance by the Board with the requirements  
25                 described in paragraph (2) as necessary based on a



1 triennial risk assessment. Any review deemed nec-  
2 essary shall examine the proposed and actual con-  
3 tent of closed meetings and determine whether the  
4 closure of the meetings was consistent with section  
5 552b of title 5, United States Code.”; and

6 (2) by striking paragraphs (4) and (5) and in-  
7 serting the following:

8 “(4) MATERIALS RELATING TO CLOSED POR-  
9 TIONS OF MEETING.—To facilitate the risk assess-  
10 ment required under paragraph (3) of this sub-  
11 section, and any subsequent review conducted by the  
12 Inspector General, the Office of the National Science  
13 Board shall maintain the General Counsel’s certifi-  
14 cate, the presiding officer’s statement, and a tran-  
15 script or recording of any closed meeting, for at  
16 least 3 years after such meeting.”.

17 **SEC. 10399F. SCIENCE AND ENGINEERING INDICATORS RE-**  
18 **PORT SUBMISSION.**

19 Section 4(j)(1) of the National Science Foundation  
20 Act of 1950 (42 U.S.C. 1863(j)(1)) is amended by striking  
21 “January 15” and inserting “March 15”.

22 **TITLE IV—BIOECONOMY**  
23 **RESEARCH AND DEVELOPMENT**

24 **SEC. 10401. DEFINITIONS.**

25 In this title:

1           (1) INITIATIVE.—The term “Initiative” means  
2           the National Engineering Biology Research and De-  
3           velopment Initiative established under section  
4           10402.

5           (2) OMICS.—The term “omics” refers to the  
6           collective technologies used to explore the roles, rela-  
7           tionships, and actions of the various types of mol-  
8           ecules that make up the cells and systems of an or-  
9           ganism and the systems level analysis of their func-  
10          tions.

11 **SEC. 10402. NATIONAL ENGINEERING BIOLOGY RESEARCH**  
12 **AND DEVELOPMENT INITIATIVE.**

13          (a) IN GENERAL.—The President, acting through the  
14          Office of Science and Technology Policy, shall implement  
15          a National Engineering Biology Research and Develop-  
16          ment Initiative to advance societal well-being, national se-  
17          curity, sustainability, and economic productivity and com-  
18          petitiveness through the following:

19               (1) Advancing areas of research at the intersec-  
20               tion of the biological, physical, chemical, data, and  
21               computational and information sciences and engi-  
22               neering to accelerate scientific understanding and  
23               technological innovation in engineering biology.

1           (2) Advancing areas of biomanufacturing re-  
2           search to optimize, standardize, scale, and deliver  
3           new products and solutions.

4           (3) Supporting social and behavioral sciences  
5           and economics research that advances the field of  
6           engineering biology and contributes to the develop-  
7           ment and public understanding of new products,  
8           processes, and technologies.

9           (4) Improving the understanding of engineering  
10          biology of the scientific and lay public and sup-  
11          porting greater evidence-based public discourse  
12          about its benefits and risks.

13          (5) Supporting research relating to the risks  
14          and benefits of engineering biology, including under  
15          subsection (d).

16          (6) Supporting the development of novel tools  
17          and technologies to accelerate scientific under-  
18          standing and technological innovation in engineering  
19          biology.

20          (7) Expanding the number of researchers, edu-  
21          cators, and students and a retooled workforce with  
22          engineering biology training, including from tradi-  
23          tionally underrepresented and underserved popu-  
24          lations.

1           (8) Accelerating the translation and commer-  
2           cialization of engineering biology and biomanufac-  
3           turing research and development by the private sec-  
4           tor.

5           (9) Improving the interagency planning and co-  
6           ordination of Federal Government activities related  
7           to engineering biology.

8           (b) INITIATIVE ACTIVITIES.—The activities of the  
9 Initiative shall include the following:

10           (1) Sustained support for engineering biology  
11           research and development through the following:

12                   (A) Grants to fund the work of individual  
13                   investigators and teams of investigators, includ-  
14                   ing interdisciplinary teams.

15                   (B) Projects funded under joint solicita-  
16                   tions by a collaboration of not fewer than two  
17                   agencies participating in the Initiative.

18                   (C) Interdisciplinary research centers that  
19                   are organized to investigate basic research  
20                   questions, carry out technology development  
21                   and demonstration activities, and increase un-  
22                   derstanding of how to scale up engineering biol-  
23                   ogy processes, including biomanufacturing.

24           (2) Sustained support for databases and related  
25           tools, including the following:

1           (A) Support for the establishment,  
2           curation, and maintenance of curated genomics,  
3           epigenomics, and other relevant omics data-  
4           bases, including plant, animal, and microbial  
5           databases, that are available to researchers to  
6           carry out engineering biology research in a  
7           manner that does not compromise national se-  
8           curity or the privacy or security of information  
9           within such databases.

10           (B) Development of standards for such  
11           databases, including for curation, interoper-  
12           ability, and protection of privacy and security.

13           (C) Support for the development of com-  
14           putational tools, including artificial intelligence  
15           tools, that can accelerate research and innova-  
16           tion using such databases.

17           (D) An inventory and assessment of all  
18           Federal government omics databases to identify  
19           opportunities to improve the utility of such  
20           databases, as appropriate and in a manner that  
21           does not compromise national security or the  
22           privacy and security of information within such  
23           databases, and inform investment in such data-  
24           bases as critical infrastructure for the engineer-  
25           ing biology research enterprise.

1           (3) Sustained support for the development, op-  
2           timization, and validation of novel tools and tech-  
3           nologies to enable the dynamic study of molecular  
4           processes in situ, including through the following:

5                   (A) Research conducted at Federal labora-  
6                   tories.

7                   (B) Grants to fund the work of investiga-  
8                   tors at institutions of higher education and  
9                   other nonprofit research institutions.

10                   (C) Incentivized development of retooled  
11                   industrial sites across the country that foster a  
12                   pivot to modernized engineering biology initia-  
13                   tives.

14                   (D) Awards under the Small Business In-  
15                   novation Research Program and the Small  
16                   Business Technology Transfer Program (as de-  
17                   scribed in section 9 of the Small Business Act  
18                   (15 U.S.C. 638)).

19           (4) Support for education and training of un-  
20           dergraduate and graduate students in engineering  
21           biology, biomanufacturing, bioprocess engineering,  
22           and computational science applied to engineering bi-  
23           ology and in the related ethical, legal, environmental,  
24           safety, security, and other societal domains.

1           (5) Support for a national network of testbeds  
2           based on open standards, interfaces, and processes,  
3           including by repurposing existing facilities such as  
4           those specified in paragraph (3)(C), that would en-  
5           able scale up of laboratory engineering biology re-  
6           search.

7           (6) Activities to develop robust mechanisms for  
8           documenting and quantifying the outputs and eco-  
9           nomic benefits of engineering biology.

10          (7) Activities to accelerate the translation and  
11          commercialization of new products, processes, and  
12          technologies by carrying out the following:

13                 (A) Identifying precompetitive research op-  
14                 portunities.

15                 (B) Facilitating public-private partnerships  
16                 in engineering biology research and develop-  
17                 ment, including to address barriers to scaling  
18                 up innovations in engineering biology.

19                 (C) Connecting researchers, graduate stu-  
20                 dents, and postdoctoral fellows with entrepre-  
21                 neurship education and training opportunities.

22                 (D) Supporting proof of concept activities  
23                 and the formation of startup companies includ-  
24                 ing through programs such as the Small Busi-

1           ness Innovation Research Program and the  
2           Small Business Technology Transfer Program.

3           (c) EXPANDING PARTICIPATION.—The Initiative  
4 shall include, to the maximum extent practicable, outreach  
5 to primarily undergraduate and historically Black colleges  
6 and universities, Tribal Colleges or Universities, and mi-  
7 nority-serving institutions about Initiative opportunities,  
8 and shall encourage the development of research collabora-  
9 tions between research-intensive universities and primarily  
10 undergraduate and historically Black colleges and univer-  
11 sities, Tribal Colleges or Universities, and minority-serv-  
12 ing institutions.

13           (d) ETHICAL, LEGAL, ENVIRONMENTAL, SAFETY,  
14 SECURITY, AND SOCIETAL ISSUES.—Initiative activities  
15 shall take into account ethical, legal, environmental, safe-  
16 ty, security, and other appropriate societal issues by car-  
17 rying out the following:

18           (1) Supporting research, including in the social  
19 sciences, and other activities addressing ethical,  
20 legal, environmental, and other appropriate societal  
21 issues related to engineering biology, including inte-  
22 grating research on such topics with the research  
23 and development in engineering biology, and encour-  
24 aging the dissemination of the results of such re-  
25 search, including through interdisciplinary engineer-



1       ing biology research centers described in subsection  
2       (b)(1)(C).

3           (2) Supporting research and other activities re-  
4       lated to the safety and security implications of engi-  
5       neering biology, including outreach to increase  
6       awareness among Federal researchers and federally-  
7       funded researchers at institutions of higher edu-  
8       cation about potential safety and security implica-  
9       tions of engineering biology research, as appropriate.

10          (3) Ensuring that input from Federal and non-  
11       Federal experts on the ethical, legal, environmental,  
12       safety, security, and other appropriate societal issues  
13       related to engineering biology is integrated into the  
14       Initiative.

15          (4) Ensuring, through the agencies and depart-  
16       ments that participate in the Initiative, that public  
17       input and outreach are integrated into the Initiative  
18       by the convening of regular and ongoing public dis-  
19       cussions through mechanisms such as workshops,  
20       consensus conferences, and educational events, as  
21       appropriate.

22          (5) Complying with all applicable provisions of  
23       Federal law.

1 **SEC. 10403. INITIATIVE COORDINATION.**

2 (a) INTERAGENCY COMMITTEE.—The President, act-  
3 ing through the Office of Science and Technology Policy,  
4 shall designate an interagency committee to coordinate ac-  
5 tivities of the Initiative as appropriate, which shall be co-  
6 chaired by the Office of Science and Technology Policy.  
7 The Director of the Office of Science and Technology Pol-  
8 icy shall select an additional co-chairperson from among  
9 the members of the interagency committee. The inter-  
10 agency committee shall oversee the planning, manage-  
11 ment, and coordination of the Initiative. The interagency  
12 committee shall carry out the following:

13 (1) Provide for interagency coordination of Fed-  
14 eral engineering biology research, development, and  
15 other activities undertaken pursuant to the Initia-  
16 tive.

17 (2) Establish and periodically update goals and  
18 priorities for the Initiative.

19 (3) Develop, not later than 12 months after the  
20 date of the enactment of this Act, and update every  
21 five years thereafter, a strategic plan submitted to  
22 the Committee on Science, Space, and Technology,  
23 the Committee on Agriculture, and the Committee  
24 on Energy and Commerce of the House of Rep-  
25 resentatives and the Committee on Commerce,  
26 Science, and Transportation, the Committee on Ag-

1        riculture, Nutrition, and Forestry, the Committee on  
2        Small Business and Entrepreneurship, and the Com-  
3        mittee on Health, Education, Labor, and Pensions  
4        of the Senate that—

5                (A) guides the activities of the Initiative  
6                for purposes of meeting the goals and priorities  
7                established under (and updated pursuant to)  
8                paragraph (2); and

9                (B) describes—

10                    (i) the Initiative’s support for long-  
11                    term funding for interdisciplinary engineer-  
12                    ing biology research and development;

13                    (ii) the Initiative’s support for edu-  
14                    cation and public outreach activities;

15                    (iii) the Initiative’s support for re-  
16                    search and other activities on ethical, legal,  
17                    environmental, safety, security, and other  
18                    appropriate societal issues related to engi-  
19                    neering biology, including—

20                            (I) an applied biorisk manage-  
21                            ment research plan;

22                            (II) recommendations for inte-  
23                            grating security into biological data  
24                            access and international reciprocity  
25                            agreements;

1 (III) recommendations for manu-  
2 facturing restructuring to support en-  
3 gineering biology research, develop-  
4 ment, and scaling-up initiatives; and

5 (IV) an evaluation of existing  
6 biosecurity governance policies, guid-  
7 ance, and directives for the purposes  
8 of creating an adaptable, evidence-  
9 based framework to respond to emerg-  
10 ing biosecurity challenges created by  
11 advances in engineering biology;

12 (iv) how the Initiative will contribute  
13 to moving results out of the laboratory and  
14 into application for the benefit of society  
15 and United States competitiveness; and

16 (v) how the Initiative will measure  
17 and track the contributions of engineering  
18 biology to United States economic growth  
19 and other societal indicators.

20 (4) Develop a national genomic sequencing  
21 strategy to ensure engineering biology research fully  
22 leverages plant, animal, and microbe biodiversity, as  
23 appropriate and in a manner that does not com-  
24 promise economic competitiveness, national security,  
25 or the privacy or security of human genetic informa-

1           tion, to enhance long-term innovation and competi-  
2           tiveness in engineering biology in the United States.

3           (5) Develop a plan to utilize Federal programs,  
4           such as the Small Business Innovation Research  
5           Program and the Small Business Technology Trans-  
6           fer Program (as described in section 9 of the Small  
7           Business Act (15 U.S.C. 638)), in support of the ac-  
8           tivities described in section 10402(b)(3).

9           (6) In carrying out this section, take into con-  
10          sideration the recommendations of the advisory com-  
11          mittee established under section 10404, the results  
12          of the workshop convened under section 10402, ex-  
13          isting reports on related topics, and the views of aca-  
14          demic, State, industry, and other appropriate  
15          groups.

16          (b) QUINQUENNIAL REPORT.—Beginning with fiscal  
17          year 2023 and every five years thereafter for ten years,  
18          the interagency committee shall prepare and submit to the  
19          Committee on Science, Space, and Technology, the Com-  
20          mittee on Energy and Commerce, and the Committee on  
21          Agriculture of the House of Representatives and the Com-  
22          mittee on Commerce, Science, and Transportation, the  
23          Committee on Health, Education, Labor, and Pensions,  
24          the Committee on Small Business and Entrepreneurship,

1 and the Committee on Agriculture, Nutrition, and For-  
2 estry of the Senate a report that includes the following:

3 (1) A summarized agency budget in support of  
4 the Initiative for the current fiscal year, including a  
5 breakout of spending for each agency participating  
6 in the Program, and for the development and acqui-  
7 sition of any research facilities and instrumentation.

8 (2) An assessment of how Federal agencies are  
9 implementing the plan described in subsection  
10 (a)(3), including the following:

11 (A) A description of the amount and num-  
12 ber of awards made under the Small Business  
13 Innovation Research Program and the Small  
14 Business Technology Transfer Program (as de-  
15 scribed in section 9 of the Small Business Act  
16 (15 U.S.C. 638)) in support of the Initiative.

17 (B) A description of the amount and num-  
18 ber of projects funded under joint solicitations  
19 by a collaboration of not fewer than two agen-  
20 cies participating in the Initiative.

21 (C) A description of effects of newly-fund-  
22 ed projects by the Initiative.

23 (c) INITIATIVE COORDINATION OFFICE.—

1           (1) IN GENERAL.—The President shall establish  
2           an Initiative Coordination Office, with a Director  
3           and full-time staff, which shall—

4                   (A) provide technical and administrative  
5                   support to the interagency committee and the  
6                   advisory committee established under subsection  
7                   (a) and section 10404;

8                   (B) serve as the point of contact on Fed-  
9                   eral engineering biology activities for govern-  
10                  ment organizations, academia, industry, profes-  
11                  sional societies, State governments, interested  
12                  citizen groups, and others to exchange technical  
13                  and programmatic information;

14                  (C) oversee interagency coordination of the  
15                  Initiative, including by encouraging and sup-  
16                  porting joint agency solicitation and selection of  
17                  applications for funding of activities under the  
18                  Initiative, as appropriate;

19                  (D) conduct public outreach, including dis-  
20                  semination of findings and recommendations of  
21                  the advisory committee, as appropriate;

22                  (E) serve as the coordinator of ethical,  
23                  legal, environmental, safety, security, and other  
24                  appropriate societal input; and

1           (F) promote access to, and early applica-  
2           tion of, the technologies, innovations, and ex-  
3           pertise derived from Initiative activities to agen-  
4           cy missions and systems across the Federal  
5           Government, and to United States industry, in-  
6           cluding startup companies.

7           (2) FUNDING.—The Director of the Office of  
8           Science and Technology Policy, in coordination with  
9           each participating Federal department and agency,  
10          as appropriate, shall develop and annually update an  
11          estimate of the funds necessary to carry out the ac-  
12          tivities of the Initiative Coordination Office and sub-  
13          mit such estimate with an agreed summary of con-  
14          tributions from each agency to Congress as part of  
15          the President’s annual budget request to Congress.

16          (3) TERMINATION.—The Initiative Coordination  
17          Office established under this subsection shall termi-  
18          nate on the date that is 10 years after the date of  
19          the enactment of this Act.

20          (d) RULE OF CONSTRUCTION.—Nothing in this sec-  
21          tion may be construed to alter the policies, processes, or  
22          practices of individual Federal agencies in effect on the  
23          day before the date of the enactment of this Act relating  
24          to the conduct of biomedical research and advanced devel-



1 opment, including the solicitation and review of extra-  
2 mural research proposals.

3 **SEC. 10404. ADVISORY COMMITTEE ON ENGINEERING BIOL-**  
4 **OGY RESEARCH AND DEVELOPMENT.**

5 (a) IN GENERAL.—The agency co-chair of the inter-  
6 agency committee established under section 10403 shall,  
7 in consultation with the Office of Science and Technology  
8 Policy, designate or establish an advisory committee on  
9 engineering biology research and development (in this sec-  
10 tion referred to as the “advisory committee”) to be com-  
11 posed of not fewer than 12 members, including representa-  
12 tives of research and academic institutions, industry, and  
13 nongovernmental entities, who are qualified to provide ad-  
14 vice on the Initiative.

15 (b) ASSESSMENT.—The advisory committee shall as-  
16 sess the following:

17 (1) The current state of United States competi-  
18 tiveness in engineering biology, including the scope  
19 and scale of United States investments in engineer-  
20 ing biology research and development in the inter-  
21 national context.

22 (2) Current market barriers to commercializa-  
23 tion of engineering biology products, processes, and  
24 tools in the United States.

1           (3) Progress made in implementing the Initia-  
2           tive.

3           (4) The need to revise the Initiative.

4           (5) The balance of activities and funding across  
5           the Initiative.

6           (6) Whether the strategic plan developed or up-  
7           dated by the interagency committee established  
8           under section 10403 is helping to maintain United  
9           States leadership in engineering biology.

10          (7) Whether ethical, legal, environmental, safe-  
11          ty, security, and other appropriate societal issues are  
12          adequately addressed by the Initiative.

13          (c) REPORTS.—Beginning not later than two years  
14 after the date of the enactment of this Act and not less  
15 frequently than once every five years thereafter, the advi-  
16 sory committee shall submit to the President, the Com-  
17 mittee on Science, Space, and Technology, the Committee  
18 on Energy and Commerce, and the Committee on Agri-  
19 culture of the House of Representatives, and the Com-  
20 mittee on Commerce, Science, and Transportation, the  
21 Committee on Health, Education, Labor, and Pensions,  
22 and the Committee on Agriculture, Nutrition, and For-  
23 estry of the Senate, a report on the following:

24           (1) The findings of the advisory committee's as-  
25           sessment under subsection (b).

1           (2) The advisory committee's recommendations  
2           for ways to improve the Initiative.

3           (d) APPLICATION OF FEDERAL ADVISORY COM-  
4 MITTEE ACT.—Section 14 of the Federal Advisory Com-  
5 mittee Act (5 U.S.C. App.) shall not apply to the advisory  
6 committee.

7           (e) TERMINATION.—The advisory committee estab-  
8 lished under subsection (a) shall terminate on the date  
9 that is 10 years after the date of the enactment of this  
10 Act.

11 **SEC. 10405. EXTERNAL REVIEW OF ETHICAL, LEGAL, ENVI-**  
12 **RONMENTAL, SAFETY, SECURITY, AND SOCI-**  
13 **ETAL ISSUES.**

14           (a) IN GENERAL.—Not later than six months after  
15 the date of enactment of this Act, the Director of the Na-  
16 tional Science Foundation shall seek to enter into an  
17 agreement with the National Academies of Sciences, Engi-  
18 neering, and Medicine to conduct a review, and make rec-  
19 ommendations with respect to, the ethical, legal, environ-  
20 mental, safety, security, and other appropriate societal  
21 issues related to engineering biology research and develop-  
22 ment. The review shall include the following:

23           (1) An assessment of the current research on  
24           such issues.

1           (2) A description of the research needs relating  
2           to such issues.

3           (3) Recommendations on how the Initiative can  
4           address the research needs identified pursuant to  
5           paragraph (2).

6           (4) Recommendations on how researchers en-  
7           gaged in engineering biology can best incorporate  
8           considerations of such issues into the development of  
9           research proposals and the conduct of research.

10          (b) REPORT TO CONGRESS.—The agreement entered  
11          into under subsection (a) shall require the National Acad-  
12          emies of Sciences, Engineering, and Medicine to, not later  
13          than two years after the date of the enactment of this  
14          Act—

15                (1) submit to the Committee on Science, Space,  
16                and Technology and the Committee on Agriculture  
17                of the House of Representatives and the Committee  
18                on Commerce, Science, and Transportation and the  
19                Committee on Agriculture, Nutrition, and Forestry  
20                of the Senate a report containing the findings and  
21                recommendations of the review conducted under sub-  
22                section (a); and

23                (2) make a copy of such report available on a  
24                publicly accessible website.

1 **SEC. 10406. AGENCY ACTIVITIES.**

2 (a) NATIONAL SCIENCE FOUNDATION.—As part of  
3 the Initiative, the National Science Foundation shall carry  
4 out the following:

5 (1) Support research in engineering biology and  
6 biomanufacturing through individual grants, collabo-  
7 rative grants, and through interdisciplinary research  
8 centers.

9 (2) Support research on the environmental,  
10 legal, ethical, and social implications of engineering  
11 biology.

12 (3) Provide support for research instrumenta-  
13 tion, equipment, and cyberinfrastructure for engi-  
14 neering biology disciplines, including support for re-  
15 search, development, optimization, and validation of  
16 novel technologies to enable the dynamic study of  
17 molecular processes in situ.

18 (4) Support curriculum development and re-  
19 search experiences for secondary, undergraduate,  
20 and graduate students in engineering biology and  
21 biomanufacturing, including through support for  
22 graduate fellowships and traineeships in engineering  
23 biology.

24 (5) Award grants, on a competitive basis, to en-  
25 able institutions to support graduate students and

1 postdoctoral fellows who perform some of their engi-  
2 neering biology research in an industry setting.

3 (b) DEPARTMENT OF COMMERCE.—

4 (1) NATIONAL INSTITUTE OF STANDARDS AND  
5 TECHNOLOGY.—As part of the Initiative, the Direc-  
6 tor of the National Institute of Standards and Tech-  
7 nology shall carry out the following:

8 (A) Advance the development of standard  
9 reference materials and measurements, includ-  
10 ing to promote interoperability between new  
11 component technologies and processes for engi-  
12 neering biology and biomanufacturing discovery,  
13 innovation, and production processes.

14 (B) Establish new data tools, techniques,  
15 and processes necessary to advance engineering  
16 biology and biomanufacturing.

17 (C) Provide access to user facilities with  
18 advanced or unique equipment, services, mate-  
19 rials, and other resources to industry, institu-  
20 tions of higher education, nonprofit organiza-  
21 tions, and government agencies to perform re-  
22 search and testing.

23 (D) Provide technical expertise to inform  
24 the potential development of guidelines or safe-

1           guards for new products, processes, and sys-  
2           tems of engineering biology.

3           (2) NATIONAL OCEANIC AND ATMOSPHERIC AD-  
4           MINISTRATION.—As part of the initiative, the Ad-  
5           ministrators of the National Oceanic and Atmos-  
6           pheric Administration shall carry out the following:

7                   (A) Conduct and support research in omics  
8                   and associated bioinformatic sciences and de-  
9                   velop tools and products to improve ecosystem  
10                  stewardship, monitoring, management, assess-  
11                  ments, and forecasts, consistent with the mis-  
12                  sion of the agency.

13                   (B) Collaborate with other agencies to un-  
14                  derstand potential environmental threats and  
15                  safeguards related to engineering biology.

16           (c) DEPARTMENT OF ENERGY.—As part of the Ini-  
17           tiative, the Secretary of Energy shall carry out the fol-  
18           lowing:

19                   (1) Conduct and support research, development,  
20                  demonstration, and commercial application activities  
21                  in engineering biology, including in the areas of syn-  
22                  thetic biology, advanced biofuel and bioproduct de-  
23                  velopment, biobased materials, and environmental  
24                  remediation.

1           (2) Support the development, optimization and  
2 validation of novel, scalable tools and technologies to  
3 enable the dynamic study of molecular processes in  
4 situ.

5           (3) Provide access to user facilities with ad-  
6 vanced or unique equipment, services, materials, and  
7 other resources, including secure access to high-per-  
8 formance computing, as appropriate, to industry, in-  
9 stitutions of higher education, nonprofit organiza-  
10 tions, and government agencies to perform research  
11 and testing;.

12           (4) Strengthen collaboration between the Office  
13 of Science and the Energy Efficiency and Renewable  
14 Energy Office to help transfer fundamental research  
15 results to industry and accelerate commercial appli-  
16 cations.

17           (d) DEPARTMENT OF DEFENSE.—As part of the Ini-  
18 tiative, the Secretary of Defense shall carry out the fol-  
19 lowing:

20           (1) Conduct and support research and develop-  
21 ment in engineering biology and associated data and  
22 information sciences.

23           (2) Support curriculum development and re-  
24 search experiences in engineering biology and associ-  
25 ated data and information sciences across the mili-



1 tary education system, including the service acad-  
2 emies, professional military education, and military  
3 graduate education.

4 (3) Assess risks of potential national security  
5 and economic security threats relating to engineering  
6 biology.

7 (e) NATIONAL AERONAUTICS AND SPACE ADMINIS-  
8 TRATION.—As part of the Initiative, the National Aero-  
9 nautics and Space Administration shall carry out the fol-  
10 lowing:

11 (1) Conduct and support research in engineer-  
12 ing biology, including in synthetic biology, and re-  
13 lated to Earth and space sciences, aeronautics, space  
14 technology, and space exploration and experimen-  
15 tation, consistent with the priorities established in  
16 the National Academies' decadal surveys.

17 (2) Award grants, on a competitive basis, that  
18 enable institutions to support graduate students and  
19 postdoctoral fellows who perform some of their engi-  
20 neering biology research in an industry setting.

21 (f) DEPARTMENT OF AGRICULTURE.—As part of the  
22 Initiative, the Secretary of Agriculture shall support re-  
23 search and development in engineering biology through the  
24 Agricultural Research Service, the National Institute of

1 Food and Agriculture programs and grants, and the Office  
2 of the Chief Scientist.

3 (g) ENVIRONMENTAL PROTECTION AGENCY.—As  
4 part of the Initiative, the Environmental Protection Agen-  
5 cy shall support research on how products, processes, and  
6 systems of engineering biology will affect or can protect  
7 the environment.

8 (h) DEPARTMENT OF HEALTH AND HUMAN SERV-  
9 ICES.—As part of the Initiative, the Secretary of Health  
10 and Human Services, as appropriate and consistent with  
11 activities of the Department of Health and Human Serv-  
12 ices in effect on the day before the date of the enactment  
13 of this Act, shall carry out the following:

14 (1) Support research and development to ad-  
15 vance the understanding and application of engineer-  
16 ing biology for human health.

17 (2) Support relevant interdisciplinary research  
18 and coordination.

19 (3) Support activities necessary to facilitate  
20 oversight of relevant emerging biotechnologies.

21 **SEC. 10407. RULE OF CONSTRUCTION.**

22 Nothing in this title may be construed to require pub-  
23 lic disclosure of information that is exempt from manda-  
24 tory disclosure under section 552 of title 5, United States  
25 Code.

1           **TITLE V—BROADENING**  
2           **PARTICIPATION IN SCIENCE**  
3           **Subtitle A—STEM Opportunities**

4           **SEC. 10501. FEDERAL RESEARCH AGENCY POLICIES FOR**  
5                           **CAREGIVERS.**

6           (a) OSTP GUIDANCE.—Not later than 12 months  
7 after the date of the enactment of this Act, the Director,  
8 in consultation with the heads of relevant agencies, shall  
9 provide guidance to each Federal research agency to es-  
10 tablish policies that—

11                   (1) apply to all—

12                           (A) research awards granted by such agen-  
13 cy; and

14                           (B) principal investigators of such research  
15 and their trainees, including postdoctoral re-  
16 searchers and graduate students, who have  
17 caregiving responsibilities, including care for a  
18 newborn or newly adopted child and care for an  
19 immediate family member who has a disability  
20 or a serious health condition; and

21                   (2) provide, to the extent feasible—

22                           (A) flexibility in timing for the initiation of  
23 approved research awards granted by such  
24 agency;

1 (B) no-cost extensions of such research  
2 awards;

3 (C) award supplements, as appropriate, to  
4 research awards to sustain research activities  
5 conducted under such awards; and

6 (D) any other appropriate accommodations  
7 at the discretion of the director of each such  
8 agency.

9 (b) UNIFORMITY OF GUIDANCE.—In providing guid-  
10 ance under subsection (a), the Director shall encourage  
11 uniformity, to the extent practicable, and consistency in  
12 the policies established pursuant to such guidance across  
13 all Federal research agencies.

14 (c) ESTABLISHMENT OF POLICIES.—Consistent, to  
15 the extent practicable, with the guidance under subsection  
16 (a), Federal research agencies shall—

17 (1) maintain or develop and implement policies  
18 for individuals described in paragraph (1)(B) of  
19 such subsection; and

20 (2) broadly disseminate in easily accessible for-  
21 mats such policies to current and potential award re-  
22 cipients.

23 (d) DATA ON USAGE.—Federal research agencies  
24 shall consider—

1           (1) collecting data, including demographic data  
2           that can be disaggregated by sex, geographic loca-  
3           tion, and socioeconomic indicators, which may in-  
4           clude employment status, occupation, educational at-  
5           tainment, parental education, and income, on the  
6           usage of the policies under subsection (c), at both  
7           institutions of higher education and Federal labora-  
8           tories; and

9           (2) reporting such data on an annual basis to  
10          the Director in such form as required by the Direc-  
11          tor.

12 **SEC. 10502. COLLECTION AND REPORTING OF DATA ON**  
13 **FEDERAL RESEARCH AWARDS.**

14          (a) COLLECTION OF DATA.—

15           (1) IN GENERAL.—Each Federal research agen-  
16           cy shall collect, as practicable, with respect to all ap-  
17           plications for merit-reviewed research and develop-  
18           ment awards made by such agency, standardized  
19           record-level annual information on demographics,  
20           primary field, award type, institution type, review  
21           rating, budget request, funding outcome, and award-  
22           ed budget.

23           (2) UNIFORMITY AND STANDARDIZATION.—The  
24           Director, in consultation with the heads of each Fed-  
25           eral research agency, shall establish, and update as

1       necessary, a policy to ensure uniformity and stand-  
2       ardization of the data collection required under  
3       paragraph (1).

4               (3) RECORD-LEVEL DATA.—

5               (A) REQUIREMENT.—Beginning not later  
6       than two years after the issuance of the policy  
7       under paragraph (2) to Federal research agen-  
8       cies, and on an annual basis thereafter, each  
9       Federal research agency shall submit to the Na-  
10      tional Center for Science and Engineering Sta-  
11      tistics record-level data collected under para-  
12      graph (1) in the form required by the Director  
13      of the National Science Foundation.

14              (B) PREVIOUS DATA.—As part of the first  
15      submission under subparagraph (A), each Fed-  
16      eral research agency, to the extent practicable,  
17      shall also submit comparable record-level data,  
18      if it is available to the agency, for the five years  
19      preceding the date of such submission, or an  
20      analysis for why such data cannot be provided.

21              (b) REPORTING OF DATA.—The Director of the Na-  
22      tional Science Foundation shall publish statistical sum-  
23      mary data, as practicable, collected under this section,  
24      disaggregated and cross-tabulated by race, ethnicity, sex,  
25      socioeconomic indicators, which may include employment

1 status, occupation, educational attainment, parental edu-  
2 cation, and income, geographic location, and years since  
3 completion of doctoral degree, including in conjunction  
4 with the National Science Foundation's report required by  
5 section 37 of the Science and Engineering Equal Opportu-  
6 nities Act (42 U.S.C. 1885d; Public Law 96–516).

7 **SEC. 10503. POLICIES FOR REVIEW OF FEDERAL RESEARCH**  
8 **AWARDS.**

9 (a) ASSESSMENT OF POLICIES.—Federal research  
10 agencies shall regularly assess, and update as necessary,  
11 policies, and practices to remove or reduce cultural and  
12 institutional barriers limiting the recruitment, retention,  
13 and success of groups historically underrepresented in  
14 STEM research careers, including policies and practices  
15 relevant to the unbiased review of Federal research appli-  
16 cations.

17 (b) CONSIDERATIONS AND ACTIVITIES.—In carrying  
18 out the requirements under subsection (a), Federal re-  
19 search agencies shall—

20 (1) review current levels of participation of  
21 groups historically underrepresented in STEM in  
22 peer-review panels and consider approaches for ex-  
23 panding their participation;

24 (2) analyze the data collected under section  
25 10502, including funding rates of proposals from all

1 groups, including those historically underrepresented  
2 in STEM;

3 (3) collect and disseminate best practices to re-  
4 move or reduce cultural and institutional barriers  
5 limiting the recruitment, retention, and success of  
6 groups historically underrepresented in STEM re-  
7 search careers; and

8 (4) implement evidence-based policies and prac-  
9 tices to achieve the goals of this section.

10 **SEC. 10504. COLLECTION OF DATA ON DEMOGRAPHICS OF**  
11 **FACULTY.**

12 (a) COLLECTION OF DATA.—

13 (1) IN GENERAL.—Not later than 5 years after  
14 the date of the enactment of this Act and at least  
15 every five years thereafter, the Director of the Na-  
16 tional Science Foundation shall carry out a survey  
17 to collect data from award recipients on the demo-  
18 graphics of STEM faculty, by broad fields of STEM,  
19 at different types of institutions of higher education  
20 that receive Federal research funding.

21 (2) SURVEY CONSIDERATIONS.—To the extent  
22 practicable, the Director of the National Science  
23 Foundation shall survey, by sex, race, socioeconomic  
24 indicators, which may include employment status,  
25 occupation, educational attainment, parental edu-



1 cation, and income, geographic location, ethnicity,  
2 citizenship status, and years since completion of doc-  
3 toral degree—

4 (A) the number and percentage of faculty;

5 (B) the number and percentage of faculty  
6 at each rank;

7 (C) the number and percentage of faculty  
8 who are in nontenure-track positions, including  
9 teaching and research;

10 (D) the number and percentage of faculty  
11 who are reviewed for promotion, including ten-  
12 ure, and the percentage of that number who are  
13 promoted, including being awarded tenure;

14 (E) faculty years in rank;

15 (F) the number and percentage of faculty  
16 to leave tenure-track positions;

17 (G) the number and percentage of faculty  
18 hired, by rank; and

19 (H) the number and percentage of faculty  
20 in leadership positions.

21 (b) **EXISTING SURVEYS.**—The Director of the Na-  
22 tional Science Foundation, may, in modifying or expand-  
23 ing existing Federal surveys of higher education (as nec-  
24 essary)—

1           (1) take into account the considerations under  
2           subsection (a)(2) by collaborating with statistical  
3           centers at other Federal agencies; or

4           (2) make an award to an institution of higher  
5           education or nonprofit organization (or consortia  
6           thereof) to take such considerations into account.

7           (c) REPORTING DATA.—The Director of the National  
8           Science Foundation shall publish statistical summary data  
9           collected under this section, including as part of the Na-  
10          tional Science Foundation’s report required by section 37  
11          of the Science and Engineering Equal Opportunities Act  
12          (42 U.S.C. 1885d; Public Law 96–516).

13          (d) AUTHORIZATION OF APPROPRIATIONS.—There  
14          are authorized to be appropriated to the Director of the  
15          National Science Foundation \$4,000,000 in each of fiscal  
16          years 2023 through 2025 to develop and carry out the  
17          initial survey required under subsection (a).

18          **SEC. 10505. CULTURAL AND INSTITUTIONAL BARRIERS TO**  
19                                   **EXPANDING THE ACADEMIC AND FEDERAL**  
20                                   **STEM WORKFORCE.**

21          (a) BEST PRACTICES.—

22           (1) DEVELOPMENT OF GUIDANCE.—Not later  
23           than 12 months after the date of enactment of this  
24           Act, the Director, in consultation with the inter-  
25           agency working group on inclusion in STEM and

1       utilizing existing guidance already developed by Fed-  
2       eral research agencies where applicable, shall broadly  
3       disseminate to entities that receive Federal research  
4       funding best practices for—

5               (A) conducting periodic climate surveys of  
6       STEM departments and divisions, with a par-  
7       ticular focus on identifying and addressing any  
8       cultural or institutional barriers to the recruit-  
9       ment, retention, or advancement of groups his-  
10      torically underrepresented in STEM studies and  
11      careers; and

12              (B) providing educational opportunities, in-  
13      cluding workshops, for STEM professionals to  
14      learn about current research on effective prac-  
15      tices for unbiased recruitment, evaluation, and  
16      promotion of undergraduate and graduate stu-  
17      dents and research personnel.

18              (2) ESTABLISHMENT OF POLICIES.—Consistent  
19      with the guidance developed under paragraph (1)—

20              (A) The Director of the National Science  
21      Foundation, in consultation with the heads of  
22      Federal research agencies, shall develop a policy  
23      that—

1 (i) applies to, at a minimum, doctoral  
2 degree granting institutions that receive  
3 Federal research funding; and

4 (ii) requires each such institution, not  
5 later than 3 years after the date of enact-  
6 ment of this Act, and to the extent prac-  
7 ticable, to report to the Director of the Na-  
8 tional Science Foundation on activities and  
9 policies developed and implemented based  
10 on the guidance disseminated under para-  
11 graph (1); and

12 (B) each Federal research agency with a  
13 Federal laboratory shall maintain or develop  
14 and implement practices and policies for the  
15 purposes described in paragraph (1) for such  
16 laboratory and, not later than three years after  
17 the date of the enactment of this Act, each  
18 Federal laboratory shall report to the head of  
19 such agency on such practices and policies.

20 (b) REPORT TO CONGRESS.—Not later than four  
21 years after the date of the enactment of this Act, the Di-  
22 rector of the National Science Foundation shall submit a  
23 report to Congress that includes a summary and analysis  
24 of the types and frequency of activities and policies devel-

1 oped and carried out under subsection (a) based on the  
2 reports submitted under paragraph (2) of such subsection.

3 **SEC. 10506. EXISTING ACTIVITIES.**

4 A Federal research agency may satisfy requirements  
5 under this subtitle through activities and programs in ex-  
6 istence as of the date of the enactment of this Act.

7 **SEC. 10507. REPORT TO CONGRESS.**

8 Not later than four years after the date of the enact-  
9 ment of this Act, the Director shall submit to Congress  
10 a report that includes the following:

11 (1) A description and evaluation of the status  
12 and usage of policies implemented pursuant to sec-  
13 tion 10505 at all Federal research agencies, includ-  
14 ing any recommendations for revising or expanding  
15 such policies.

16 (2) With respect to efforts to remove or reduce  
17 cultural and institutional barriers limiting the re-  
18 cruitment, retention, and success of groups histori-  
19 cally underrepresented in academic and government  
20 STEM research careers under section 10505—

21 (A) what steps all Federal research agen-  
22 cies have taken to implement policies and prac-  
23 tices to further such efforts;

1 (B) a description of any significant up-  
2 dates to the policies for review of Federal re-  
3 search awards required under such section; and

4 (C) any evidence of the impact of such  
5 policies on the review or awarding of Federal  
6 research awards; and

7 (3) A description and evaluation of the status  
8 of institution of higher education and Federal lab-  
9 oratory policies and practices required under section  
10 10505, including any recommendations for revising  
11 or expanding such policies.

12 **SEC. 10508. MERIT REVIEW.**

13 Nothing in this subtitle may be construed as altering  
14 any intellectual or broader impacts criteria at Federal re-  
15 search agencies for evaluating award applications.

16 **SEC. 10509. DETERMINATION OF BUDGETARY EFFECTS.**

17 The budgetary effects of this subtitle, for the purpose  
18 of complying with the Statutory Pay-As-You-Go Act of  
19 2010, shall be determined by reference to the latest state-  
20 ment titled “Budgetary Effects of PAYGO Legislation”  
21 for this subtitle, submitted for printing in the Congres-  
22 sional Record by the Chairman of the House Budget Com-  
23 mittee, provided that such statement has been submitted  
24 prior to the vote on passage.

1 **SEC. 10510. DEFINITION.**

2 In this subtitle, the term “Director” means the Di-  
3 rector of the Office of Science and Technology Policy.

4 **Subtitle B—Rural STEM Education**  
5 **Research**

6 **SEC. 10511. DEFINITION.**

7 In this subtitle, the term “Director” means the Di-  
8 rector of the National Science Foundation.

9 **SEC. 10512. NATIONAL SCIENCE FOUNDATION RURAL STEM**  
10 **ACTIVITIES.**

11 (a) **PREPARING RURAL STEM EDUCATORS.—**

12 (1) **IN GENERAL.—**The Director shall make  
13 awards on a merit-reviewed, competitive basis to in-  
14 stitutions of higher education or nonprofit organiza-  
15 tions (or a consortium thereof) for research and de-  
16 velopment activities to advance innovative ap-  
17 proaches to support and sustain high-quality STEM  
18 teaching in rural schools.

19 (2) **USE OF FUNDS.—**

20 (A) **IN GENERAL.—**Awards made under  
21 this subsection shall be used for the research  
22 and development activities referred to in para-  
23 graph (1), which may include—

24 (i) engaging rural educators, prin-  
25 cipals, or other school leaders of students  
26 in prekindergarten through grade 12 in

1 professional learning opportunities to en-  
2 hance STEM knowledge, including com-  
3 puter science, and develop best practices;

4 (ii) supporting research on effective  
5 STEM teaching and school leadership  
6 practices in rural settings, including the  
7 use of rubrics and mastery- based grading  
8 practices to assess student performance  
9 when employing the transdisciplinary  
10 teaching approach for STEM disciplines;

11 (iii) designing and developing pre-  
12 service and in-service training resources to  
13 assist such rural educators, principals, and  
14 other school leaders in adopting  
15 transdisciplinary teaching practices across  
16 STEM courses;

17 (iv) coordinating with local partners  
18 to adapt STEM teaching practices to lever-  
19 age local, natural, and community assets in  
20 order to support in-place learning in rural  
21 areas;

22 (v) providing hands-on training and  
23 research opportunities for rural educators  
24 described in clause (i) at Federal labora-





1 (b) BROADENING PARTICIPATION OF RURAL STU-  
2 DENTS IN STEM.—

3 (1) IN GENERAL.—The Director shall make  
4 awards on a merit- reviewed, competitive basis to in-  
5 stitutions of higher education or nonprofit organiza-  
6 tions (or a consortium thereof) for—

7 (A) research and development of program-  
8 ming to identify the barriers rural students face  
9 in accessing high-quality STEM education; and

10 (B) development of innovative solutions to  
11 improve the participation and advancement of  
12 rural students in prekindergarten through  
13 grade 12 in STEM studies.

14 (2) USE OF FUNDS.—

15 (A) IN GENERAL.—Awards made under  
16 this subsection shall be used for the research  
17 and development activities referred to in para-  
18 graph (1), which may include—

19 (i) developing partnerships with com-  
20 munity colleges to offer advanced STEM  
21 course work, including computer science, to  
22 rural high school students;

23 (ii) supporting research on effective  
24 STEM practices in rural settings;

1 (iii) implementing a school-wide  
2 STEM approach, including preparation  
3 and support for principals and other school  
4 leaders;

5 (iv) improving the Foundation's Ad-  
6 vanced Technology Education program's  
7 coordination and engagement with rural  
8 communities;

9 (v) collaborating with existing commu-  
10 nity partners and networks, such as the  
11 Cooperative Extension System services and  
12 extramural research programs of the De-  
13 partment of Agriculture and youth serving  
14 organizations like 4-H, after school STEM  
15 programs, and summer STEM programs,  
16 to leverage community resources and de-  
17 velop place-based programming;

18 (vi) connecting rural school districts  
19 and institutions of higher education, to im-  
20 prove precollegiate STEM education and  
21 engagement;

22 (vii) supporting partnerships that  
23 offer hands- on inquiry-based science ac-  
24 tivities, including coding, and access to lab  
25 resources for students studying STEM in

1                   prekindergarten through grade 12 in a  
2                   rural area;

3                   (viii) evaluating the role of broadband  
4                   connectivity and its associated impact on  
5                   the STEM and technology literacy of rural  
6                   students;

7                   (ix) building capacity to support ex-  
8                   tracurricular STEM programs in rural  
9                   schools, including mentor-led engagement  
10                  programs, STEM programs held during  
11                  non-school hours, STEM networks,  
12                  makerspaces, coding activities, and com-  
13                  petitions;

14                  (x) creating partnerships with local in-  
15                  dustries and local educational agencies to  
16                  tailor STEM curricula and educational ex-  
17                  periences to the needs of a particular local  
18                  or regional economy; and

19                  (xi) any other activity the Director de-  
20                  termines will accomplish the goals of this  
21                  paragraph.

22                  (c) APPLICATION.—An applicant seeking an award  
23                  under subsection (a) or (b) shall submit an application at  
24                  such time, in such manner, and containing such informa-

1 tion as the Director may require. The application may in-  
2 clude the following:

3 (1) A description of the target population to be  
4 served by the research activity or activities for which  
5 such award is sought.

6 (2) A description of the process for recruitment  
7 and selection of students, educators, principals, and  
8 other school leaders, or schools from rural areas to  
9 participate in such activity or activities.

10 (3) A description of how such activity or activi-  
11 ties may inform efforts to promote the engagement  
12 and achievement of rural students in prekindergarten  
13 through grade 12 in STEM studies.

14 (4) In the case of a proposal consisting of a  
15 partnership or partnerships with one or more rural  
16 schools and one or more researchers, a plan for es-  
17 tablishing a sustained partnership that is jointly de-  
18 veloped and managed, draws from the capacities of  
19 each partner, and is mutually beneficial.

20 (d) PARTNERSHIPS.—In making awards under sub-  
21 section (a) or (b), the Director shall—

22 (1) encourage applicants which, for the purpose  
23 of the activity or activities funded through the  
24 award, include or partner with a nonprofit organiza-  
25 tion or an institution of higher education (or a con-

1 consortium thereof) that has extensive experience and  
2 expertise in increasing the participation of rural stu-  
3 dents in prekindergarten through grade 12 in  
4 STEM;

5 (2) encourage applicants which, for the purpose  
6 of the activity or activities funded through the  
7 award, include or partner with a consortium of rural  
8 schools or rural school districts; and

9 (3) encourage applications which, for the pur-  
10 pose of the activity or activities funded through the  
11 award, include commitments from school principals,  
12 other school leaders, and administrators to making  
13 reforms and activities proposed by the applicant a  
14 priority.

15 (e) EVALUATIONS.—All proposals for awards under  
16 subsections (a) and (b) shall include an evaluation plan  
17 that includes the use of outcome-oriented measures to as-  
18 sess the impact and efficacy of the award. Each recipient  
19 of an award under this subsection shall include results  
20 from these evaluative activities in annual and final  
21 projects.

22 (f) ACCOUNTABILITY AND DISSEMINATION.—

23 (1) EVALUATION REQUIRED.—The Director  
24 shall evaluate the portfolio of awards made under  
25 subsections (a) and (b). Such evaluation shall—

1           (A) use a common set of benchmarks and  
2           tools to assess the results of research conducted  
3           under such awards and identify best practices;  
4           and

5           (B) to the extent practicable, integrate the  
6           findings of research resulting from the activity  
7           or activities funded through such awards with  
8           the findings of other research on rural students'  
9           pursuit of degrees or careers in STEM.

10          (2) REPORT ON EVALUATIONS.—Not later than  
11          180 days after the completion of the evaluation  
12          under paragraph (1), the Director shall submit to  
13          Congress and make widely available to the public a  
14          report that includes—

15                 (A) the results of the evaluation; and

16                 (B) any recommendations for administra-  
17                 tive and legislative action that could optimize  
18                 the effectiveness of the awards made under this  
19                 subsection.

20          (g) REPORT BY COMMITTEE ON EQUAL OPPORTUNI-  
21          TIES IN SCIENCE AND ENGINEERING.—As part of the  
22          first report required by section 36(e) of the Science and  
23          Engineering Equal Opportunities Act (42 U.S.C.  
24          1885c(e)) transmitted to Congress after the date of enact-  
25          ment of this division, the Committee on Equal Opportuni-

1 ties in Science and Engineering, in consultation with the  
2 Chief Diversity Officer of the National Science Founda-  
3 tion, shall include—

4 (1) a description of past and present policies  
5 and activities of the Foundation to encourage full  
6 participation of students in rural communities in  
7 science, mathematics, engineering, and computer  
8 science fields;

9 (2) an assessment of trends in participation of  
10 rural students in prekindergarten through grade 12  
11 in Foundation activities; and

12 (3) an assessment of the policies and activities  
13 of the Foundation, along with proposals for new  
14 strategies or the broadening of existing successful  
15 strategies towards facilitating the goal of increasing  
16 participation of rural students in prekindergarten  
17 through grade 12 in Foundation activities.

18 (h) COORDINATION.—In carrying out this subsection,  
19 the Director shall, for purposes of enhancing program ef-  
20 fectiveness and avoiding duplication of activities, consult,  
21 cooperate, and coordinate with the programs and policies  
22 of other relevant Federal agencies.

23 (i) AUTHORIZATION OF APPROPRIATIONS.—There  
24 are authorized to be appropriated to the Director—



1           (1) \$8,000,000 to carry out the activities under  
2           subsection (a) for each of fiscal years 2023 through  
3           2027; and

4           (2) \$12,000,000 to carry out the activities  
5           under subsection (b) for each of fiscal years 2023  
6           through 2027.

7 **SEC. 10513. OPPORTUNITIES FOR ONLINE EDUCATION.**

8           (a) **IN GENERAL.**—The Director shall make competi-  
9           tive awards to institutions of higher education or nonprofit  
10           organizations (or a consortium thereof, which may include  
11           a private sector partner) to conduct research on online  
12           STEM education courses for rural communities.

13           (b) **RESEARCH AREAS.**—The research areas eligible  
14           for funding under this subsection shall include—

15           (1) evaluating the learning and achievement of  
16           rural students in prekindergarten through grade 12  
17           in STEM subjects;

18           (2) understanding how computer-based and on-  
19           line professional development courses and mentor ex-  
20           periences can be integrated to meet the needs of  
21           educators, principals, and other school leaders of  
22           rural students in prekindergarten through grade 12;

23           (3) combining computer-based and online  
24           STEM education and training with mentoring and  
25           other applied learning arrangements;

1           (4) leveraging online programs to supplement  
2       STEM studies for rural students that need physical  
3       and academic accommodation; and

4           (5) any other activity the Director determines  
5       will accomplish the goals of this subsection.

6       (c) EVALUATIONS.—All proposals for awards under  
7       this section shall include an evaluation plan that includes  
8       the use of outcome-oriented measures to assess the impact  
9       and efficacy of the award. Each recipient of an award  
10      under this subsection shall include results from these eval-  
11      uative activities in annual and final projects.

12      (d) ACCOUNTABILITY AND DISSEMINATION.—

13           (1) EVALUATION REQUIRED.—The Director  
14      shall evaluate the portfolio of awards made under  
15      this subsection. Such evaluation shall—

16           (A) use a common set of benchmarks and  
17           tools to assess the results of research conducted  
18           under such awards and identify best practices;  
19           and

20           (B) to the extent practicable, integrate  
21           findings from activities carried out pursuant to  
22           research conducted under this section, with re-  
23           spect to the pursuit of careers and degrees in  
24           STEM, with those activities carried out pursu-

1           ant to other research on serving rural students  
2           and communities.

3           (2) REPORT ON EVALUATIONS.—Not later than  
4           180 days after the completion of the evaluation  
5           under paragraph (1), the Director shall submit to  
6           Congress and make widely available to the public a  
7           report that includes—

8                   (A) the results of the evaluation; and

9                   (B) any recommendations for administra-  
10           tive and legislative action that could optimize  
11           the effectiveness of the awards made under this  
12           section.

13           (e) COORDINATION.—In carrying out this section, the  
14           Director shall, for purposes of enhancing program effec-  
15           tiveness and avoiding duplication of activities, consult, co-  
16           operate, and coordinate with the programs and policies of  
17           other relevant Federal agencies.

18   **SEC. 10514. NATIONAL ACADEMIES EVALUATION.**

19           (a) STUDY.—Not later than 12 months after the date  
20           of enactment of this division, the Director shall enter into  
21           an agreement with the National Academies under which  
22           the National Academies agree to conduct an evaluation  
23           and assessment that—

24                   (1) evaluates the quality and quantity of cur-  
25           rent Federal programming and research directed at

1 examining STEM education for students in pre-  
2 kindergarten through grade 12 and workforce devel-  
3 opment in rural areas;

4 (2) in coordination with the Federal Commu-  
5 nications Commission, assesses the impact that the  
6 scarcity of broadband connectivity in rural commu-  
7 nities, and the affordability of broadband  
8 connectivity, have on STEM and technical literacy  
9 for students in prekindergarten through grade 12 in  
10 rural areas;

11 (3) assesses the core research and data needed  
12 to understand the challenges rural areas are facing  
13 in providing quality STEM education and workforce  
14 development;

15 (4) makes recommendations for action at the  
16 Federal, State, and local levels for improving STEM  
17 education, including online STEM education, for  
18 students in prekindergarten through grade 12 and  
19 workforce development in rural areas; and

20 (5) makes recommendations to inform the im-  
21 plementation of programs in sections 10512 and  
22 10513 (\_\_\_\_\_-LOG262) and (\_\_\_\_\_-LOG263).

23 (b) REPORT TO DIRECTOR.—The agreement entered  
24 into under subsection (a) shall require the National Acad-  
25 emies, not later than 24 months after the date of enact-

1 ment of this division, to submit to the Director a report  
2 on the study conducted under such paragraph, including  
3 the National Academies' findings and recommendations.

4 (c) AUTHORIZATION OF APPROPRIATIONS.—There  
5 are authorized to be appropriated to the Director to carry  
6 out this section \$1,000,000 for fiscal year 2023.

7 **SEC. 10515. GAO REVIEW.**

8 Not later than 3 years after the date of enactment  
9 of this division, the Comptroller General of the United  
10 States shall conduct a study on the engagement of rural  
11 populations in Federal STEM education programs and  
12 submit to Congress a report that includes—

13 (1) an assessment of how Federal STEM edu-  
14 cation programs are serving rural populations;

15 (2) a description of initiatives carried out by  
16 Federal agencies that are targeted at supporting  
17 STEM education in rural areas;

18 (3) an assessment of what is known about the  
19 impact and effectiveness of Federal investments in  
20 STEM education programs that are targeted to  
21 rural areas; and

22 (4) an assessment of challenges that State and  
23 Federal STEM education programs face in reaching  
24 rural population centers.

1 **SEC. 10516. NIST ENGAGEMENT WITH RURAL COMMU-**  
2 **NITIES.**

3 (a) **PRIZE COMPETITION.**—Pursuant to section 24 of  
4 the Stevenson-Wydler Technology Innovation Act of 1980  
5 (15 U.S.C. 3719), the Secretary of Commerce shall carry  
6 out a program to award prizes competitively to stimulate  
7 research and development of creative technologies to sup-  
8 port the deployment of affordable and reliable broadband  
9 connectivity in rural communities, including unserved  
10 rural communities.

11 (b) **PLAN FOR DEPLOYMENT IN RURAL COMMU-**  
12 **NITIES.**—Each proposal submitted pursuant to subsection  
13 (a) shall include a proposed plan for deployment of the  
14 technology that is the subject of such proposal.

15 (c) **PRIZE AMOUNT.**—In carrying out the program  
16 under subsection (a), the Secretary may award not more  
17 than a total of \$5,000,000 to one or more winners of the  
18 prize competition.

19 (d) **REPORT.**—Not later than 60 days after the date  
20 on which a prize is awarded under the prize competition,  
21 the Secretary shall submit to the relevant committees of  
22 Congress a report that describes the winning proposal of  
23 the prize competition.

24 (e) **CONSULTATION.**—In carrying out the program  
25 under this section, the Secretary shall consult with the  
26 Federal Communications Commission and the heads of

1 relevant departments and agencies of the Federal Govern-  
2 ment.

3 **Subtitle C—MSI STEM**  
4 **Achievement**

5 **SEC. 10521. GAO REVIEW.**

6 Not later than three years after the date of the enact-  
7 ment of this Act, the Comptroller General of the United  
8 States shall report to Congress—

9 (1) an inventory of competitive funding pro-  
10 grams and initiatives carried out by Federal re-  
11 search agencies that are targeted to HBCUs, TCUs,  
12 and MSIs or partnerships with HBCUs, TCUs, and  
13 MSIs;

14 (2) an assessment of Federal research agency  
15 outreach activities to increase the participation and  
16 competitiveness of HBCUs, TCUs, and MSIs in the  
17 funding programs and initiatives identified in para-  
18 graph (1); and

19 (3) recommendations of the Comptroller Gen-  
20 eral to increase the participation of and the rate of  
21 success of HBCUs, TCUs, and MSIs in competitive  
22 funding programs offered by Federal research agen-  
23 cies.

1 **SEC. 10522. AGENCY RESPONSIBILITIES.**

2 (a) IN GENERAL.—In consultation with outside  
3 stakeholders and the heads of Federal research agencies  
4 and the Interagency Working Group on Inclusion in  
5 STEM, the Director of the Office of Science and Tech-  
6 nology Policy shall develop a uniform set of policy guide-  
7 lines for Federal research agencies to carry out a sus-  
8 tained program of outreach activities to increase clarity,  
9 transparency, and accountability for Federal research  
10 agency investments in STEM education and research ac-  
11 tivities at HBCUs, TCUs, and MSIs, including such insti-  
12 tutions in rural areas.

13 (b) OUTREACH ACTIVITIES.—In developing policy  
14 guidelines under subsection (a) the Director of the Office  
15 of Science and Technology Policy shall include guidelines  
16 that require each Federal research agency—

17 (1) to designate a liaison for HBCUs, TCUs,  
18 and MSIs responsible for—

19 (A) enhancing direct communication with  
20 HBCUs, TCUs, and MSIs to increase the Fed-  
21 eral research agency’s understanding of the ca-  
22 pacity and needs of such institutions and to  
23 raise awareness of available Federal funding op-  
24 portunities at such institutions;



1 (B) coordinating programs, activities, and  
2 initiatives while accounting for the capacity and  
3 needs of HBCUs, TCUs, and MSIs;

4 (C) tracking Federal research agency in-  
5 vestments in and engagement with HBCUs,  
6 TCUs, and MSIs; and

7 (D) reporting progress toward increasing  
8 participation of HBCUs, TCUs, and MSIs in  
9 award programs;

10 (2) to the extent practicable, to produce an an-  
11 nual summary of funding opportunities and proposal  
12 deadlines targeted at HBCUs, TCUs, and MSIs, in-  
13 cluding for grants, contracts, subcontracts, and co-  
14 operative agreements;

15 (3) to the extent practicable, identifying in an-  
16 nual budget requests potential areas for collabora-  
17 tion with HBCUs, TCUs, and MSIs in the relevant  
18 fiscal year, including relating to potential meetings  
19 and workshops;

20 (4) to investigate proposal structures that sup-  
21 port broader participation by emerging research in-  
22 stitutions, including HBCUs, TCUs, and MSIs;

23 (5) to conduct on-site reviews of research facili-  
24 ties at HBCUs, TCUs, and MSIs, as practicable,

1 and make recommendations regarding strategies for  
2 becoming more competitive in research;

3 (6) to hold geographically accessible or virtual  
4 workshops on research priorities of the Federal re-  
5 search agency and on how to write competitive  
6 award proposals and how to bolster award manage-  
7 ment capacity for the entire award lifecycle, from  
8 application to completion;

9 (7) to ensure opportunities for HBCUs, TCUs,  
10 and MSIs to directly communicate with Federal re-  
11 search agency officials responsible for managing  
12 competitive award programs in order to receive feed-  
13 back on research ideas and proposals, including  
14 guidance on the Federal research agency's merit re-  
15 view process; and

16 (8) to foster mutually beneficial public-private  
17 collaboration among Federal research agencies, in-  
18 dustry, Federal laboratories, academia, and non-  
19 profit organizations to—

20 (A) identify alternative sources of funding  
21 for STEM education and research at HBCUs,  
22 TCUs, and MSIs;

23 (B) provide access to high-quality, relevant  
24 research experiences for students and faculty of  
25 HBCUs, TCUs, and MSIs;

1 (C) expand the professional networks of  
2 students and faculty of HBCUs, TCUs, and  
3 MSIs;

4 (D) broaden STEM educational opportuni-  
5 ties for students and faculty of HBCUs, TCUs,  
6 and MSIs; and

7 (E) support the transition of students of  
8 HBCUs, TCUs, and MSIs into the STEM  
9 workforce;

10 (c) STRATEGIC PLAN.—

11 (1) IN GENERAL.—Not later than one year  
12 after the date of the enactment of this Act, the Di-  
13 rector of the Office of Science and Technology Pol-  
14 icy, in collaboration with the head of each Federal  
15 research agency, shall submit to Congress a report  
16 containing a strategic plan which reflects the plans  
17 of each Federal research agency to increase the ca-  
18 pacity of HBCUs, TCUs, and MSIs to compete ef-  
19 fectively for grants, contracts, or cooperative agree-  
20 ments and to encourage HBCUs, TCUs, and MSIs  
21 to participate in Federal programs.

22 (2) CONSIDERATIONS.—In developing a stra-  
23 tegic plan under paragraph (1), the Director and the  
24 head of each Federal research agency shall consider  
25 the following:

1           (A) Issuing new or expanding existing  
2 funding opportunities targeted to HBCUs,  
3 TCUs, and MSIs.

4           (B) Modifying existing research and devel-  
5 opment program solicitations to incentivize ef-  
6 fective partnerships with HBCUs, TCUs, and  
7 MSIs.

8           (C) Offering planning grants for HBCUs,  
9 TCUs, and MSIs to develop or equip grant of-  
10 fices with the requisite depth of knowledge to  
11 submit competitive grant proposals and manage  
12 awarded grants.

13           (D) Offering additional training programs,  
14 including individualized and timely guidance to  
15 grant officers, faculty, and postdoctoral re-  
16 searchers at HBCUs, TCUs, and MSIs to en-  
17 sure their understanding of the requirements  
18 for an effective grant proposal.

19           (E) Other approaches for making current  
20 competitive funding models more accessible for  
21 underresourced HBCUs, TCUs, and MSIs.

22       (d) REPORT ON POLICY GUIDELINES.—Not later  
23 than two years after the date of the enactment of this Act  
24 and every five years thereafter, the Director of the Office  
25 of Science and Technology Policy shall report to Congress

1 on the implementation by Federal research agencies of the  
2 policy guidelines developed under this section.

3 (e) REPORT ON COORDINATION OF FEDERAL STEM  
4 EDUCATION.—Subsection (d) of section 101(d) of the  
5 America COMPETES Reauthorization Act of 2010 (42  
6 U.S.C. 6621) is amended—

7 (1) in paragraph (7) by striking “and”;

8 (2) in paragraph (8) by striking the period at  
9 the end;

10 (3) by adding at the end the following:

11 “(9) an account of Federal research agency in-  
12 vestments in HBCUs, TCUs, and MSIs, including,  
13 to the degree practicable, data on the level of partici-  
14 pation of HBCUs, TCUs, and MSIs as prime recipi-  
15 ents, contractors, subrecipients, or subcontractors of  
16 an award, or reasonable estimates thereof; and

17 “(10) a description of material changes to the  
18 implementation of section 10522 of the Research  
19 and Development, Competition, and Innovation  
20 Act.”.

21 **SEC. 10523. RESEARCH AT THE NATIONAL SCIENCE FOUN-**  
22 **DATION.**

23 (a) IN GENERAL.—The Director shall make awards,  
24 on a competitive basis, to institutions of higher education  
25 or nonprofit organizations (or consortia thereof) to—

1           (1) conduct research described in subsection (b)  
2           with respect to HBCUs, TCUs, and MSIs; and

3           (2) identify and broadly disseminate effective  
4           models for programs and practices at HBCUs,  
5           TCUs, and MSIs that promote the education and  
6           workforce preparation of minority students pursuing  
7           STEM studies and careers in which such students  
8           are underrepresented.

9           (b) RESEARCH.—Research described in this sub-  
10          section is research on the contribution of HBCUs, TCUs,  
11          and MSIs to the education and training of underrep-  
12          resented minority students in STEM fields and to the  
13          meeting of national STEM workforce needs, including re-  
14          lating to the following:

15               (1) The diversity with respect to local context,  
16               cultural differences, and institutional structure  
17               among HBCUs, TCUs, and MSIs and any associ-  
18               ated impact on education and research endeavors.

19               (2) Effective practices at HBCUs, TCUs, and  
20               MSIs and associated outcomes on student recruit-  
21               ment, retention, and advancement in STEM fields,  
22               including the ability for students to compete for fel-  
23               lowships, employment, and advancement in the  
24               workforce.

1           (3) Contributions made by HBCUs, TCUs, and  
2           MSIs to local, regional, and national workforces.

3           (4) The challenges and opportunities for  
4           HBCUs, TCUs, and MSIs in attaining the resources  
5           needed for integrating effective practices in STEM  
6           education, including providing research experiences  
7           for underrepresented minority students.

8           (5) The access of students at HBCUs, TCUs,  
9           and MSIs to STEM infrastructure and any associ-  
10          ated outcomes for STEM competency.

11          (6) Models of STEM curriculum, learning, and  
12          teaching successful at HBCUs, TCUs, and MSIs for  
13          increasing participation, retention, and success of  
14          underrepresented minority students.

15          (7) Successful or promising partnerships be-  
16          tween HBCUs, TCUs, and MSIs and other institu-  
17          tions of higher education, private sector and non-  
18          profit organizations, Federal laboratories, and inter-  
19          national research institutions.

20          (c) RESEARCH EXPERIENCES.—Awards under this  
21          section may fund the development or expansion of oppor-  
22          tunities for the exchange of students and faculty to con-  
23          duct research, facilitate professional development, and  
24          provide mentorship, including through partnerships with  
25          institutions of higher education that are not HBCUs,

1 TCUs, or MSIs, private sector and nonprofit organiza-  
2 tions, Federal laboratories, and international research in-  
3 stitutions.

4 **SEC. 10524. CAPACITY-BUILDING PROGRAM FOR DEVEL-**  
5 **OPING UNIVERSITIES.**

6 (a) AWARDS.—

7 (1) IN GENERAL.—The Director shall make  
8 awards, on a competitive basis, to eligible institu-  
9 tions described in subsection (b) to support the mis-  
10 sion of the Foundation and to build institutional re-  
11 search capacity at eligible institutions.

12 (2) ADMINISTRATION.—The Director may ad-  
13 minister separate competitions for each category of  
14 eligible institution described in subparagraphs (A)  
15 through (C) of subsection (b)(1) in order to ensure  
16 fair competition for institutions with significantly  
17 different research capacities.

18 (b) ELIGIBLE INSTITUTIONS.—To be eligible to re-  
19 ceive an award under this subsection, an entity—

20 (1) shall be—

21 (A) a historically Black college or univer-  
22 sity;

23 (B) a Tribal College or University;

24 (C) a minority-serving institution;



1 (D) an institution of higher education with  
2 an established STEM capacity-building pro-  
3 gram focused on Native Hawaiians and Alaska  
4 Natives; or

5 (E) consortia thereof;

6 (2) shall—

7 (A) have not more than \$50,000,000 in  
8 annual federally financed research and develop-  
9 ment expenditures for science and engineering  
10 as reported through the National Science Foun-  
11 dation Higher Education Research and Devel-  
12 opment Survey; or

13 (B) not be an institution classified as hav-  
14 ing very high research activity by the Carnegie  
15 Classification of Institutions of Higher Edu-  
16 cation.

17 (c) PARTNERSHIPS.—In making awards under this  
18 section, the Director shall—

19 (1) encourage entities that are consortia of eli-  
20 gible institutions to submit proposals and require  
21 such proposals to include a plan for establishing a  
22 sustained partnership that is jointly developed and  
23 managed, draws from the capacities of each institu-  
24 tion, and is mutually beneficial;

1           (2) encourage proposals submitted in partner-  
2           ship with the private sector, nonprofit organizations,  
3           Federal laboratories, and international research in-  
4           stitutions, as appropriate;

5           (3) require proposals described in paragraphs  
6           (1) and (2) to include a plan to strengthen the ad-  
7           ministrative and research capacity of the partnering  
8           HBCUs, TCUs, or MSIs to lead future proposals.

9           (d) VERY HIGH RESEARCH ACTIVITY STATUS HIS-  
10          TORICALLY BLACK COLLEGES AND UNIVERSITIES PRO-  
11          GRAM.—Awards under this section may be used to enable  
12          HBCUs which have high research activity status to  
13          achieve very high research activity status, as classified  
14          under the Carnegie Classification of Institutions of Higher  
15          Education, by enabling—

16               (1) faculty professional development;

17               (2) stipends for graduate and undergraduate  
18               students, and postdoctoral scholars;

19               (3) acquisition of laboratory equipment and in-  
20               strumentation; and

21               (4) other activities as necessary to build re-  
22               search capacity.

23          (e) PROPOSALS.—To receive an award under this  
24          subsection, an eligible institution shall submit an applica-  
25          tion to the Director at such time, in such manner, and

1 containing such information as the Director may require,  
2 including—

3 (1) a plan that describes how the eligible insti-  
4 tution will establish or expand research office capac-  
5 ity and how such award would be used to—

6 (A) conduct an assessment of capacity-  
7 building and research infrastructure needs of  
8 an eligible institution;

9 (B) enhance institutional resources to pro-  
10 vide administrative research development sup-  
11 port to faculty at an eligible institution;

12 (C) bolster the institutional research com-  
13 petitiveness of an eligible institution to support  
14 awards made by the Foundation;

15 (D) support the acquisition of instrumen-  
16 tation necessary to build research capacity at  
17 an eligible institution in research areas directly  
18 associated with the Foundation;

19 (E) increase capability of an eligible insti-  
20 tution to move technology into the marketplace;

21 (F) increase engagement with industry to  
22 execute research through the SBIR and STTR  
23 programs (as such terms are defined in section  
24 9(e) of the Small Business Act (15 U.S.C.

1           638(e)) and direct contracts at an eligible insti-  
2           tution;

3           (G) enhance STEM curriculum and re-  
4           search training opportunities at the under-  
5           graduate, graduate, and postdoctoral levels at  
6           an eligible institution;

7           (H) further faculty development initiatives  
8           and strengthen institutional research training  
9           infrastructure, capacity, and competitiveness of  
10          an eligible institution;

11          (I) address plans and prospects for long-  
12          term sustainability of institutional enhance-  
13          ments at an eligible institution resulting from  
14          the award including, if applicable, how the  
15          award may be leveraged by an eligible institu-  
16          tion to build a broader base of support; and

17          (J) develop and implement mechanisms for  
18          institutions of higher education to partner with  
19          HBCUs, TCUs, and MSIs on STEM education,  
20          including the facilitation of student exchanges,  
21          course and resource sharing, collaboration, and  
22          matriculation of students to either institution's  
23          graduate programs, mentoring programs for  
24          students and junior faculty, joint research

1 projects, and student access to graduate edu-  
2 cation; and

3 (2) as relevant, a plan, which shall be updated  
4 every three years, that describes the institution's  
5 strategy to achieve very high research activity sta-  
6 tus, including making investments with institutional  
7 and non-Federal funds, to achieve that status within  
8 a decade of the grant award, to the extent prac-  
9 ticable.

10 (f) MSI CENTERS OF INNOVATION.—Awards under  
11 this section may fund the establishment of not more than  
12 five MSI Centers of Innovation to leverage successes of  
13 HBCUs, TCUs, and MSIs in STEM education and re-  
14 search training of underrepresented minority students as  
15 models for other institutions, including both HBCUs,  
16 TCUs, and MSIs and institutions of higher education that  
17 are not HBCUs, TCUs, or MSIs. Such centers will be lo-  
18 cated on campuses of selected HBCUs, TCUs, or MSIs,  
19 and serve as incubators to allow institutions of higher edu-  
20 cation to experiment, pilot, evaluate, and scale up prom-  
21 ising practices.

22 (g) AWARDS.—Awards made under this subsection  
23 shall be for periods of three years and may be extended  
24 for periods of not more than five years.

1 (h) AUTHORIZATION OF APPROPRIATIONS.—There  
2 are authorized to be appropriated to the Director  
3 \$200,000,000 for fiscal year 2023 and \$250,000,000 for  
4 each of fiscal years 2024 through 2027 to carry out the  
5 activities in this section and section 10523.

6 (i) REPORT ON IMPROVING THE RESEARCH CAPAC-  
7 ITY AT HIGH RESEARCH ACTIVITY HISTORICALLY BLACK  
8 COLLEGES AND UNIVERSITIES.—

9 (1) IN GENERAL.—Not later than one year  
10 after the date of the enactment of this Act, the Na-  
11 tional Science and Technology Council shall prepare  
12 and submit a report that—

13 (A) identifies challenges and barriers to  
14 Federal research and development awards for  
15 high research activity status HBCUs; and

16 (B) identifies recommendations for Federal  
17 research agencies to sustainably boost the re-  
18 search capacity of high research activity status  
19 HBCUs through awards-making authorities.

20 (2) REPORT SUBMISSION.—The National  
21 Science and Technology Council shall transmit the  
22 report required under paragraph (1) to the Director,  
23 the Administrator of the National Aeronautics and  
24 Space Administration, the Secretary of Agriculture,  
25 the Secretary of Commerce, the Secretary of De-

1 fense, the Secretary of Energy, the Secretary of  
2 Health and Human Services, and the heads of other  
3 such agencies as determined relevant by the Na-  
4 tional Science and Technology Council.

5 (3) INFORMATION FROM FEDERAL AGENCIES.—  
6 The National Science and Technology Council may  
7 secure directly from a Federal department or agency  
8 such information as the National Science and Tech-  
9 nology Council considers necessary to prepare the re-  
10 port required under paragraph (1). Upon a request  
11 from the National Science and Technology Council,  
12 the head of a Federal department or agency shall  
13 furnish such information as is requested to the Na-  
14 tional Science and Technology Council.

15 **SEC. 10525. TRIBAL COLLEGES AND UNIVERSITIES PRO-**  
16 **GRAM.**

17 (a) AWARDS TO BROADEN TRIBAL COLLEGE AND  
18 UNIVERSITY STUDENT PARTICIPATION IN COMPUTER  
19 SCIENCE.—Section 525 of the America COMPETES Re-  
20 authorization Act of 2010 (42 U.S.C. 1862p–13) is  
21 amended by adding at the end the following:

22 “(d) AWARDS TO BROADEN TRIBAL COLLEGE AND  
23 UNIVERSITY STUDENT PARTICIPATION IN COMPUTER  
24 SCIENCE.—

1           “(1) IN GENERAL.—The Director, as part of  
2           the program authorized under this section, shall  
3           make awards on a competitive, merit-reviewed basis  
4           to eligible entities to increase the participation of  
5           Tribal populations in computer science and computa-  
6           tional thinking education programs to enable stu-  
7           dents to develop skills and competencies in coding,  
8           problem-solving, critical thinking, creativity and col-  
9           laboration.

10           “(2) PURPOSE.—Awards made under this sub-  
11           section shall support—

12                   “(A) research and development needed to  
13                   bring computer science and computational  
14                   thinking courses and degrees to Tribal Colleges  
15                   or Universities;

16                   “(B) research and development of instruc-  
17                   tional materials needed to integrate computer  
18                   science and computational thinking into pro-  
19                   grams that are culturally relevant to students  
20                   attending Tribal Colleges or Universities;

21                   “(C) research, development and evaluation  
22                   of distance education for computer science and  
23                   computational thinking courses and degree pro-  
24                   grams for students attending Tribal Colleges  
25                   and Universities; and



1           “(D) other activities consistent with the  
2           activities described in paragraphs (1) through  
3           (4) of subsection (b), as determined by the Di-  
4           rector.

5           “(3) PARTNERSHIPS.—A Tribal College or Uni-  
6           versity seeking an award under this subsection, or  
7           consortia thereof, may partner with an institution of  
8           higher education or nonprofit organization with dem-  
9           onstrated expertise in academic program develop-  
10          ment.

11          “(4) COORDINATION.—In carrying out this sub-  
12          section, the Director shall consult and cooperate  
13          with the programs and policies of other relevant  
14          Federal agencies to avoid duplication with and en-  
15          hance the effectiveness of the program under this  
16          subsection.

17          “(5) AUTHORIZATION OF APPROPRIATIONS.—  
18          There are authorized to be appropriated to the Di-  
19          rector \$2,000,000 in each of fiscal years 2023  
20          through 2027 to carry out this subsection.”.

21          (b) EVALUATION.—

22                 (1) IN GENERAL.—Not later than two years  
23                 after the date of the enactment of this Act, the Di-  
24                 rector shall evaluate the award program authorized  
25                 under section 525 of the America COMPETES Re-

1 authorization Act of 2010 (42 U.S.C. 1862p–13), as  
2 amended by subsection (a).

3 (2) REQUIREMENTS.—In conducting the evalua-  
4 tion under paragraph (1), the Director shall, as  
5 practicable—

6 (A) use a common set of benchmarks and  
7 assessment tools to identify best practices and  
8 materials developed or demonstrated by the re-  
9 search conducted pursuant to award programs  
10 under section 525 of the America COMPETES  
11 Reauthorization Act of 2010 (42 U.S.C.  
12 1862p–13), as amended by subsection (a);

13 (B) include an assessment of the effective-  
14 ness of such award programs in expanding ac-  
15 cess to high quality STEM education, research,  
16 and outreach at Tribal Colleges or Universities,  
17 as applicable;

18 (C) assess the number of students who  
19 participated in such award programs; and

20 (D) assess the percentage of students par-  
21 ticipating in such award programs who success-  
22 fully complete their education programs.

23 (3) REPORT.—Not later than 180 days after  
24 the date on which the evaluation under paragraph  
25 (1) is completed, the Director shall submit to Con-

1       gress and make available to the public, a report on  
2       the results of the evaluation, including any rec-  
3       ommendations for legislative action that could opti-  
4       mize the effectiveness of the award program author-  
5       ized under section 525 of the America COMPETES  
6       Reauthorization Act of 2010, as amended by sub-  
7       section (a).

8       **SEC. 10526. DEFINITIONS.**

9       In this subtitle:

10           (1) DIRECTOR.—The term “Director” means  
11       the Director of the National Science Foundation.

12           (2) HBCU.—The term “HBCU” has the mean-  
13       ing given the term “part B institution” in section  
14       322 of the Higher Education Act of 1965 (20  
15       U.S.C. 1061).

16           (3) MINORITY SERVING INSTITUTION.—The  
17       term “minority serving institution” or “MSI” means  
18       Hispanic-Serving Institutions as defined in section  
19       502 of the Higher Education Act of 1965 (20  
20       U.S.C. 1101a); Alaska Native Serving Institutions  
21       and Native Hawaiian-Serving Institutions as defined  
22       in section 317 of the Higher Education Act of 1965  
23       (20 U.S.C. 1059d); and Predominantly Black Insti-  
24       tutions, Asian American and Native American Pa-  
25       cific Islander-Serving Institutions, and Native Amer-

1        ican-Serving Nontribal Institutions as defined in sec-  
2        tion 371 of the Higher Education Act of 1965 (20  
3        U.S.C. 1067q(e)).

4            (4) TCU.—The term “TCU” has the meaning  
5        given the term “Tribal College or University” in sec-  
6        tion 316 of the Higher Education Act of 1965 (20  
7        U.S.C. 1059c).

8            **Subtitle D—Combating Sexual**  
9            **Harassment in Science**

10        **SEC. 10531. FINDINGS.**

11        Congress makes the following findings:

12            (1) According to the report issued by the Na-  
13        tional Academies of Sciences, Engineering, and Med-  
14        icine in 2018 entitled “Sexual Harassment of  
15        Women: Climate, Culture, and Consequences in Aca-  
16        demic Sciences, Engineering, and Medicine”—

17            (A) sexual harassment is pervasive in insti-  
18        tutions of higher education;

19            (B) the most common type of sexual har-  
20        assment is gender harassment;

21            (C) 58 percent of individuals in the aca-  
22        demic workplace experience sexual harassment,  
23        the second highest rate when compared to the  
24        military, the private sector, and Federal, State,  
25        and local government;

1 (D) women who are members of racial or  
2 ethnic minority groups are more likely to expe-  
3 rience sexual harassment and to feel unsafe at  
4 work than White women, White men, or men  
5 who are members of such groups;

6 (E) the training for each individual who  
7 has a Doctor of Philosophy in the science, tech-  
8 nology, engineering, and mathematics fields is  
9 estimated to cost approximately \$500,000; and

10 (F) attrition of an individual so trained re-  
11 sults in a loss of talent and money.

12 (2) According to a 2017 University of Illinois  
13 study, among astronomers and planetary scientists,  
14 18 percent of women who are members of racial or  
15 ethnic minority groups and 12 percent of White  
16 women skipped professional events because they did  
17 not feel safe attending.

18 (3) Reporting procedures with respect to sexual  
19 harassment are inconsistent among Federal research  
20 agencies and have varying degrees of accessibility.

21 (4) There is not adequate communication  
22 among Federal research agencies and between such  
23 agencies and recipients regarding reports of sexual  
24 harassment, which has resulted in harassers receiv-

1       ing Federal funding after moving to a different in-  
2       stitution.

3       **SEC. 10532. PURPOSE.**

4       The purpose of this subtitle is to increase under-  
5       standing of the causes and consequences of sex-based and  
6       sexual harassment, as discussed in the report issued by  
7       the National Academies in 2018 entitled “Sexual Harass-  
8       ment of Women: Climate, Culture, and Consequences in  
9       Academic Sciences, Engineering, and Medicine”, and to  
10      advance evidence-based approaches to reduce the preva-  
11      lence and negative impact of such harassment.

12      **SEC. 10533. DEFINITION.**

13      In this subtitle, the term “Director” means the Di-  
14      rector of the National Science Foundation.

15      **SEC. 10534. RESEARCH AWARDS.**

16      (a) IN GENERAL.—The Director shall make awards,  
17      on a competitive basis, to institutions of higher education  
18      or nonprofit organizations (or consortia of such institu-  
19      tions or organizations)—

20              (1) to expand research efforts to better under-  
21              stand the factors contributing to, and consequences  
22              of, sex-based and sexual harassment affecting indi-  
23              viduals in the STEM workforce, including students  
24              and trainees; and

1           (2) to examine approaches to reduce the inci-  
2           dence and negative consequences of such harass-  
3           ment.

4           (b) USE OF FUNDS.—Activities funded by an award  
5           under this section may include—

6           (1) research on the sex-based and sexual har-  
7           assment experiences of individuals, including in ra-  
8           cial and ethnic minority groups, disabled individuals,  
9           foreign nationals, sexual-minority individuals, and  
10          others;

11          (2) development and assessment of policies,  
12          procedures, trainings, and interventions, with respect  
13          to sex-based and sexual harassment, conflict man-  
14          agement, and ways to foster respectful and inclusive  
15          climates;

16          (3) research on approaches for remediating the  
17          negative impacts and outcomes of such harassment  
18          on individuals experiencing such harassment;

19          (4) support for institutions of higher education  
20          or nonprofit organizations to develop, adapt, imple-  
21          ment, and assess the impact of innovative, evidence-  
22          based strategies, policies, and approaches to policy  
23          implementation to prevent and address sex-based  
24          and sexual harassment;

1           (5) research on alternatives to the power dy-  
2           namics, hierarchical, and dependent relationships,  
3           including but not limited to the mentor-mentee rela-  
4           tionship, in academia that have been shown to create  
5           higher levels of risk for and lower levels of reporting  
6           of sex- based and sexual harassment; and

7           (6) establishing a center for the ongoing com-  
8           pilation, management, and analysis of organizational  
9           climate survey data.

10 **SEC. 10535. RESPONSIBLE CONDUCT GUIDE.**

11           (a) IN GENERAL.—Not later than 180 days after the  
12           date of enactment of this Act, the Director shall enter into  
13           an agreement with the National Academies to update the  
14           report entitled “On Being a Scientist: A Guide to Respon-  
15           sible Conduct in Research” issued by the National Acad-  
16           emies. The report, as so updated, shall include—

17           (1) updated professional standards of conduct  
18           in research;

19           (2) promising practices for preventing, address-  
20           ing, and mitigating the negative impact of sex-based  
21           and sexual harassment, to include—

22                   (A) standards of treatment individuals can  
23                   expect to receive under updated standards of  
24                   conduct;



1 (B) evidence-based practices for fostering a  
2 climate intolerant of sex-based, sexual, and  
3 other forms of harassment;

4 (C) methods, including bystander interven-  
5 tion, for identifying and addressing incidents of  
6 such harassment; and

7 (D) professional standards for mentorship  
8 and teaching with an emphasis on power diffu-  
9 sion mechanisms and preventing such harass-  
10 ment; and

11 (3) promising practices for mitigating potential  
12 security risks that threaten research security.

13 (b) REPORT.—Not later than 18 months after the ef-  
14 fective date of the agreement under subsection (a), the  
15 National Academies, as part of such agreement, shall sub-  
16 mit to the Director and the Committee on Science, Space,  
17 and Technology of the House of Representatives and the  
18 Committee on Commerce, Science, and Transportation of  
19 the Senate the report referred to in such subparagraph,  
20 as updated pursuant to such subparagraph.

21 **SEC. 10536. INTERAGENCY WORKING GROUP.**

22 (a) IN GENERAL.—The Director of the Office of  
23 Science and Technology Policy, acting through the Na-  
24 tional Science and Technology Council, shall establish or  
25 designate an interagency working group for the purpose

1 of coordinating Federal research agency efforts to reduce  
2 the prevalence of sex-based and sexual harassment involv-  
3 ing award personnel. In coordination with the working  
4 group on inclusion in STEM fields established under sec-  
5 tion 308 of the American Innovation and Competitiveness  
6 Act (42 U.S.C. 6626) and the Safe Inclusive Research En-  
7 vironments Subcommittee of the National Science and  
8 Technology Council, and in consultation with representa-  
9 tives from each Federal research agency, the Office for  
10 Civil Rights at the Department of Health and Human  
11 Services, the Office for Civil Rights at the Department  
12 of Education, and the Equal Employment Opportunity  
13 Commission, the working group shall—

14           (1) not later than 90 days after the date of the  
15           enactment of this Act, submit to the Committee on  
16           Science, Space, and Technology, the Committee on  
17           Education and Labor, and the Committee on Energy  
18           and Commerce of the House of Representatives and  
19           the Committee on Commerce, Science, and Trans-  
20           portation and the Committee on Health, Education,  
21           Labor, and Pensions of the Senate an inventory of  
22           Federal research agency policies, procedures, and re-  
23           sources dedicated to preventing and responding to  
24           reports of sex-based and sexual harassment;

1           (2) not later than 6 months after the date on  
2           which the inventory is submitted under paragraph  
3           (1)—

4                   (A) in consultation with outside stake-  
5                   holders, develop a consistent set of policy guide-  
6                   lines for Federal research agencies; and

7                   (B) submit a report to the committees re-  
8                   ferred to in paragraph (1) containing such  
9                   guidelines;

10           (3) encourage and monitor efforts of Federal  
11           research agencies to develop or maintain and imple-  
12           ment policies based on the guidelines developed  
13           under paragraph (2);

14           (4) not later than 1 year after the date on  
15           which the inventory under paragraph (1) is sub-  
16           mitted, and every 5 years thereafter, the Director of  
17           the Office of Science and Technology Policy shall re-  
18           port to Congress on the implementation by Federal  
19           research agencies of the policy guidelines developed  
20           under paragraph (2); and

21           (5) update such policy guidelines as needed.

22           (b) REQUIREMENTS.—In developing policy guidelines  
23           under subsection (a)(2), the Director of the Office of  
24           Science and Technology Policy shall include guidelines  
25           that require, to the extent practicable—

1           (1) recipients to submit to the Federal research  
2           agency or agencies from which the recipients receive  
3           funding reports relating to—

4                   (A) any decision made to launch a formal  
5                   investigation of sex-based or sexual harassment,  
6                   including bullying, retaliation, or hostile work-  
7                   ing conditions by, or of, award personnel;

8                   (B) administrative action, related to an al-  
9                   legation against award personnel of any such  
10                  harassment, as set forth in organizational poli-  
11                  cies or codes of conduct, statutes, regulations,  
12                  or executive orders, that affects the ability of  
13                  award personnel or their trainees to carry out  
14                  the activities of the award;

15                  (C) the total number of investigations with  
16                  no findings or determinations of misconduct in-  
17                  cluding such harassment;

18                  (D) findings or determinations of such  
19                  harassment, as set forth in organizational poli-  
20                  cies or codes of conduct, statutes, regulations,  
21                  or Executive orders by, or of, award personnel,  
22                  including the final disposition of a matter in-  
23                  volving a violation of organizational policies and  
24                  processes, to include the exhaustion of permis-  
25                  sible appeals, or a determination of a sexual of-

1           fense in a court of law, or any other discipli-  
2           nary action taken;

3           (2) the sharing, updating, and archiving of re-  
4           ports of sex- based and sexual harassment from re-  
5           cipients submitted under paragraph (1) with rel-  
6           evant Federal research agencies, on a yearly basis  
7           and by agency request; and

8           (3) consistency among Federal research agen-  
9           cies with regard to the policies and procedures for  
10          receiving reports submitted pursuant to paragraph  
11          (1).

12          (4) FERPA.—The Director of the Office of  
13          Science and Technology Policy shall ensure that  
14          such guidelines and requirements are consistent with  
15          the requirements of section 444 of the General Edu-  
16          cation Provisions Act (20 U.S.C. 1232g) (commonly  
17          referred to as the “Family Educational Rights and  
18          Privacy Act of 1974”).

19          (5) PRIVACY PROTECTIONS.—The Director of  
20          the Office of Science and Technology Policy shall en-  
21          sure that such guidelines and requirements—

22                  (A) do not infringe upon the privacy rights  
23                  of individuals associated with reports submitted  
24                  to Federal research agencies; and

1 (B) do not require recipients to provide in-  
2 terim reports to Federal research agencies.

3 (c) CONSIDERATIONS.—In carrying out subsection  
4 (a)(2), the Director of the Office of Science and Tech-  
5 nology Policy shall consider issuing guidelines that require  
6 or incent—

7 (1) recipients to periodically assess their organi-  
8 zational climate, which may include the use of cli-  
9 mate surveys, focus groups, or exit interviews;

10 (2) recipients to publish on a publicly available  
11 internet website the results of assessments con-  
12 ducted pursuant to paragraph (1), disaggregated by  
13 sex and, if practicable, race, ethnicity, disability sta-  
14 tus, and sexual orientation, and in a manner that  
15 does not include personally identifiable information;

16 (3) recipients to make public on an annual  
17 basis the number of reports of sex-based and sexual  
18 harassment at that institution or organization;

19 (4) recipients to regularly assess and improve  
20 policies, procedures, and interventions to reduce the  
21 prevalence of and improve the reporting of sex-based  
22 and sexual harassment;

23 (5) each entity applying for a research and de-  
24 velopment award certify that a code of conduct is in  
25 place for maintaining a healthy and welcoming work-

1 place for award personnel and posted on their public  
2 website;

3 (6) each recipient and Federal research agency  
4 to have in place mechanisms for addressing the  
5 needs of individuals who have experienced sex-based  
6 and sexual harassment, including those individuals  
7 seeking to reintegrate at the recipient entity; and

8 (7) recipients to work to create a climate intolerant of sex-based and sexual harassment and that  
9 values and promotes diversity and inclusion.

11 (d) FEDERAL RESEARCH AGENCY IMPLEMENTA-  
12 TION.—Not later than 270 days after receiving the guide-  
13 lines under paragraph (a)(2), each Federal research agen-  
14 cy shall—

15 (1) develop or maintain and implement policies  
16 with respect to sex-based and sexual harassment  
17 that are consistent with policy guidelines under sub-  
18 section (a)(2) and that protect the privacy of all par-  
19 ties involved in any report and investigation of sex-  
20 based or sexual harassment, to the maximum extent  
21 practicable; and

22 (2) broadly disseminate such policies to current  
23 and potential recipients of research and development  
24 awards made by such agency.

1 **SEC. 10537. NATIONAL ACADEMIES ASSESSMENT.**

2 Not later than 3 years after the date of enactment  
3 of this Act, the Director shall enter into an agreement  
4 with the National Academies to undertake a study and  
5 issue a report on the influence of sex-based and sexual  
6 harassment in institutions of higher education on the ca-  
7 reer advancement of individuals in the STEM workforce.

8 The study shall assess—

9 (1) the state of research on sex-based and sex-  
10 ual harassment in such workforce;

11 (2) whether research demonstrates a decrease  
12 in the prevalence of sex-based and sexual harass-  
13 ment in such workforce;

14 (3) the progress made with respect to imple-  
15 menting recommendations promulgated in the Na-  
16 tional Academies consensus study report entitled  
17 “Sexual Harassment of Women: Climate, Culture,  
18 and Consequences in Academic Sciences, Engineer-  
19 ing, and Medicine”;

20 (4) where to focus future efforts with respect to  
21 decreasing the prevalence of sex-based and sexual  
22 harassment in such institutions, including specific  
23 recommendations; and

24 (5) other recommendations and issues, as the  
25 National Academies determines appropriate.



1 **SEC. 10538. GAO STUDY.**

2 Not later than 3 years after the date of enactment  
3 of this division, the Comptroller General of the United  
4 States shall—

5 (1) complete a study that assesses the degree to  
6 which Federal research agencies have implemented  
7 the policy guidelines developed under section  
8 10536(a)(2) and the effectiveness of that implemen-  
9 tation; and

10 (2) submit a report to the Committee on  
11 Science, Space, and Technology of the House of  
12 Representatives and the Committee on Commerce,  
13 Science, and Transportation of the Senate on the re-  
14 sults of such study, including recommendations on  
15 potential changes to practices and policies to im-  
16 prove those guidelines and that implementation.

17 **SEC. 10539. AUTHORIZATION OF APPROPRIATIONS.**

18 There is authorized to be appropriated to the Direc-  
19 tor to carry out this subtitle, \$32,500,000.

1 **TITLE VI—MISCELLANEOUS**  
2 **SCIENCE AND TECHNOLOGY**  
3 **PROVISIONS**

4 **Subtitle A—Supporting Early-**  
5 **career Researchers**

6 **SEC. 10601. EARLY-CAREER RESEARCH FELLOWSHIP PRO-**  
7 **GRAM.**

8 (a) IN GENERAL.—The Director of the National  
9 Science Foundation may establish a 2-year pilot program  
10 to make awards to highly qualified early-career investiga-  
11 tors to carry out an independent research program at the  
12 institution of higher education or participating Federal re-  
13 search facility chosen by such investigator, to last for a  
14 period not greater than two years.

15 (b) SELECTION PROCESS.—The Director of the Na-  
16 tional Science Foundation shall select recipients under  
17 subsection (a) from among citizens, nationals, and lawfully  
18 admitted permanent resident aliens of the United States.

19 (c) OUTREACH.—The Director of the National  
20 Science Foundation shall conduct program outreach to re-  
21 cruit fellowship applicants—

22 (1) from all regions of the country;

23 (2) from historically underrepresented popu-  
24 lations in the fields of science, technology, engineer-  
25 ing, and mathematics; and

1           (3) who graduate from or intend to carry out  
2           research at a variety of types of institutions of high-  
3           er education, including—

4                   (A) historically Black colleges and univer-  
5                   sities;

6                   (B) Tribal Colleges and Universities;

7                   (C) minority-serving institutions;

8                   (D) institutions of higher education that  
9                   are not among the top 50 institutions in annual  
10                  Federal funding for research; and

11                  (E) EPSCoR institutions.

12           (d) SPECIAL CONSIDERATION.—The Director of the  
13           National Science Foundation shall give special consider-  
14           ation and priority to an application from an individual who  
15           graduated from or is intending to carry out research at  
16           an institution of the type specified in subsection (c)(3).

17           (e) REPORTS FROM FELLOWS.—Not later than 180  
18           days after the end of the pilot program under this section,  
19           each early-career investigator who receives an award  
20           under the pilot program shall submit to the Director of  
21           the National Science Foundation a report that describes  
22           how the early-career investigator used the award funds.

23           (f) REPORT FROM THE DIRECTOR.—Not later than  
24           90 days after the conclusion of the second year of the pilot  
25           program, the Director of the National Science Foundation

1 shall submit to Congress a report that includes the fol-  
2 lowing:

3 (1) A summary of the uses of award funds  
4 under this section and the impact of the pilot pro-  
5 gram under this section.

6 (2) Statistical summary data on fellowship  
7 awardees disaggregated by race, ethnicity, sex, geog-  
8 raphy, age, years since completion of doctoral de-  
9 gree, and institution type.

10 (3) If determined effective, a plan for perma-  
11 nent implementation of the pilot program.

12 **SEC. 10602. AUTHORIZATION OF APPROPRIATIONS.**

13 There is authorized to be appropriated to the Direc-  
14 tor of the National Science Foundation \$250,000,000 for  
15 each of fiscal years 2023 through 2024 to carry out the  
16 activities in this subtitle.

17 **Subtitle B—National Science and**  
18 **Technology Strategy**

19 **SEC. 10611. NATIONAL SCIENCE AND TECHNOLOGY STRAT-**  
20 **EGY.**

21 Section 206 of the National Science and Technology  
22 Policy, Organization, and Priorities Act of 1976 (42  
23 U.S.C. 6615) is amended to read as follows:

1 **“SEC. 206. NATIONAL SCIENCE AND TECHNOLOGY STRAT-**  
2 **EGY.**

3 “(a) IN GENERAL.—Not later than December 31 of  
4 the year immediately after the calendar year in which a  
5 review under section 206B is completed, the Director of  
6 the Office of Science and Technology Policy shall, in co-  
7 ordination with the National Science and Technology  
8 Council, develop and submit to Congress a comprehensive  
9 national science and technology strategy of the United  
10 States to meet national research and development objec-  
11 tives for the following 4-year period (in this section re-  
12 ferred to as ‘the national science and technology strat-  
13 egy’).

14 “(b) REQUIREMENTS.—In developing each national  
15 science and technology strategy described in subsection  
16 (a), the Director of the Office of Science and Technology  
17 Policy shall—

18 “(1) consider—

19 “(A) the recommendations and priorities  
20 developed by the review under section 206B;

21 “(B) the most recently published interim  
22 or final national security strategy report sub-  
23 mitted pursuant to section 108 of the National  
24 Security Act of 1947 (50 U.S.C. 3043);

25 “(C) other relevant national plans, reports,  
26 and strategies; and

1           “(D) the strategic plans of relevant Fed-  
2           eral departments and agencies; and

3           “(2) include a description of—

4           “(A) strategic objectives and research pri-  
5           orities necessary to maintain and advance—

6           “(i) the leadership of the United  
7           States in science and technology, including  
8           in the key technology focus areas, includ-  
9           ing near-term, medium-term, and long-  
10          term economic competitiveness; and

11          “(ii) the leadership of the United  
12          States in technologies required to address  
13          societal and national challenges, including  
14          a transition to a circular economy;

15          “(B) programs, policies, and activities that  
16          the President recommends across all Federal  
17          departments and agencies to achieve the stra-  
18          tegic objectives and research priorities described  
19          in subparagraph (A);

20          “(C) plans to promote sustainability prac-  
21          tices and strategies for increasing jobs in the  
22          United States;

23          “(D) global trends in science and tech-  
24          nology, including potential threats to the leader-  
25          ship of the United States in science and tech-

1 nology and opportunities for international col-  
2 laboration in science and technology; and

3 “(E) plans to foster the development of  
4 international partnerships to reinforce domestic  
5 policy actions, build new markets, engage in  
6 collaborative research, and create an inter-  
7 national environment that reflects United  
8 States values and protects United States inter-  
9 ests.

10 “(c) CONSULTATION.—The Director of the Office of  
11 Science and Technology Policy shall consult as necessary  
12 with the Office of Management and Budget and other ap-  
13 propriate elements of the Executive Office of the President  
14 to ensure that the recommendations and priorities delin-  
15 eated in the science and technology strategy are incor-  
16 porated in the development of annual budget requests.

17 “(d) BI-ANNUAL BRIEFING TO CONGRESS.—The Di-  
18 rector of the Office of Science and Technology Policy shall  
19 provide on a bi-annual basis, after each release of the na-  
20 tional science and technology strategy, a briefing to the  
21 relevant congressional committees, which may include up-  
22 dates on the following:

23 “(1) The status and development of the na-  
24 tional science and technology strategy, including any  
25 significant changes.

1           “(2) The implementation of the national science  
2           and technology strategy.

3           “(3) Any other information about the national  
4           science and technology strategy, as determined by  
5           the Director of the Office of Science and Technology  
6           Policy.

7           “(e) PUBLICATION.—The Director of the Office of  
8           Science and Technology Policy shall, consistent with the  
9           protection of national security and other sensitive matters  
10          to the maximum extent practicable, make each national  
11          science and technology strategy publicly available on an  
12          internet website of the Office. Each report may include  
13          a classified annex if the Director of the Office of Science  
14          and Technology Policy determines such is appropriate.

15          “(f) TERMINATION.—This section terminates on the  
16          date that is ten years after the date of the enactment of  
17          this section.”.

18       **SEC. 10612. STRATEGY AND REPORT ON THE NATION’S ECO-**  
19                                       **NOMIC SECURITY, SCIENCE, RESEARCH, AND**  
20                                       **INNOVATION TO SUPPORT THE NATIONAL SE-**  
21                                       **CURITY STRATEGY.**

22          (a) DEFINITIONS.—In this section:

23                  (1) FOREIGN COUNTRY OF CONCERN.—The  
24                  term “foreign country of concern” means the Peo-  
25                  ple’s Republic of China, the Democratic People’s Re-



1 public of Korea, the Russian Federation, the Islamic  
2 Republic of Iran, or any other country determined to  
3 be a country of concern by the Department of State.

4 (2) FOREIGN ENTITY OF CONCERN.—The term  
5 “foreign entity of concern” means a foreign entity  
6 that is—

7 (A) designated as a foreign terrorist orga-  
8 nization by the Secretary of State under section  
9 219(a) of the Immigration and Nationality Act  
10 (8 U.S.C. 1189(a));

11 (B) included on the list of specially des-  
12 ignated nationals and blocked persons main-  
13 tained by the Office of Foreign Assets Control  
14 of the Department of the Treasury (commonly  
15 known as the SDN list);

16 (C) owned by, controlled by, or subject to  
17 the jurisdiction or direction of a government of  
18 a foreign country that is a covered nation (as  
19 such term is defined in section 4872 of title 10,  
20 United States Code);

21 (D) alleged by the Attorney General to  
22 have been involved in activities for which a con-  
23 viction was obtained under—

1 (i) chapter 37 of title 18, United  
2 States Code (commonly known as the Es-  
3 pionage Act);

4 (ii) section 951 or 1030 of title 18,  
5 United States Code;

6 (iii) chapter 90 of title 18, United  
7 States Code (commonly known as the Eco-  
8 nomic Espionage Act of 1996);

9 (iv) the Arms Export Control Act (22  
10 U.S.C. 2751 et seq.);

11 (v) section 224, 225, 226, 227, or 236  
12 of the Atomic Energy Act of 1954 (42  
13 U.S.C. 2274, 2275, 2276, 2277, and  
14 2284);

15 (vi) the Export Control Reform Act of  
16 2018 (50 U.S.C. 4801 et seq.); or

17 (vii) the International Emergency  
18 Economic Powers Act (50 U.S.C. 1701 et  
19 seq.); or

20 (E) determined by the Secretary of Com-  
21 merce, in consultation with the Secretary of De-  
22 fense and the Director of National Intelligence,  
23 to be engaged in unauthorized conduct that is  
24 detrimental to the national security or foreign  
25 policy of the United States.

1           (3) NATIONAL SECURITY STRATEGY.—The term  
2           “national security strategy” means the national se-  
3           curity strategy required under section 108 of the  
4           National Security Act of 1947 (50 U.S.C. 3043).

5           (b) STRATEGY AND REPORT.—

6           (1) IN GENERAL.—Not later than 90 days after  
7           the transmission of each national security strategy  
8           under section 108(a) of the National Security Act of  
9           1947 (50 U.S.C. 3043(a)), the President, acting  
10          through the Director of the Office of Science and  
11          Technology Policy, shall, in coordination with the  
12          National Science and Technology Council, the Na-  
13          tional Security Council, the Director of the National  
14          Economic Council, and the heads of such other rel-  
15          evant Federal agencies as the Director of the Office  
16          of Science and Technology Policy considers appro-  
17          priate and in consultation with such nongovern-  
18          mental partners as the Director of the Office of  
19          Science and Technology Policy considers appro-  
20          priate—

21                 (A) review such strategy, including the na-  
22                 tional defense strategy under subsection (g) of  
23                 section 113 of title 10, United States Code, and  
24                 the national science and technology strategy  
25                 under section 206 of the National Science and

1 Technology Policy, Organization, and Priorities  
2 Act of 1976 (42 U.S.C. 6615), programs, and  
3 resources as the Director of the Office of  
4 Science and Technology Policy determines per-  
5 tain to United States' national competitiveness  
6 in science, technology, research, innovation, and  
7 technology transfer activities, including pat-  
8 enting and licensing, that support the national  
9 security strategy;

10 (B) develop or revise a national strategy to  
11 improve the national competitiveness of United  
12 States science, technology, research, and inno-  
13 vation to support the national security strategy;  
14 and

15 (C) submit to Congress—

16 (i) a report on the findings of the Di-  
17 rector of the Office of Science and Tech-  
18 nology Policy with respect to the review  
19 conducted pursuant to subparagraph (A);  
20 and

21 (ii) the strategy developed or revised  
22 pursuant to subparagraph (B).

23 (2) TERMINATION.—This subsection terminates  
24 on the date that is 5 years after the date of the en-  
25 actment of this Act.

1 (c) ELEMENTS.—

2 (1) REPORT.—Each report submitted under  
3 subsection (b)(1)(C)(i) shall include the following:

4 (A) An assessment of the efforts of the  
5 United States Government to preserve United  
6 States leadership in key emerging technologies  
7 and prevent United States strategic competitors  
8 from leveraging advanced technologies to gain  
9 strategic military or economic advantages over  
10 the United States.

11 (B) An assessment of public and private  
12 investment in science and technology relevant to  
13 national security purposes, and the implications  
14 of such for the geostrategic position of the  
15 United States.

16 (C) A description of the prioritized eco-  
17 nomic security interests and objectives.

18 (D) An assessment of global trends in  
19 science and technology, including potential  
20 threats to the national security of the United  
21 States in science and technology.

22 (E) An assessment of the national debt  
23 and its implications for the economic and na-  
24 tional security of the United States.

1           (F) An assessment of how regional innova-  
2           tion capacity efforts in STEM fields are con-  
3           tributing and could contribute to the national  
4           security the United States, including programs  
5           run by State and local governments.

6           (G) An assessment of the following:

7                   (i) Workforce needs for competitive-  
8                   ness in technology areas identified in the  
9                   national security strategy.

10                   (ii) Any efforts needed to expand  
11                   pathways into technology fields to achieve  
12                   the goals of the national security strategy.

13           (H) An assessment of barriers to the devel-  
14           opment, evolution, or competitiveness of start-  
15           ups, small and mid-sized business entities, and  
16           industries that are critical to national security.

17           (I) An assessment of the effectiveness of  
18           the Federal Government, federally funded re-  
19           search and development centers, and national  
20           laboratories in supporting and promoting the  
21           technology commercialization and technology  
22           transfer of technologies critical to national secu-  
23           rity.

24           (J) An assessment of manufacturing ca-  
25           pacity, logistics, and supply chain dynamics of

1 major export sectors that are critical to national  
2 security, including access to a skilled workforce,  
3 physical infrastructure, and broadband network  
4 infrastructure.

5 (K) An assessment of how the Federal  
6 Government is increasing the participation of  
7 underrepresented populations in science, re-  
8 search, innovation, and manufacturing.

9 (L) An assessment of public-private part-  
10 nerships in technology commercialization in  
11 support of national security, including—

12 (i) the structure of current defense  
13 technology research and commercialization  
14 arrangements with regard to public-private  
15 partnerships; and

16 (ii) the extent to which intellectual  
17 property developed with Federal defense  
18 funding—

19 (I) is being used to manufacture  
20 in the United States rather than in  
21 other countries; and

22 (II) is being used by foreign busi-  
23 ness entities that are majority owned  
24 or controlled (as such term is defined  
25 in section 800.208 of title 31, Code of

1 Federal Regulations, or a successor  
2 regulation), or minority owned greater  
3 than 25 percent by—

4 (aa) any governmental orga-  
5 nization of a foreign country of  
6 concern; or

7 (bb) any other entity that  
8 is—

9 (AA) known to be  
10 owned or controlled by any  
11 governmental organization  
12 of a foreign country of con-  
13 cern; or

14 (BB) organized under,  
15 or otherwise subject to, the  
16 laws of a foreign country of  
17 concern.

18 (M) Recommendations to enhance the abil-  
19 ity of the Federal Government to recruit into  
20 Federal service and retain in such service indi-  
21 viduals with critical skills relevant to national  
22 security.

23 (N) Recommendations for policies to pro-  
24 tect United States leadership and the allies of  
25 the United States in critical areas relevant to



1 national security through targeted export con-  
2 trols, investment screening, and counterintel-  
3 ligence activities.

4 (O) Informed by the interagency process  
5 established under section 1758 of the Export  
6 Control Reform Act of 2018, a technology  
7 annex, which may be classified, describing an  
8 integrated and enduring approach to the identi-  
9 fication, prioritization, development, and field-  
10 ing of emerging technologies relevant to na-  
11 tional security.

12 (2) STRATEGY.—Each strategy submitted  
13 under subsection (b)(1)(C)(ii) shall, to the extent  
14 practicable, include the following:

15 (A) A plan to utilize available tools to ad-  
16 dress or minimize the leading threats and chal-  
17 lenges and to take advantage of the leading op-  
18 portunities, particularly in regards to tech-  
19 nologies central to international competition in  
20 science and technology relevant to national se-  
21 curity purposes, including the following:

22 (i) Specific objectives, tasks, metrics,  
23 and milestones for each relevant Federal  
24 agency.

1 (ii) Strategic objectives and priorities  
2 necessary to maintain the leadership of the  
3 United States in science and technology  
4 relevant to national security purposes, in-  
5 cluding near-term, medium-term, and long-  
6 term research priorities.

7 (iii) Specific plans to safeguard re-  
8 search and technology funded, as appro-  
9 priate, in whole or in part, by the Federal  
10 Government, including in technologies crit-  
11 ical to national security, from theft or  
12 exfiltration by foreign entities of concern.

13 (iv) Specific plans to support public  
14 and private sector investment in research,  
15 technology development, education and  
16 workforce development, and domestic man-  
17 ufacturing supportive of the national secu-  
18 rity of the United States and to foster the  
19 use of public-private partnerships.

20 (v) A description of the following:

21 (I) How the strategy submitted  
22 under subsection (b)(1)(C)(ii) sup-  
23 ports the national security strategy.

24 (II) How the strategy submitted  
25 under such subsection is integrated

1 and coordinated with the most re-  
2 cent—

3 (aa) national defense strat-  
4 egy under subsection (g) of sec-  
5 tion 113 of title 10, United  
6 States Code; and

7 (bb) national science and  
8 technology strategy under section  
9 206 of the National Science and  
10 Technology Policy, Organization,  
11 and Priorities Act of 1976 (42  
12 U.S.C. 6615).

13 (vi) A plan to encourage the govern-  
14 ments of countries that are allies or part-  
15 ners of the United States to cooperate with  
16 the execution of such strategy, where ap-  
17 propriate.

18 (vii) A plan for strengthening the in-  
19 dustrial base of the United States.

20 (viii) A plan to remove or update over-  
21 ly burdensome or outdated Federal regula-  
22 tions, as appropriate.

23 (ix) A plan—

24 (I) to further incentivize industry  
25 participation in public-private partner-

1 ships for the purposes of accelerating  
2 technology research and commer-  
3 cialization in support of national secu-  
4 rity, including alternate ways of ac-  
5 counting for in-kind contributions and  
6 valuing partially manufactured prod-  
7 ucts;

8 (II) to ensure that intellectual  
9 property developed with Federal fund-  
10 ing is commercialized in the United  
11 States; and

12 (III) to ensure, to the maximum  
13 appropriate extent, that intellectual  
14 property developed with Federal fund-  
15 ing is not being used by foreign busi-  
16 ness entities that are majority owned  
17 or controlled (as such term is defined  
18 in section 800.208 of title 31, Code of  
19 Federal Regulations, or a successor  
20 regulation), or minority owned greater  
21 than 25 percent by—

22 (aa) any governmental orga-  
23 nization of a foreign country of  
24 concern; or

1 (bb) any other entity that  
2 is—

3 (AA) known to be  
4 owned or controlled by any  
5 governmental organization  
6 of a foreign country of con-  
7 cern; or

8 (BB) organized under,  
9 or otherwise subject to, the  
10 laws of a foreign country of  
11 concern.

12 (x) An identification of additional re-  
13 sources, administrative action, or legisla-  
14 tive action recommended to assist with the  
15 implementation of such strategy.

16 (d) RESEARCH AND DEVELOPMENT FUNDING.—The  
17 Director of the Office of Science and Technology Policy  
18 shall, as the Director of the Office of Science and Tech-  
19 nology Policy considers necessary, consult with the Direc-  
20 tor of the Office of Management and Budget and with the  
21 heads of such other elements of the Executive Office of  
22 the President as the Director of the Office of Science and  
23 Technology Policy considers appropriate to ensure the rec-  
24 ommendations and priorities with respect to research and  
25 development funding relevant to national security, as ex-

1 pressed in the most recent report and strategy submitted  
2 under subsection (b)(1)(C) are incorporated into the devel-  
3 opment of annual budget requests for Federal research  
4 agencies.

5 (e) PUBLICATION.—The Director of the Office of  
6 Science and Technology Policy shall, consistent with the  
7 protection of national security and other sensitive matters  
8 and to the maximum extent practicable, make each report  
9 submitted under subsection (b)(1)(C)(i) publicly available  
10 on an internet website of the Office of Science and Tech-  
11 nology Policy. Each such report may include a classified  
12 annex if the Director of the Office of Science and Tech-  
13 nology Policy determines such is appropriate.

14 **SEC. 10613. QUADRENNIAL SCIENCE AND TECHNOLOGY RE-**  
15 **VIEW.**

16 The National Science and Technology Policy, Organi-  
17 zation, and Priorities Act of 1976 (42 U.S.C. 6601 et seq.)  
18 is amended by inserting after section 206 the following  
19 new section:

20 **“SEC. 206B. QUADRENNIAL SCIENCE AND TECHNOLOGY RE-**  
21 **VIEW.**

22 “(a) REQUIREMENTS.—

23 “(1) QUADRENNIAL REVIEWS REQUIRED.—Not  
24 later than December 31, 2023, and every four years  
25 thereafter, the Director of the Office of Science and

1 Technology Policy shall complete a review of the  
2 science and technology enterprise of the United  
3 States (in this section referred to as the ‘quadren-  
4 nial science and technology review’).

5 “(2) SCOPE.—The quadrennial science and  
6 technology review shall be a comprehensive examina-  
7 tion of the science and technology strategy of the  
8 United States, including recommendations for main-  
9 taining global leadership in science and technology  
10 and advancing science and technology to address the  
11 societal and national challenges and guidance re-  
12 garding the coordination of programs, assets, capa-  
13 bilities, budget, policies, and authorities across all  
14 Federal research and development programs.

15 “(3) CONSULTATION.—The Director of the Of-  
16 fice of Science and Technology Policy shall conduct  
17 each quadrennial science and technology review in  
18 consultation with the following:

19 “(A) The National Science and Technology  
20 Council.

21 “(B) The President’s Council of Advisors  
22 on Science and Technology.

23 “(C) The National Science Board.

24 “(D) The National Security Council.

1                   “(E) The heads of other relevant Federal  
2 agencies.

3                   “(F) Other relevant governmental and  
4 nongovernmental entities, including representa-  
5 tives from industry, institutions of higher edu-  
6 cation, nonprofit organizations, Members of  
7 Congress, and other policy experts.

8                   “(4) COORDINATION.—The Director of the Of-  
9 fice of Science and Technology Policy shall ensure  
10 that each quadrennial science and technology review  
11 is coordinated with other relevant statutorily re-  
12 quired reviews, and to the maximum extent prac-  
13 ticable incorporates information and recommenda-  
14 tions from existing reviews to avoid duplication.

15                   “(b) CONTENTS.—In each quadrennial science and  
16 technology review, the Director of the Office of Science  
17 and Technology Policy shall—

18                   “(1) provide an integrated view of, and rec-  
19 ommendations for, science and technology policy  
20 across the Federal Government, while considering  
21 economic and national security and other societal  
22 and national challenges;

23                   “(2) assess and recommend priorities for re-  
24 search, development, and demonstration programs to  
25 maintain United States leadership in science and



1 technology, including in manufacturing and indus-  
2 trial innovation;

3 “(3) assess and recommend priorities for re-  
4 search, development, and demonstration programs to  
5 address societal and national challenges;

6 “(4) assess the global competition in science  
7 and technology and identify potential threats to the  
8 leadership of the United States in science and tech-  
9 nology and opportunities for international collabora-  
10 tion;

11 “(5) assess and make recommendations on the  
12 science, technology, engineering, mathematics, and  
13 computer science workforce of the United States;

14 “(6) assess and make recommendations to im-  
15 prove regional innovation across the United States;

16 “(7) identify and assess sectors critical for the  
17 long-term resilience of United States innovation  
18 leadership across design, manufacturing, supply  
19 chains, and markets;

20 “(8) assess and make recommendations to im-  
21 prove translation of basic and applied research and  
22 the enhancement of technology transfer of federally  
23 funded research;

1           “(9) identify, assess, and make recommenda-  
2           tions to address science and technology gaps that  
3           would not be met without Federal investment;

4           “(10) review administrative and legislative poli-  
5           cies and funding opportunities that affect private  
6           sector science and technology activities, and identify  
7           and make recommendations regarding policies that  
8           maintain and grow the participation and competi-  
9           tiveness of small- and medium-sized businesses;

10           “(11) assess and identify the infrastructure and  
11           tools needed to maintain the leadership of the  
12           United States in science and technology and address  
13           other societal and national challenges; and

14           “(12) review administrative or legislative poli-  
15           cies that affect the science and technology enterprise  
16           and identify and make recommendations regarding  
17           policies that hinder research and development in the  
18           United States.

19           “(c) REPORTING.—

20           “(1) IN GENERAL.—Not later than December  
21           31 of the year in which a quadrennial science and  
22           technology review is conducted, the Director of the  
23           Office of Science and Technology Policy shall submit  
24           to Congress a report relating to such review.

1           “(2) PUBLICATION.—The Director of the Office  
2           of Science and Technology Policy shall, consistent  
3           with the protection of national security and other  
4           sensitive matters to the maximum extent practicable,  
5           make each report submitted under paragraph (1)  
6           publicly available on an internet website of the Of-  
7           fice of Science and Technology Policy. Each report  
8           may include a classified annex if the Director of the  
9           Office of Science and Technology Policy determines  
10          such appropriate.

11          “(d) TERMINATION.—This section shall terminate on  
12          the date that is ten years after the date of the enactment  
13          of this section.”.

## 14          **Subtitle C—Regional Innovation**

### 15          **SEC. 10621. REGIONAL INNOVATION CAPACITY.**

16          (a) IN GENERAL.—The Stevenson-Wydler Tech-  
17          nology Innovation Act of 1980 (Public Law 96–480; 15  
18          U.S.C. 3701 et seq.) is amended—

19                  (1) by redesignating section 28 as section 30;  
20          and

21                  (2) by inserting after section 27 the following:

22          **“SEC. 28. REGIONAL TECHNOLOGY AND INNOVATION HUB**  
23                  **PROGRAM.**

24          “(a) DEFINITIONS.—In this section:

1           “(1) APPROPRIATE COMMITTEES OF CON-  
2           GRESS.—The term ‘appropriate committees of Con-  
3           gress’ means—

4                   “(A) the Committee on Commerce,  
5           Science, and Transportation, the Committee on  
6           Environment and Public Works, and the Com-  
7           mittee on Appropriations of the Senate; and

8                   “(B) the Committee on Science, Space,  
9           and Technology and the Committee on Appro-  
10          priations of the House of Representatives.

11          “(2) COOPERATIVE EXTENSION SERVICES.—  
12          The term ‘cooperative extension services’ has the  
13          meaning given the term in section 1404 of the Food  
14          and Agriculture Act of 1977 (7 U.S.C. 3103).

15          “(3) SITE CONNECTIVITY INFRASTRUCTURE.—  
16          The term ‘site connectivity infrastructure’ means lo-  
17          calized driveways and access roads to a facility as  
18          well as hookups to the new facility for drinking  
19          water, waste water, broadband, and other basic in-  
20          frastructure services already present in the area.

21          “(4) VENTURE DEVELOPMENT ORGANIZA-  
22          TION.—The term ‘venture development organization’  
23          has the meaning given such term in section 27(a) of  
24          the Stevenson-Wydler Act of 1980 (15 U.S.C.  
25          3722(a)).

1           “(5) COMMUNITY DEVELOPMENT FINANCIAL IN-  
2           STITUTION.—The term ‘community development fi-  
3           nancial institution’ has the meaning given in section  
4           103 of the Community Development Banking and  
5           Financial Institutions Act of 1994 (12 U.S.C.  
6           4702).

7           “(6) MINORITY DEPOSITORY INSTITUTION.—  
8           The term ‘minority depository institution’ means an  
9           entity that is—

10                   “(A) a minority depository institution, as  
11                   defined in section 308 of the Financial Institu-  
12                   tions Reform, Recovery, and Enforcement Act  
13                   of 1989 (12 U.S.C. 1463 note); or

14                   “(B) considered to be a minority deposi-  
15                   tory institution by—

16                           “(i) the appropriate Federal banking  
17                           agency; or

18                           “(ii) the National Credit Union Ad-  
19                           ministration, in the case of an insured  
20                           credit union.

21           “(7) LOW POPULATION STATE.—The term ‘low  
22           population State’ means a State without an urban-  
23           ized area with a population greater than 250,000 as  
24           reported in the decennial census.

1           “(8) SMALL AND RURAL COMMUNITIES.—The  
2 term ‘small and rural community’ means a noncore  
3 area, a micropolitan area, or a small metropolitan  
4 statistical area with a population of not more than  
5 250,000.

6           “(b) REGIONAL TECHNOLOGY AND INNOVATION HUB  
7 PROGRAM.—

8           “(1) IN GENERAL.—Subject to the availability  
9 of appropriations, the Secretary shall carry out a  
10 program—

11           “(A) to encourage new and constructive  
12 collaborations among local, State, Tribal, and  
13 Federal government entities, institutions of  
14 higher education, the private sector, economic  
15 development organizations, labor organizations,  
16 nonprofit organizations, and community organi-  
17 zations that promote broad-based regional inno-  
18 vation initiatives;

19           “(B) to support eligible consortia in the  
20 development and implementation of regional in-  
21 novation strategies;

22           “(C) to designate eligible consortia as re-  
23 gional technology and innovation hubs and fa-  
24 cilitate activities by consortia designated as re-

1           gional technology and innovation hubs in imple-  
2           menting their regional innovation strategies—

3                   “(i) to enable United States leader-  
4                   ship in technology and innovation sectors  
5                   critical to national and economic security;

6                   “(ii) to support regional economic de-  
7                   velopment and resilience, including in  
8                   small cities and rural areas, and promote  
9                   increased geographic diversity of innova-  
10                  tion across the United States;

11                  “(iii) to promote the benefits of tech-  
12                  nology development and innovation for all  
13                  Americans, including underserved commu-  
14                  nities and vulnerable communities;

15                  “(iv) to support the modernization  
16                  and expansion of United States manufac-  
17                  turing based on advances in technology  
18                  and innovation;

19                  “(v) to support domestic job creation  
20                  and broad-based economic growth; and

21                  “(vi) to improve the pace of market  
22                  readiness, industry maturation, and overall  
23                  commercialization and domestic production  
24                  of innovative research;

1           “(D) to ensure that the regional tech-  
2           nology and innovation hubs address the inter-  
3           section of emerging technologies and either re-  
4           gional challenges or national challenges; and

5           “(E) to conduct ongoing research, evalua-  
6           tion, analysis, and dissemination of best prac-  
7           tices for regional development and competitive-  
8           ness in technology and innovation.

9           “(2) AWARDS.—The Secretary shall carry out  
10          the program required by paragraph (1) through the  
11          award of the following:

12           “(A) Strategy development grants or coop-  
13           erative agreements to eligible consortia under  
14           subsection (e).

15           “(B) Strategy implementation grants or  
16           cooperative agreements to regional technology  
17           and innovation hubs under subsection (f).

18           “(3) ADMINISTRATION.—The Secretary shall  
19          carry out this section through the Assistant Sec-  
20          retary of Commerce for Economic Development in  
21          coordination with the Under Secretary of Commerce  
22          for Standards and Technology.

23           “(c) ELIGIBLE CONSORTIA.—For purposes of this  
24          section, an eligible consortium is a consortium that—



1           “(1) includes 1 or more of each of the fol-  
2           lowing—

3                   “(A) institutions of higher education,  
4                   which may include Historically Black Colleges  
5                   and Universities, Tribal Colleges or Univer-  
6                   sities, and minority-serving institutions;

7                   “(B) State, territorial, local, or Tribal gov-  
8                   ernments or other political subdivisions of a  
9                   State, including State and local agencies, or a  
10                  consortium thereof;

11                  “(C) industry or firms in relevant tech-  
12                  nology, innovation, or manufacturing sectors;

13                  “(D) economic development organizations  
14                  or similar entities that are focused primarily on  
15                  improving science, technology, innovation, en-  
16                  trepreneurship, or access to capital; and

17                  “(E) labor organizations or workforce  
18                  training organizations, which may include State  
19                  and local workforce development boards as es-  
20                  tablished under sections 101 and 107 of the  
21                  Workforce Investment and Opportunity Act (29  
22                  U.S.C. 3111; 3122); and

23           “(2) may include 1 or more—

24                   “(A) economic development entities with  
25                   relevant expertise, including a district organiza-

1           tion (as defined in section 300.3 of title 13,  
2           Code of Federal Regulations, or successor regu-  
3           lation);

4           “(B) organizations that contribute to in-  
5           creasing the participation of underserved popu-  
6           lations in science, technology, innovation, and  
7           entrepreneurship;

8           “(C) venture development organizations;

9           “(D) organizations that promote local eco-  
10          nomic stability, high-wage domestic jobs, and  
11          broad-based economic opportunities, such as  
12          employee ownership membership associations  
13          and State or local employee ownerships and co-  
14          operative development centers, financial institu-  
15          tions and investment funds, including commu-  
16          nity development financial institutions and mi-  
17          nority depository institutions;

18          “(E) elementary schools and secondary  
19          schools, including area career and technical  
20          education schools (as defined in section 3 of the  
21          Carl D. Perkins Career and Technical Edu-  
22          cation Act of 2006 (29 U.S.C. 2302));

23          “(F) National Laboratories (as defined in  
24          section 2 of the Energy Policy Act of 2005 (42  
25          U.S.C. 15801));

1                   “(G) Federal laboratories;  
2                   “(H) Manufacturing extension centers;  
3                   “(I) Manufacturing USA institutes;  
4                   “(J) transportation planning organizations;  
5                   “(K) a cooperative extension services;  
6                   “(L) organizations that represent the per-  
7                   spectives of underserved communities in eco-  
8                   nomic development initiatives; and  
9                   “(M) institutions receiving an award under  
10                  section 10388 of the Research and Develop-  
11                  ment, Competition, and Innovation Act.

12                  “(d) DESIGNATION OF REGIONAL TECHNOLOGY AND  
13 INNOVATION HUBS.—

14                  “(1) IN GENERAL.—In carrying out subsection  
15                  (b)(1)(C), the Secretary shall use a competitive,  
16                  merit-review process to designate eligible consortia  
17                  as regional technology and innovation hubs.

18                  “(2) DISTRIBUTION.—In conducting the com-  
19                  petitive process under paragraph (1), the Secretary  
20                  shall ensure geographic and demographic diversity in  
21                  the designation of regional technology hubs by, sub-  
22                  ject to available appropriations, designating at least  
23                  20 technology hubs, and—

24                  “(A) seeking to designate at least three  
25                  technology hubs in each region covered by a re-

1           gional office of the Economic Development Ad-  
2           ministration, while—

3                   “(i) ensuring that not fewer than one-  
4                   third of eligible consortia so designated as  
5                   regional technology hubs significantly ben-  
6                   efit a small and rural community, which  
7                   may include a State or territory described  
8                   in clauses (ii) and (iii);

9                   “(ii) ensuring that not fewer than  
10                  one-third of eligible consortia so designated  
11                  as regional technology hubs include as a  
12                  member of the eligible consortia at least 1  
13                  member that is a State or territory that is  
14                  eligible to receive funding from the Estab-  
15                  lished Program to Stimulate Competitive  
16                  Research of the National Science Founda-  
17                  tion; and

18                  “(iii) ensuring that at least one eligi-  
19                  ble consortium so designated as a regional  
20                  technology hub is headquartered in a low  
21                  population State that is eligible to receive  
22                  funding from the Established Program to  
23                  Stimulate Competitive Research of the Na-  
24                  tional Science Foundation;

1           “(B) seeking to designate an additional  
2           two regional technology hubs based on selection  
3           factors which shall include likelihood of success  
4           and may include regional factors such as the  
5           extent to which the regional technology and in-  
6           novation hub significantly engages and benefits  
7           underserved communities in and near metro-  
8           politan areas;

9           “(C) encouraging eligible consortia to le-  
10          verage institutions of higher education serving  
11          populations historically underrepresented in  
12          STEM, including historically Black Colleges  
13          and Universities, Tribal Colleges or Univer-  
14          sities, and minority-serving institutions to sig-  
15          nificantly benefit an area or region; and

16          “(D) encouraging proposals from eligible  
17          consortia that would significantly benefit an  
18          area or region whose economy significantly re-  
19          lies on or has recently relied on coal, oil, or nat-  
20          ural gas production or development.

21          “(3) RELATION TO CERTAIN GRANT AWARDS.—  
22          The Secretary shall not require an eligible consor-  
23          tium to receive a grant or cooperative agreement  
24          under subsection (e) in order to be designated as a

1 regional technology and innovation hub under para-  
2 graph (1) of this subsection.

3 “(e) STRATEGY DEVELOPMENT GRANTS AND COOP-  
4 ERATIVE AGREEMENTS.—

5 “(1) IN GENERAL.—The Secretary shall use a  
6 competitive, merit-review process to award grants or  
7 cooperative agreements to eligible consortia for the  
8 development of regional innovation strategies.

9 “(2) NUMBER OF RECIPIENTS.—Subject to  
10 availability of appropriations, the Secretary shall  
11 seek to award a grant or cooperative agreement  
12 under paragraph (1) to not fewer than 60 eligible  
13 consortia.

14 “(3) GEOGRAPHIC DIVERSITY AND REPRESENTATION.—

15  
16 “(A) IN GENERAL.—The Secretary shall  
17 carry out paragraph (1) in a manner that en-  
18 sures geographic diversity and representation  
19 from communities of differing populations.

20 “(B) AWARDS TO SMALL AND RURAL COM-  
21 MUNITIES.—In carrying out paragraph (1), the  
22 Secretary shall—

23 “(i) award not fewer than one-third of  
24 the grants and cooperative agreements  
25 under such paragraph to eligible consortia

1 that significantly benefit a small and rural  
2 community, which may include a State de-  
3 scribed in clause (ii); and

4 “(ii) award not fewer than one-third  
5 of the grants and cooperative agreements  
6 under such paragraph to eligible consortia  
7 that include as a member of the eligible  
8 consortia at least 1 member that is a State  
9 or territory that is eligible to receive fund-  
10 ing from the Established Program to Stim-  
11 ulate Competitive Research of the National  
12 Science Foundation.

13 “(4) USE OF FUNDS.—

14 “(A) Use of funds under this grant shall  
15 include—

16 “(i) coordination of a locally defined  
17 planning processes, across jurisdictions  
18 and agencies, relating to developing a com-  
19 prehensive regional technology strategy;

20 “(ii) identification of regional partner-  
21 ships for developing and implementing a  
22 comprehensive regional technology strat-  
23 egy;

1                   “(iii) implementation or updating of  
2                   assessments to determine regional needs  
3                   and capabilities;

4                   “(iv) development or updating of goals  
5                   and strategies to implement an existing  
6                   comprehensive regional plan;

7                   “(v) identification or implementation  
8                   of planning and local zoning and other  
9                   code changes necessary to implement a  
10                  comprehensive regional technology strat-  
11                  egy; and

12                  “(vi) development of plans for pro-  
13                  moting broad-based economic growth in a  
14                  region.

15                  “(B) Use of funds under this grant may  
16                  include the formation of a workforce develop-  
17                  ment strategy, according to the needs for a  
18                  skilled and technical workforce at all skill and  
19                  degree levels in the region proposed to be served  
20                  by the eligible consortia. Any workforce develop-  
21                  ment strategy submitted pursuant to paragraph  
22                  (1) should include—

23                         “(i) how the eligible consortia will de-  
24                         velop, offer, or improve educational or ca-



1 reer training programs and curriculum for  
2 a skilled and technical workforce;

3 “(ii) the extent to which such pro-  
4 grams developed and offered by the eligible  
5 consortia will meet the educational or ca-  
6 reer training needs of a skilled and tech-  
7 nical workforce in the region to be served;

8 “(iii) how the eligible consortia will  
9 provide facilities for students to receive  
10 training under such programs developed  
11 and offered by the eligible consortia; and

12 “(iv) how the eligible consortia will  
13 enhance outreach and recruitment for such  
14 programs developed and offered by the eli-  
15 gible consortia to populations underrep-  
16 resented in STEM.

17 “(5) FEDERAL SHARE.—The Federal share of  
18 the cost of an effort carried out using a grant or co-  
19 operative agreement awarded under this subsection  
20 may not exceed 80 percent—

21 “(A) where in-kind contributions may be  
22 used for all or part of the non-Federal share,  
23 but Federal funding from other government  
24 sources may not count towards the non-Federal  
25 share;

1           “(B) except in the case of an eligible con-  
2           sortium that represents all or part of a small  
3           and rural or other underserved community, the  
4           Federal share may be up to 90 percent of the  
5           total cost, subject to subparagraph (A); and

6           “(C) except in the case of an eligible con-  
7           sortium that is led by a Tribal government, the  
8           Federal share may be up to 100 percent of the  
9           total cost of the project.

10          “(f) STRATEGY IMPLEMENTATION GRANTS AND CO-  
11          OPERATIVE AGREEMENTS.—

12           “(1) IN GENERAL.—The Secretary shall use a  
13           competitive, merit-review process to award grants or  
14           cooperative agreements to regional technology and  
15           innovation hubs for the implementation of regional  
16           innovation strategies, including regional strategies  
17           for infrastructure and site development, in support  
18           of the regional innovation and technology and inno-  
19           vation hub’s plans and programs. The Secretary  
20           should determine the size and number of awards  
21           based on appropriations available to ensure the suc-  
22           cess of regional technology and innovation hubs as  
23           outlined in subsection (h).

24           “(2) USE OF FUNDS.—Grants or cooperative  
25           agreements awarded under paragraph (1) to a re-

1 regional technology and innovation hub may be used  
2 by the regional technology and innovation hub to  
3 support any of the following activities, consistent  
4 with the most current regional innovation strategy of  
5 the regional technology and innovation hub, which  
6 may have been developed with or without financial  
7 assistance received under subsection (e) of this sec-  
8 tion:

9 “(A) WORKFORCE DEVELOPMENT ACTIVITIES.—Workforce development activities includ-  
10 ing activities relating to the following:  
11

12 “(i) The creation of partnerships between industry, workforce, nonprofit, and  
13 educational institutions, which may include  
14 community colleges, to create and align  
15 technical training and educational pro-  
16 grams, including for a skilled technical  
17 workforce.  
18

19 “(ii) The design, development, and  
20 updating of educational and training cur-  
21 riculum and programs, including training  
22 of trainers, teachers, or instructors tied to  
23 demonstrated regional skilled and technical  
24 workforce needs.

1           “(iii) The procurement of facilities  
2           and equipment, as required to train a  
3           skilled and technical workforce.

4           “(iv) The development and execution  
5           of programs, including traineeships and  
6           apprenticeships, to rapidly provide training  
7           and award certificates or credentials recog-  
8           nized by regional industries or other orga-  
9           nizations.

10           “(v) The matching of regional employ-  
11           ers with a potential new entrant, under-  
12           employed, underrepresented, reentering, or  
13           incumbent workforce, as well as the secur-  
14           ing of commitments from employers to hire  
15           workers who successfully complete training  
16           programs, or who are awarded certificates  
17           or credentials.

18           “(vi) The expansion of successful  
19           training programs at a scale required by  
20           the region served by the regional tech-  
21           nology and innovation hub, including  
22           through the use of online education and  
23           mentoring.

24           “(vii) The development and expansion  
25           of programs with the goal of increasing the

1 participation of persons historically under-  
2 represented in STEM and manufacturing  
3 in the workforce development plans of the  
4 regional technology and innovation hub.

5 “(viii) The provision of support serv-  
6 ices for attendees of training programs de-  
7 veloped, updated, or expanded pursuant to  
8 this subsection, including career coun-  
9 seling.

10 “(ix) The implementation of outreach  
11 and recruitment for training programs de-  
12 veloped, updated, or expanded pursuant to  
13 this subsection, particularly at local edu-  
14 cational institutions, including high schools  
15 and community colleges.

16 “(B) BUSINESS AND ENTREPRENEUR DE-  
17 VELOPMENT ACTIVITIES.—Business and entre-  
18 preneur development activities, including activi-  
19 ties relating to the following:

20 “(i) The development and growth of  
21 local and regional businesses and the train-  
22 ing of entrepreneurs, which may include  
23 support for the expansion of employee  
24 owned businesses and cooperatives.

1                   “(ii) The support of technology com-  
2                   mercialization, including funding for activi-  
3                   ties relevant to the protection of intellec-  
4                   tual property and for advancing potential  
5                   ventures such as acceleration, incubation,  
6                   early-stage production and other relevant  
7                   programming.

8                   “(iii) The development of local and re-  
9                   gional capital networks and consortia to  
10                  attract necessary private funding to busi-  
11                  nesses and entrepreneurs in the region.

12                  “(iv) The development of local and re-  
13                  gional networks for business and entre-  
14                  preneur mentorship.

15                  “(C) TECHNOLOGY DEVELOPMENT AND  
16                  MATURATION ACTIVITIES.—Technology matura-  
17                  tion activities, including activities relating to  
18                  the following:

19                         “(i) The development and deployment  
20                         of technologies in sectors critical to the re-  
21                         gion served by the regional technology and  
22                         innovation hub or to national and economic  
23                         security, including industry-university re-  
24                         search cooperation, proof of concept, proto-

1 type development, testing, and scale-up for  
2 manufacturing.

3 “(ii) The development of program-  
4 ming to support the creation and transfer  
5 of intellectual property into private use,  
6 such as through startup creation.

7 “(iii) The provision of facilities for  
8 technology maturation, including incuba-  
9 tors and production testbeds for collabo-  
10 rative development of technologies by pri-  
11 vate sector, academic, nonprofit, and other  
12 entities.

13 “(iv) Activities to provide or ensure  
14 access to capital for new business and  
15 business expansion, including by attracting  
16 new private, public, and philanthropic in-  
17 vestment and by establishing local and re-  
18 gional venture and loan funds, community  
19 development financial institutions, and mi-  
20 nority depository institutions.

21 “(D) INFRASTRUCTURE-RELATED ACTIVI-  
22 TIES.—The building of facilities and site  
23 connectivity infrastructure necessary to carry  
24 out activities described in subparagraphs (A),

1 (B), and (C), including activities relating to the  
2 following:

3 “(i) Establishing a center with re-  
4 quired tools and instrumentation for work-  
5 force development.

6 “(ii) Establishing a facility for tech-  
7 nology development, demonstration, and  
8 testing.

9 “(iii) Establishing collaborative incu-  
10 bators to support technology commer-  
11 cialization and entrepreneur training.

12 “(3) TERM.—

13 “(A) INITIAL PERFORMANCE PERIOD.—  
14 The term of an initial grant or cooperative  
15 agreement awarded under this subsection shall  
16 be for a period that the Secretary deems appro-  
17 priate for the proposed activities but not less  
18 than 2 years.

19 “(B) SUBSEQUENT PERFORMANCE PE-  
20 RIOD.—The Secretary may renew a grant or co-  
21 operative agreement awarded to a regional tech-  
22 nology and innovation hub under paragraph (1)  
23 for such period as the Secretary considers ap-  
24 propriate, if the Secretary determines that the  
25 regional technology and innovation hub has



1           made satisfactory progress towards the metrics  
2           agreed to under subsection (j).

3           “(C) FLEXIBLE APPROACH.—In renewing  
4           a grant or cooperative agreement under sub-  
5           paragraph (B), the Secretary and the eligible  
6           consortium may agree to new or additional uses  
7           of funds in order to meet changes in the needs  
8           of the region.

9           “(4) LIMITATION ON AMOUNT OF AWARDS.—

10           “(A) INITIAL PERFORMANCE PERIOD.—  
11           The amount of an initial grant or cooperative  
12           agreements awarded to a regional technology  
13           and innovation hub under paragraph (3)(A)  
14           shall be no more than \$150,000,000.

15           “(B) SUBSEQUENT PERFORMANCE PE-  
16           RIOD.—Upon renewal of a grant or cooperative  
17           agreement under paragraph (3)(B), the Sec-  
18           retary may award funding in the amount that  
19           the Secretary considers appropriate, ensuring  
20           that no single regional technology and innova-  
21           tion hub receives more than 10 percent of the  
22           aggregate amount of the grants and cooperative  
23           agreements awarded under this subsection.

24           “(5) MATCHING REQUIRED.—

1           “(A) INITIAL PERFORMANCE PERIOD.—Ex-  
2           cept in the case of a regional technology and in-  
3           novation hub described in subparagraph (C),  
4           the total amount of all grants awarded to a re-  
5           gional technology and innovation hub under this  
6           subsection in phase one shall not exceed 90 per-  
7           cent of the total operating costs of the regional  
8           technology and innovation hub during the initial  
9           performance period.

10           “(B) SUBSEQUENT PERFORMANCE PE-  
11           RIOD.—Except in the case of a regional tech-  
12           nology and innovation hub described in sub-  
13           paragraph (C), the total amount of all grants  
14           awarded to a regional technology and innova-  
15           tion hub in subsequent performance periods  
16           shall not exceed 75 percent of the total oper-  
17           ating costs of the regional technology and inno-  
18           vation hub in each year of the grant or coopera-  
19           tive agreement.

20           “(C) SMALL AND RURAL COMMUNITIES,  
21           UNDERSERVED COMMUNITIES, AND INDIAN  
22           TRIBES.—

23           “(i) IN GENERAL.—The total Federal  
24           financial assistance awarded in a given  
25           year to a regional technology and innova-

1                   tion hub under this subsection shall not ex-  
2                   ceed amounts as follows:

3                   “(I) In the case of a regional  
4                   technology and innovation hub that  
5                   primarily serves a small and rural  
6                   community or other underserved com-  
7                   munity, in a fiscal year, 90 percent of  
8                   the total funding of the regional tech-  
9                   nology and innovation hub in that fis-  
10                  cal year.

11                  “(II) In the case of a regional  
12                  technology and innovation hub that is  
13                  led by a Tribal government, in a fiscal  
14                  year, 100 percent of the total funding  
15                  of the regional technology and innova-  
16                  tion hub in that fiscal year.

17                  “(ii) MINIMUM THRESHOLD OF RURAL  
18                  REPRESENTATION.—For purposes of  
19                  clause (i)(I), the Secretary shall establish a  
20                  minimum threshold of rural representation  
21                  in the regional technology and innovation  
22                  hub.

23                  “(D) IN-KIND CONTRIBUTIONS.—For pur-  
24                  poses of this paragraph, in-kind contributions  
25                  may be used for part of the non-Federal share

1           of the total funding of a regional technology  
2           and innovation hub in a fiscal year.

3           “(6) GRANTS FOR INFRASTRUCTURE.—Any  
4           grant or cooperative agreement awarded under this  
5           subsection to support the construction of facilities  
6           and site connectivity infrastructure shall be awarded  
7           pursuant to section 201 of the Public Works and  
8           Economic Development Act of 1965 (42 U.S.C.  
9           3141) and subject to the provisions of such Act, ex-  
10          cept that subsection (b) of such section and sections  
11          204 and 301 of such Act (42 U.S.C. 3144; 3161)  
12          shall not apply.

13          “(7) RELATION TO CERTAIN GRANT AWARDS.—  
14          The Secretary shall not require a regional tech-  
15          nology and innovation hub to receive a grant or co-  
16          operative agreement under subsection (e) in order to  
17          receive a grant or cooperative agreement under this  
18          subsection.

19          “(g) APPLICATIONS.—An eligible consortium seeking  
20          designation as a regional technology and innovation hub  
21          under subsection (d) or a grant or cooperative agreement  
22          under subsection (e) or (f) shall submit to the Secretary  
23          an application therefore at such time, in such manner, and  
24          containing such information as the Secretary may specify.

1           “(h) CONSIDERATIONS FOR DESIGNATION AND  
2 AWARD OF STRATEGY IMPLEMENTATION GRANTS AND  
3 COOPERATIVE AGREEMENTS.—In selecting an eligible  
4 consortium that submitted an application under sub-  
5 section (g) for designation under subsection (d) or for a  
6 grant or cooperative agreement under subsection (f), the  
7 Secretary shall consider the following:

8           “(1) The potential of the eligible consortium to  
9           advance the research, development, deployment, and  
10          domestic manufacturing of technologies in a key  
11          technology focus area, as described in section 10387  
12          of the Research and Development, Competition, and  
13          Innovation Act or other technology or innovation  
14          sector critical to national security and economic  
15          competitiveness.

16          “(2) The likelihood of positive regional eco-  
17          nomic effect, including increasing the number of  
18          high wage domestic jobs, creating new economic op-  
19          portunities for economically disadvantaged and  
20          underrepresented populations, and building and re-  
21          taining wealth in the region.

22          “(3) How the eligible consortium plans to inte-  
23          grate with and leverage the resources of 1 or more  
24          federally funded research and development centers,  
25          National Laboratories, Federal laboratories, Manu-

1 facturing USA institutes, Hollings Manufacturing  
2 Extension Partnership centers, regional innovation  
3 engines or translation accelerators established under  
4 sections 10388 and 10389 of the Research and De-  
5 velopment, Competition, and Innovation Act, test  
6 beds established and operated under section 10390  
7 of such Act, or other Federal entities.

8 “(4) How the eligible consortium will engage  
9 with the private sector, including small- and me-  
10 dium-sized businesses and cooperatives, and em-  
11 ployee-owned businesses and cooperatives, to com-  
12 mercialize new technologies and improve the resil-  
13 iency and sustainability of domestic supply chains in  
14 a key technology focus area, or other technology or  
15 innovation sector critical to national security and  
16 economic competitiveness.

17 “(5) How the eligible consortium will carry out  
18 workforce development and skills acquisition pro-  
19 gramming, including through partnerships with enti-  
20 ties that include State and local workforce develop-  
21 ment boards, institutions of higher education, in-  
22 cluding community colleges, historically Black col-  
23 leges and universities, Tribal Colleges or Univer-  
24 sities, and minority-serving institutions, labor orga-  
25 nizations, nonprofit organizations, workforce devel-

1       opment programs, and other related activities au-  
2       thorized by the Secretary, to support the develop-  
3       ment of a skilled technical workforce for the regional  
4       technology and innovation hub, including key tech-  
5       nology focus area or other technology or innovation  
6       sector critical to national security and economic  
7       competitiveness.

8               “(6) How the eligible consortium will improve  
9       or expand science, technology, engineering, and  
10      mathematics education programs and opportunities  
11      in the identified region in elementary and secondary  
12      school and higher education institutions located in  
13      the identified region to support the development of  
14      a key technology focus area or other technology or  
15      innovation sector critical to national security and  
16      economic competitiveness.

17              “(7) How the eligible consortium plans to de-  
18      velop partnerships with venture development organi-  
19      zations, community development financial institu-  
20      tions and minority depository institutions, and  
21      sources of private investment in support of private  
22      sector activity, including launching new or expanding  
23      existing companies in a key technology focus area or  
24      other technology or innovation sector critical to na-  
25      tional security and economic competitiveness.

1           “(8) How the eligible consortium plans to orga-  
2           nize the activities of regional partners across sectors  
3           in support of a regional technology and innovation  
4           hub.

5           “(9) How the eligible consortium considers op-  
6           portunities to support local and regional businesses  
7           through procurement, including from minority-owned  
8           and women-owned businesses.

9           “(10) How the eligible consortium will ensure  
10          that growth in technology, innovation, and advanced  
11          manufacturing sectors produces opportunity across  
12          the identified region and for economically disadvan-  
13          taged, minority, underrepresented and rural popu-  
14          lations, including, as appropriate, consideration of  
15          how the eligible consortium takes into account the  
16          relevant impact of existing regional status and plans  
17          or may affect regional goals for affordable housing  
18          availability, local and regional transportation, high-  
19          speed internet access, and primary and secondary  
20          education.

21          “(11) How well the region’s education institu-  
22          tions align their activities, including research, edu-  
23          cational programs, training, with the proposed areas  
24          of focus.



1           “(12) The likelihood efforts served by the con-  
2           sortium will be sustained once Federal support ends.

3           “(13) How the eligible consortium will, as ap-  
4           propriate—

5                   “(A) enhance the economic, environmental,  
6                   and energy security of the United States by  
7                   promoting domestic development, manufacture,  
8                   and deployment of innovative clean technologies  
9                   and advanced manufacturing practices; and

10                   “(B) support translational research, tech-  
11                   nology development, manufacturing innovation,  
12                   and commercialization activities relating to  
13                   clean technology.

14           “(i) COORDINATION AND COLLABORATION.—

15                   “(1) COORDINATION WITH REGIONAL INNOVA-  
16                   TION PROGRAM.—The Secretary shall ensure the ac-  
17                   tivities under this section do not duplicate activities  
18                   or efforts under section 27.

19                   “(2) COORDINATION AMONG HUBS.—The Sec-  
20                   retary shall ensure eligible consortia that receive a  
21                   grant or cooperative agreement under this section  
22                   coordinate and share best practices for regional eco-  
23                   nomic development.

24                   “(3) COORDINATION WITH PROGRAMS OF THE  
25                   NATIONAL INSTITUTE OF STANDARDS AND TECH-

1       NOLOGY.—The Secretary shall coordinate the activi-  
2       ties of regional technology and innovation hubs des-  
3       ignated under this section, the Hollings Manufac-  
4       turing Extension Partnership, and the Manufac-  
5       turing USA Program, as the Secretary considers ap-  
6       propriate, to maintain the effectiveness of a manu-  
7       facturing extension center or a Manufacturing USA  
8       institute.

9               “(4) COORDINATION WITH DEPARTMENT OF  
10       ENERGY PROGRAMS.—The Secretary shall, in col-  
11       laboration with the Secretary of Energy, coordinate  
12       the activities and selection of regional technology  
13       and innovation hubs designated under this section,  
14       as the Secretaries consider appropriate, to maintain  
15       the effectiveness of activities at the Department of  
16       Energy and the National Laboratories.

17               “(5) INTERAGENCY COLLABORATION.—In des-  
18       ignating regional technology and innovation hubs  
19       under subsection (d) and awarding grants or cooper-  
20       ative agreements under subsection (f), the Sec-  
21       retary—

22               “(A) shall collaborate with Federal depart-  
23       ments and agencies whose missions contribute  
24       to the goals of the regional technology and in-  
25       novation hub;

1           “(B) shall consult with the Director of the  
2           National Science Foundation for the purpose of  
3           ensuring that the regional technology and inno-  
4           vation hubs are aligned with relevant science,  
5           technology, and engineering expertise; and

6           “(C) may accept funds from other Federal  
7           agencies to support grants, cooperative agree-  
8           ments, and activities under this section.

9           “(j)   PERFORMANCE   MEASUREMENT,   TRANS-  
10          PARENCY, AND ACCOUNTABILITY.—

11           “(1)   METRICS,   STANDARDS,   AND   ASSESS-  
12          MENT.—For each grant and cooperative agreement  
13          awarded under subsection (f) for a regional tech-  
14          nology and innovation hub, the Secretary shall—

15           “(A) in consultation with the regional tech-  
16          nology and innovation hub, develop metrics,  
17          which may include metrics relating to domestic  
18          job creation, patent awards, increases in re-  
19          search funding, business formation and expan-  
20          sion, and participation of individuals or commu-  
21          nities historically underrepresented in STEM,  
22          to assess the effectiveness of the activities fund-  
23          ed in making progress toward the purposes set  
24          forth under subsection (b)(1);

1           “(B) establish standards for the perform-  
2           ance of the regional technology and innovation  
3           hub that are based on the metrics developed  
4           under subparagraph (A); and

5           “(C) prior to any award made under a  
6           subsequent performance period in subsection (f)  
7           and every 2 years thereafter until Federal fi-  
8           nancial assistance under this section for the re-  
9           gional technology and innovation hub is discon-  
10          tinued, conduct an assessment of the regional  
11          technology and innovation hub to confirm  
12          whether the performance of the regional tech-  
13          nology and innovation hub is meeting the stand-  
14          ards for performance established under sub-  
15          paragraph (B) of this paragraph.

16          “(2) FINAL REPORTS BY RECIPIENTS OF  
17          STRATEGY IMPLEMENTATION GRANTS AND COOPER-  
18          ATIVE AGREEMENTS.—

19                 “(A) IN GENERAL.—The Secretary shall  
20                 require each eligible consortium that receives a  
21                 grant or cooperative agreement under sub-  
22                 section (f) for activities of a regional technology  
23                 and innovation hub, as a condition of receipt of  
24                 such grant or cooperative agreement, to submit  
25                 to the Secretary, not later than 120 days after

1 the last day of the term of the grant or cooper-  
2 ative agreement, a report on the activities of  
3 the regional technology and innovation hub sup-  
4 ported by the grant or cooperative agreement.

5 “(B) CONTENTS OF REPORT.—Each report  
6 submitted by an eligible consortium under sub-  
7 paragraph (A) shall include the following:

8 “(i) A detailed description of the ac-  
9 tivities carried out by the regional tech-  
10 nology and innovation hub using the grant  
11 or cooperative agreement described in sub-  
12 paragraph (A), including the following:

13 “(I) A description of each project  
14 the regional technology and innovation  
15 hub completed using such grant or co-  
16 operative agreement.

17 “(II) An explanation of how each  
18 project described in subclause (I)  
19 achieves a specific goal under this sec-  
20 tion in the region of the regional tech-  
21 nology and innovation hub with re-  
22 spect to—

23 “(aa) the resiliency and sus-  
24 tainability of a supply chain;

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1                   “(bb) research, development,  
2                   and deployment of a critical tech-  
3                   nology;

4                   “(cc) workforce training and  
5                   development;

6                   “(dd) domestic job creation;

7                   “(ee) entrepreneurship and  
8                   company formation;

9                   “(ff) commercialization;

10                  “(gg) access to private cap-  
11                  ital; or

12                  “(hh) participation of indi-  
13                  viduals or communities histori-  
14                  cally underrepresented in STEM.

15                  “(ii) A discussion of any obstacles en-  
16                  countered by the regional technology and  
17                  innovation hub in the implementation of  
18                  the regional technology and innovation hub  
19                  and how the regional technology and inno-  
20                  vation hub overcame those obstacles.

21                  “(iii) An evaluation of the success of  
22                  the projects of the regional technology and  
23                  innovation hub using the performance  
24                  standards and measures established under  
25                  paragraph (1), including an evaluation of

1 the planning process and how the project  
2 contributes to carrying out the regional in-  
3 novation strategy of the regional tech-  
4 nology and innovation hub.

5 “(iv) The effectiveness of the regional  
6 technology and innovation hub in ensuring  
7 that, in the region of the regional tech-  
8 nology and innovation hub, growth in tech-  
9 nology and innovation sectors produces  
10 broadly shared opportunity across the re-  
11 gion, including for economic disadvantaged  
12 and underrepresented populations and  
13 rural areas.

14 “(v) Information regarding such other  
15 matters as the Secretary may require.

16 “(3) INTERIM REPORTS BY RECIPIENTS OF  
17 GRANTS AND COOPERATIVE AGREEMENTS.—In addi-  
18 tion to requiring submittal of final reports under  
19 paragraph (2)(A), the Secretary may require a re-  
20 gional technology and innovation hub described in  
21 such paragraph to submit to the Secretary such in-  
22 terim reports as the Secretary considers appropriate.

23 “(4) ANNUAL REPORTS TO CONGRESS.—Not  
24 less frequently than once each year, the Secretary  
25 shall submit to the appropriate committees of Con-

1       gress an annual report on the results of the assess-  
2       ments conducted by the Secretary under paragraph  
3       (1)(C) during the period covered by the report.

4       “(k) AUTHORIZATION OF APPROPRIATIONS.—There  
5       is authorized to be appropriated to the Secretary—

6               “(1) \$50,000,000 to award grants and coopera-  
7       tive agreements under subsection (e) for the period  
8       of fiscal years 2023 through 2027;

9               “(2) \$2,950,000,000 to award grants and coop-  
10      erative agreements under subsection (f) for the pe-  
11      riod of fiscal years 2023 and 2024; and

12              “(3) \$7,000,000,000 to award grants and coop-  
13      erative agreements under subsection (f) for the pe-  
14      riod of fiscal years 2025 through 2027.

15      “(l) ADMINISTRATION.—The Secretary may use  
16      funds made available to carry out this section for adminis-  
17      trative costs under this section.

18      **“SEC. 29. DISTRESSED AREA RECOMPETE PILOT PROGRAM.**

19      “(a) IN GENERAL.—Within the program authorized  
20      under section 28, the Secretary is authorized to establish  
21      a pilot program, to be known as the ‘Recompete Pilot Pro-  
22      gram’, to provide grants to eligible recipients representing  
23      eligible areas or Tribal lands to alleviate persistent eco-  
24      nomic distress and support long-term comprehensive eco-  
25      nomic development and job creation in eligible areas.



1           “(b) STRATEGY DEVELOPMENT GRANTS AND COOP-  
2 ERATIVE AGREEMENTS.—Subject to available appropria-  
3 tions, the Secretary is authorized, on the application of  
4 an eligible recipient, to award up to one half of the number  
5 of grants under subsection (e) of section 28 to eligible re-  
6 cipients to develop a recompetete plan and carry out related  
7 predevelopment activities.

8           “(c) STRATEGY IMPLEMENTATION GRANTS AND CO-  
9 OPERATIVE AGREEMENTS.—Subject to available appropria-  
10 tions and subsection (f) , the Secretary shall award,  
11 on the application of an eligible recipient, at least ten  
12 strategy implementation grants, in accordance with a re-  
13 compete plan review and approved by the Secretary, to  
14 carry out coordinated and comprehensive economic devel-  
15 opment programs and activities in an eligible area, con-  
16 sistent with a recompetete plan approved by the Secretary.  
17 Such activities may include—

18           “(1) workforce development activities of the  
19 kind described in section 28(f) or other job training  
20 and workforce outreach programs oriented to local  
21 employer needs, such as—

22           “(A) customized job training programs  
23 carried out by local community colleges and  
24 other training or educational organizations in  
25 partnership with local businesses;

1           “(B) workforce outreach programs located  
2           in, and targeted to, lower-income and under-  
3           employed neighborhoods; and

4           “(C) programs to embed job placement  
5           and training services in neighborhood institu-  
6           tions such as churches, housing projects, and  
7           community advocacy programs; and

8           “(D) job retention programs and activities,  
9           such as the provision of career coaches;

10          “(2) business and entrepreneur development ac-  
11          tivities of the kind described in section 28(f), tech-  
12          nology development and maturation activities of the  
13          kind described in such section, or the provision of  
14          business advice and assistance to small and medium-  
15          sized local businesses and entrepreneurs. Such ad-  
16          vice and assistance may include—

17                 “(A) manufacturing extension services;

18                 “(B) small business development centers;

19                 “(C) centers to help businesses bid for  
20          Federal procurement contracts;

21                 “(D) entrepreneurial assistance programs  
22          that link entrepreneurs with available public  
23          and private resources;

24                 “(E) legal advice and resources; and

25                 “(F) assistance in accessing capital;

1           “(3) infrastructure related activities of the kind  
2 described in section 28(f) or other land and site de-  
3 velopment programs, such as brownfield redevelop-  
4 ment, research and technology parks, business incu-  
5 bators, business corridor development, and other in-  
6 frastructure activities related to supporting job cre-  
7 ation and employment for residents, subject to the  
8 requirements of section 28(f)(6); and

9           “(4) additional planning, predevelopment, tech-  
10 nical assistance, and other administrative activities  
11 as may be necessary for the ongoing implementation,  
12 administration, and operation of the programs and  
13 activities carried out with a grant or cooperative  
14 agreement under this section, including but not lim-  
15 ited to economic development planning and evalua-  
16 tion.

17       “(d) TERM.—

18           “(1) INITIAL PERFORMANCE PERIOD.—The  
19 term of an initial grant or cooperative agreement  
20 awarded under subsection (c) shall be for a period  
21 that the Secretary deems appropriate for the pro-  
22 posed activities but not less than 2 years.

23           “(2) SUBSEQUENT PERFORMANCE PERIOD.—  
24 The Secretary may renew a grant or cooperative  
25 agreement awarded under subsection (c) for such pe-

1       riod, such amount, and such terms as the Secretary  
2       considers appropriate, if the Secretary determines  
3       that the recipient of an award under subsection (c)  
4       has made satisfactory progress towards metrics or  
5       benchmarking requirements established by the Sec-  
6       retary at time of award.

7               “(3) FLEXIBLE APPROACH.—In renewing a  
8       grant or cooperative agreement under subsection (c),  
9       the Secretary may approve new or additional uses of  
10      funds, consistent with the uses described in sub-  
11      section (c), to meet changes in the needs of the re-  
12      gion.

13             “(e) LIMITATIONS.—

14               “(1) LIMITATION ON ELIGIBLE AREAS.—An eli-  
15      gible area may not benefit from more than 1 grant  
16      or cooperative agreement described in subsection (b)  
17      and 1 grant or cooperative agreement described in  
18      subsection (c), provided that a renewal described in  
19      subsection (d)(2) shall not constitute an additional  
20      grant.

21               “(2) LIMITATION ON RECIPIENTS.—For pur-  
22      poses of the program under this section, an eligible  
23      recipient may not receive multiple grants described  
24      in subsection (c) on behalf of more than 1 eligible  
25      area.

1 “(f) AWARD AMOUNT.—

2 “(1) IN GENERAL.—In determining the amount  
3 of a grant that an eligible recipient may be awarded  
4 under subsection (c), the Secretary shall—

5 “(A) take into consideration the proposed  
6 activities and projected expenditures outlined in  
7 an approved recompetete plan; and

8 “(B) award not more than the product ob-  
9 tained by multiplying—

10 “(i) the prime-age employment gap of  
11 the eligible area;

12 “(ii) the prime-age population of the  
13 eligible area; and

14 “(iii) either—

15 “(I) \$70,585 for local labor mar-  
16 kets; or

17 “(II) \$53,600 for local commu-  
18 nities.

19 “(2) MINIMUM AMOUNT.—The Secretary may  
20 not make an award that is less than \$20,000,000 to  
21 an eligible recipient.

22 “(g) APPLICATIONS.—To be considered for a grant  
23 or cooperative agreement under—

24 “(1) subsection (b) of this section, an eligible  
25 recipient shall submit to the Secretary an application

1 at such time, in such manner, and containing such  
2 information as the Secretary determines to be appro-  
3 priate; and

4 “(2) subsection (c) of this section, an eligible  
5 recipient shall submit to the Secretary an application  
6 at such time, in such manner, and containing such  
7 information as the Secretary determines to be appro-  
8 priate, including a recompetete plan approved by the  
9 Secretary.

10 “(h) RELATION TO CERTAIN GRANT AWARDS.—The  
11 Secretary shall not require an eligible recipient to receive  
12 a grant or cooperative agreement under subsection (b) in  
13 order to receive a grant or cooperative agreement under  
14 subsection (c).

15 “(i) AUTHORIZATION OF APPROPRIATIONS.—There is  
16 authorized to be appropriated to the Secretary  
17 \$1,000,000,000 to award grants and cooperative agree-  
18 ments under subsection (c) of this section, for the period  
19 of fiscal years 2022 through 2026.

20 “(j) DEFINITIONS.—In this section:

21 “(1) ELIGIBLE AREA.—The term ‘eligible area’  
22 means either of the following:

23 “(A) A local labor market that—

24 “(i) has a prime-age employment gap  
25 equal to not less than 2.5 percent; and

1                   “(ii) meets additional criteria as the  
2                   Secretary may establish.

3                   “(B) A local community that—

4                   “(i) has a prime-age employment gap  
5                   equal to not less than 5 percent;

6                   “(ii) is not located within an eligible  
7                   local labor market that meets the criteria  
8                   described in subparagraph (A);

9                   “(iii) has a median annual household  
10                  income of not more than \$75,000; and

11                  “(iv) meets additional criteria as the  
12                  Secretary may establish.

13                  “(2) ELIGIBLE RECIPIENT.—The term ‘eligible  
14                  recipient’ means a specified entity that has been au-  
15                  thorized in a manner as determined by the Secretary  
16                  to represent and act on behalf of an eligible area for  
17                  the purposes of this section.

18                  “(3) LOCAL LABOR MARKET.—The term ‘local  
19                  labor market’ means any of the following areas that  
20                  contains 1 or more specified entities described in  
21                  subparagraphs (A) through (D) of paragraph (6):

22                  “(A) A metropolitan statistical area or  
23                  micropolitan statistical area, excluding any area  
24                  described in subparagraph (C).

1           “(B) A commuting zone, excluding any  
2 areas described in subparagraphs (A) and (C).

3           “(C) The Tribal land with a Tribal prime-  
4 age population represented by a Tribal govern-  
5 ment.

6           “(4) LOCAL COMMUNITY.—The term ‘local com-  
7 munity’ means the area served by a general-purpose  
8 unit of local government that is located within, but  
9 does not cover the entire area of, a local labor mar-  
10 ket that does not meet the criteria described in para-  
11 graph (1)(A).

12           “(5) PRIME-AGE EMPLOYMENT GAP.—

13           “(A) IN GENERAL.—The term ‘prime-age  
14 employment gap’ means the difference (ex-  
15 pressed as a percentage) between—

16           “(i) the national 5-year average  
17 prime-age employment rate; and

18           “(ii) the 5-year average prime-age em-  
19 ployment rate of the eligible area.

20           “(B) CALCULATION.—For the purposes of  
21 subparagraph (A), an individual is prime-age if  
22 such individual between the ages of 25 years  
23 and 54 years.



1           “(6) RECOMPETE PLAN.—The term ‘recompete  
2           plan’ means a comprehensive multiyear economic de-  
3           velopment plan that—

4                   “(A) includes—

5                           “(i) proposed programs and activities  
6                           to be carried out with a grant awarded  
7                           under subsection (c) to address the eco-  
8                           nomic challenges of the eligible area in a  
9                           comprehensive manner that promotes long-  
10                          term, sustained economic growth, lasting  
11                          job creation, per capita wage increases,  
12                          and reduction in the prime-age employ-  
13                          ment gap of the eligible area;

14                          “(ii) projected costs and annual ex-  
15                          penditures and proposed disbursement  
16                          schedule;

17                          “(iii) the roles and responsibilities of  
18                          specified entities that may receive grant  
19                          funds awarded under subsection (c); and

20                          “(iv) other information as the Sec-  
21                          retary determines appropriate;

22                          “(B) is submitted to the Secretary for ap-  
23                          proval for an eligible recipient to be considered  
24                          for a grant described in subsection (c); and

1           “(C) may be modified over the term of the  
2           grant by the eligible recipient, subject to the  
3           approval of the Secretary or at the direction of  
4           the Secretary, if the Secretary determines  
5           benchmarking requirements are repeatedly not  
6           met or if other circumstances necessitate a  
7           modification.

8           “(7) SPECIFIED ENTITY.—The term ‘specified  
9           entity’ means—

10                   “(A) a unit of local government;

11                   “(B) the District of Columbia;

12                   “(C) a territory of the United States;

13                   “(D) a Tribal government;

14                   “(E) political subdivision of a State or  
15           other entity, including a special-purpose entity  
16           engaged in economic development activities;

17                   “(F) a public entity or nonprofit organiza-  
18           tion, acting in cooperation with the officials of  
19           a political subdivision of a State or other entity  
20           described in subparagraph (E);

21                   “(G) an economic development district (as  
22           defined in section 3 of the Public Works and  
23           Economic Development Act of 1965 (42 U.S.C.  
24           3122); and

1           “(H) a consortium of any of the specified  
2 entities described in this paragraph which serve  
3 or are contained within the same eligible area.

4           “(8) TRIBAL LAND.—The term ‘Tribal land’  
5 means any land—

6           “(A) located within the boundaries of an  
7 Indian reservation, pueblo, or rancharia; or

8           “(B) not located within the boundaries of  
9 an Indian reservation, pueblo, or rancharia, the  
10 title to which is held—

11           “(i) in trust by the United States for  
12 the benefit of an Indian Tribe or an indi-  
13 vidual Indian;

14           “(ii) by an Indian Tribe or an indi-  
15 vidual Indian, subject to restriction against  
16 alienation under laws of the United States;  
17 or

18           “(iii) by a dependent Indian commu-  
19 nity.

20           “(9) TRIBAL PRIME-AGE POPULATION.—

21           “(A) IN GENERAL.—The term ‘Tribal  
22 prime-age population’ shall be equal to the sum  
23 obtained by adding—

24           “(i) the product obtained by multi-  
25 plying—

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1                   “(I) the total number of individ-  
2                   uals ages 25 through 54 residing on  
3                   the Tribal land of the Tribal govern-  
4                   ment; and

5                   “(II) 0.65; and

6                   “(ii) the product obtained by multi-  
7                   plying—

8                   “(I) the total number of individ-  
9                   uals ages 25 through 54 included on  
10                  the membership roll of the Tribal gov-  
11                  ernment; and

12                  “(II) 0.35

13                  “(B) USE OF DATA.—A calculation under  
14                  subparagraph (A) shall be determined based on  
15                  data provided by the applicable Tribal govern-  
16                  ment to the Department of the Treasury under  
17                  the Coronavirus State and Local Fiscal Recov-  
18                  ery Fund programs under title VI of the Social  
19                  Security Act (42 U.S.C. 801 et seq.).”.

20                  (b) INITIAL DESIGNATIONS AND AWARDS.—

21                  (1) COMPETITION REQUIRED.—Not later than 1  
22                  year after the date of the enactment of this Act,  
23                  subject to the availability of appropriations, the Sec-  
24                  retary of Commerce shall commence a competition  
25                  under subsection (d)(1) of section 28 of the Steven-

1 son-Wydler Technology Innovation Act of 1980 (as  
2 added by this section).

3 (2) DESIGNATION AND AWARD.—Not later than  
4 18 months after the date of the enactment of this  
5 Act, if the Secretary has received at least 1 applica-  
6 tion under subsection (g) of section 28 of the Ste-  
7 venson-Wydler Technology Innovation Act of 1980  
8 (as added by this section) from an eligible consor-  
9 tium which the Secretary considers suitable for des-  
10 ignation under subsection (d)(1) of such section 28,  
11 the Secretary shall—

12 (A) designate at least 1 regional tech-  
13 nology and innovation hub under subsection  
14 (d)(1) of such section 28; and

15 (B) award a grant or cooperative agree-  
16 ment under subsection (f)(1) of such section 28  
17 to each regional technology and innovation hub  
18 designated pursuant to subparagraph (A) of  
19 this paragraph.

20 (c) DISTRESSED AREA DESIGNATION AND AWARD.—  
21 Not later than 18 months after the date of the enactment  
22 of this section, subject to the availability of appropriations,  
23 if the Secretary has received applications under section 29  
24 of the Stevenson-Wydler Technology Innovation Act of  
25 1980 (as added by this section) from an eligible recipient

1 which the Secretary considers suitable for award under  
2 such section 29, the Secretary shall award grants or coop-  
3 erative agreement under subsections (b) and (c) of such  
4 section 29 to one or more eligible recipients.

5 **SEC. 10622. REGIONAL CLEAN ENERGY INNOVATION PRO-**  
6 **GRAM.**

7 Subtitle C of title IX of the Energy Independence and  
8 Security Act of 2007 is amended by adding at the end  
9 the following:

10 **“SEC. 936. REGIONAL CLEAN ENERGY INNOVATION PRO-**  
11 **GRAM.**

12 “(a) DEFINITIONS.—In this section:

13 “(1) REGIONAL CLEAN ENERGY INNOVATION  
14 PARTNERSHIP.—The term ‘regional clean energy in-  
15 novation partnership’ means a group of one or more  
16 persons, including a covered consortium, who per-  
17 form a collection of activities that are coordinated by  
18 such covered consortium to carry out the purposes  
19 of the program under subsection (c) in a region of  
20 the United States.

21 “(2) COVERED CONSORTIUM.—The term ‘cov-  
22 ered consortium’ means an individual or group of in-  
23 dividuals in partnership with a government entity,  
24 including a State, territorial, local, or tribal govern-

1           ment or unit of such government, and at least 2 or  
2           more of the following additional entities—

3                   “(A) an institution of higher education or  
4                   a consortium of institutions of higher education,  
5                   including community colleges;

6                   “(B) a workforce development program;

7                   “(C) a private sector entity or group of en-  
8                   tities, including a trade or industry association;

9                   “(D) a nonprofit organization;

10                  “(E) a community group or community-  
11                  based organization;

12                  “(F) a labor organization or joint labor-  
13                  management organization;

14                  “(G) a National Laboratory;

15                  “(H) a venture development organization;

16                  “(I) a community development financial in-  
17                  stitution or minority depository institution;

18                  “(J) a worker cooperative membership as-  
19                  sociation or state or local employee ownership  
20                  or cooperative development center;

21                  “(K) an organization focused on clean en-  
22                  ergy technology innovation or entrepreneurship;

23                  “(L) a business or clean energy accelerator  
24                  or incubator;

1                   “(M) an economic development organiza-  
2                   tion;

3                   “(N) a manufacturing facility or organiza-  
4                   tion;

5                   “(O) a multi-institutional collaboration; or

6                   “(P) any other entity that the Secretary  
7                   determines to be relevant.

8                   “(3) PROGRAM.—The term ‘program’ means  
9                   the Regional Clean Energy Innovation Program au-  
10                  thorized in subsection (b).

11                  “(4) INSTITUTION OF HIGHER EDUCATION.—  
12                  The term ‘institution of higher education’ has the  
13                  meaning given such term in section 101 or  
14                  102(a)(1)(B) of the Higher Education Act of 1965,  
15                  as amended (20 U.S.C. 1001, 1002(a)(1)(B)).

16                  “(5) NATIONAL LABORATORY.—The term ‘Na-  
17                  tional Laboratory’ has the meaning given that term  
18                  in section 2 of the Energy Policy Act of 2005 (42  
19                  U.S.C. 15801).

20                  “(6) CLEAN ENERGY TECHNOLOGY.—The term  
21                  ‘clean energy technology’ means a technology that  
22                  significantly reduces energy use, increases energy ef-  
23                  ficiency, reduces greenhouse gas emissions, reduces  
24                  emissions of other pollutants, or mitigates other neg-



1       ative environmental consequences of energy produc-  
2       tion, transmission or use.

3           “(7) COMMUNITY-BASED ORGANIZATION.—The  
4       term ‘community-based organization’ has the mean-  
5       ing given the term in section 3 of the Workforce In-  
6       novation and Opportunity Act (29 U.S.C. 3102).

7           “(8) COMMUNITY COLLEGE.—The term ‘com-  
8       munity college’ means—

9           “(A) a public institution of higher edu-  
10       cation, including additional locations, at which  
11       the highest degree, or the predominantly award-  
12       ed degree, is an associate degree; or

13          “(B) any Tribal college or university (as  
14       defined in section 316 of the Higher Education  
15       Act of 1965 (20 U.S.C. 1059e)).

16          “(9) WORKFORCE DEVELOPMENT PROGRAM.—  
17       The term ‘workforce development program’ has the  
18       meaning given the term in section 3 of the Work-  
19       force Innovation and Opportunity Act (29 U.S.C.  
20       3102).

21          “(b) IN GENERAL.—The Secretary shall establish a  
22       Regional Clean Energy Innovation Program, a research,  
23       development, demonstration, and commercial application  
24       program designed to enhance the economic, environ-  
25       mental, and energy security of the United States and ac-

1 celerate the pace of innovation of diverse clean energy  
2 technologies through the formation or support of regional  
3 clean energy innovation partnerships.

4 “(c) PURPOSES OF THE PROGRAM.—The purposes of  
5 the Program established under subsection (b) are to—

6 “(1) improve the competitiveness of United  
7 States’ clean energy technology research, develop-  
8 ment, demonstration, and commercial application;  
9 and

10 “(2) support the development of tools and tech-  
11 nologies best suited for use in diverse regions of the  
12 United States, including in rural, tribal, and low-in-  
13 come communities.

14 “(d) REGIONAL CLEAN ENERGY INNOVATION PART-  
15 NERSHIPS.—

16 “(1) IN GENERAL.—The Secretary shall com-  
17 petitively award grants to covered consortia to estab-  
18 lish or support regional clean energy innovation  
19 partnerships that achieve the purposes of the Pro-  
20 gram in subsection (c).

21 “(2) PERMISSIBLE ACTIVITIES.—Grants award-  
22 ed under this subsection shall be used for activities  
23 determined appropriate by the Secretary to achieve  
24 the purposes of the Program in subsection (c), in-  
25 cluding—

1           “(A) facilitating the commercial applica-  
2           tion of clean energy products, processes, and  
3           services, including through research, develop-  
4           ment, demonstration, or technology transfer;

5           “(B) planning among participants of a re-  
6           gional clean energy innovation partnership to  
7           improve the strategic and cost-effective coordi-  
8           nation of the partnership;

9           “(C) improving stakeholder involvement in  
10          the development of goals and activities of a re-  
11          gional clean energy innovation partnership;

12          “(D) assessing different incentive mecha-  
13          nisms for clean energy development and com-  
14          mercial application in the region;

15          “(E) hosting events and conferences; and

16          “(F) establishing and updating roadmaps  
17          to measure progress on relevant goals, such as  
18          those relevant to metrics developed under sub-  
19          section (g).

20          “(3) APPLICATIONS.—Each application sub-  
21          mitted to the Secretary under paragraph (1) may in-  
22          clude—

23                 “(A) a list of members and roles of mem-  
24                 bers of the covered consortia, as well as any  
25                 other stakeholders supporting the activities of

1 the regional clean energy innovation partner-  
2 ship;

3 “(B) an assessment of the relevant clean  
4 energy innovation assets needed in a region to  
5 achieve proposed outcomes, such as education  
6 and workforce development programs, research  
7 facilities, infrastructure or site development, ac-  
8 cess to capital, manufacturing capabilities, or  
9 other assets;

10 “(C) a description of proposed activities  
11 that the regional clean energy innovation part-  
12 nership plans to undertake and how the pro-  
13 posed activities will achieve the purposes de-  
14 scribed in subsection (c);

15 “(D) a plan for attracting additional funds  
16 and identification of funding sources from non-  
17 Federal sources to deliver the proposed out-  
18 comes of the regional clean energy innovation  
19 partnership;

20 “(E) a plan for partnering and collabo-  
21 rating with community development financial  
22 institutions and minority depository institu-  
23 tions, labor organizations and community  
24 groups, worker cooperative membership associa-  
25 tions, local and state employee ownership and

1 cooperative development centers, and other local  
2 institutions in order to promote employee, com-  
3 munity, and public ownership in the clean en-  
4 ergy sector, and advance models of local eco-  
5 nomic development that build and retain wealth  
6 in the region;

7 “(F) a plan for sustaining activities of the  
8 regional clean energy innovation partnership  
9 after funds received under this program have  
10 been expended; and

11 “(G) a proposed budget, including finan-  
12 cial contributions from non-Federal sources.

13 “(4) CONSIDERATIONS.—In selecting covered  
14 consortia for funding under the Program, the Sec-  
15 retary shall, to the maximum extent practicable—

16 “(A) give special consideration to applica-  
17 tions from rural, tribal, and low-income commu-  
18 nities; and

19 “(B) ensure that there is geographic diver-  
20 sity among the covered consortia selected to re-  
21 ceive funding.

22 “(5) AWARD AMOUNT.—Grants given out under  
23 this Program shall be in an amount not greater than  
24 \$10,000,000, with the total grant award in any year  
25 less than that in the previous year.

1           “(6) COST SHARE.—For grants that are dis-  
2           bursed over the course of three or more years, the  
3           Secretary shall require, as a condition of receipt of  
4           funds under this section, that a covered consortium  
5           provide not less than 50 percent of the funding for  
6           the activities of the regional clean energy partner-  
7           ship under this section for years 3, 4, and 5.

8           “(7) DURATION.—Each grant under paragraph  
9           shall be for a period of not longer than 5 years.

10           “(8) RENEWAL.—A grant awarded under this  
11           section may be renewed for a period of not more  
12           than 5 years, subject to a rigorous merit review  
13           based on the progress of a regional clean energy in-  
14           novation partnership towards achieving the purposes  
15           of the program in subsection (c) and the metrics de-  
16           veloped under subsection (g).

17           “(9) TERMINATION.—Consistent with the exist-  
18           ing authorities of the Department, the Secretary  
19           may terminate grant funding under this subsection  
20           to covered consortia during the performance period  
21           if the Secretary determines that the regional clean  
22           energy innovation partnership is underperforming.

23           “(10) ADMINISTRATIVE COSTS.—The Secretary  
24           may allow a covered consortium that receives funds  
25           under this section to allocate a portion of the fund-

1       ing received to be used for administrative or indirect  
2       costs.

3           “(11) FUNDING.—The Secretary may accept  
4       funds from other Federal agencies to support fund-  
5       ing and activities under this section.

6       “(e) PLANNING FUNDS.—The Secretary may com-  
7       petitively award grants in an amount no greater than  
8       \$2,000,000 for a period not longer than 2 years to an enti-  
9       ty consisting of a government entity, including a State,  
10      territorial, local, or tribal government or unit of such gov-  
11      ernment or any entity listed under subsection (a)(2) to  
12      plan a regional clean energy innovation partnership or es-  
13      tablish a covered consortium for the purpose of applying  
14      for funds under subsection (b).

15      “(f) INFORMATION SHARING.—As part of the pro-  
16      gram, the Secretary shall support the gathering, analysis,  
17      and dissemination of information on best practices for de-  
18      veloping and operating successful regional clean energy in-  
19      novation partnerships.

20      “(g) METRICS.—In evaluating a grant renewal under  
21      subsection (d)(8), the Secretary shall work with program  
22      evaluation experts to develop and make publicly available  
23      metrics to assess the progress of a regional clean energy  
24      innovation partnership towards achieving the purposes of  
25      the program in subsection (c).

1           “(h) COORDINATION.—In carrying out the program,  
2 the Secretary shall coordinate with, and avoid unnecessary  
3 duplication of, the activities carried out under this section  
4 with the activities of other research entities of the Depart-  
5 ment or relevant programs at other Federal agencies.

6           “(i) CONFLICTS OF INTEREST.—In carrying out the  
7 program, the Secretary shall maintain conflict of interest  
8 procedures, consistent with the conflict of interest proce-  
9 dures of the Department.

10          “(j) EVALUATION BY COMPTROLLER GENERAL.—  
11 Not later than 3 years after the date of the enactment  
12 of the Research and Development, Competition, and Inno-  
13 vation Act, and again 3 years later, the Comptroller Gen-  
14 eral shall submit to the Committee on Science, Space, and  
15 Technology of the House of Representatives and the Com-  
16 mittee on Energy and Natural Resources of the Senate  
17 an evaluation on the operation of the program during the  
18 most recent 3-year period, including—

19               “(1) an assessment of the progress made to-  
20 wards achieving the purposes specified in subsection  
21 (c) based on the metrics developed under subsection  
22 (g);

23               “(2) the short-term and long-term metrics used  
24 to determine the success of the program under sub-



1 section (g), and any changes recommended to the  
2 metrics used;

3 “(3) the regional clean energy innovation part-  
4 nerships established or supported by covered con-  
5 sortia that have received grants under subsection  
6 (d); and

7 “(4) any recommendations on how the program  
8 may be improved.

9 “(k) NATIONAL LABORATORIES.—In supporting  
10 technology transfer activities at the National Laboratories,  
11 the Secretary shall encourage partnerships with entities  
12 that are located in the same region or State as the Na-  
13 tional Laboratory.

14 “(l) SECURITY.—In carrying out the activities under  
15 this section, the Secretary shall ensure proper security  
16 controls are in place to protect sensitive information, as  
17 appropriate.

18 “(m) NO FUNDS FOR CONSTRUCTION.—No funds  
19 provided to the Department of Energy under this section  
20 shall be used for construction.

21 “(n) AUTHORIZATION OF APPROPRIATIONS.—There  
22 are authorized to be appropriated to the Secretary to carry  
23 out this section \$50,000,000 for each of fiscal years 2023  
24 through 2027.”.

## 1           **Subtitle D—Research Security**

### 2   **SEC. 10631. REQUIREMENTS FOR FOREIGN TALENT RE-** 3                           **CRUITMENT PROGRAMS.**

4           (a) **PURPOSE.**—The purpose of this subtitle is to di-  
5 rect actions to prohibit participation in any foreign talent  
6 recruitment program by personnel of Federal research  
7 agencies and to prohibit participation in a malign foreign  
8 talent recruitment program by covered individuals involved  
9 with research and development awards from those agen-  
10 cies.

11          (b) **GUIDANCE.**—Not later than 180 days after the  
12 date of the enactment of this Act, the Director of the Of-  
13 fice of Science and Technology Policy, in coordination with  
14 the interagency working group established under section  
15 1746 of the National Defense Authorization Act for Fiscal  
16 Year 2020 (42 U.S.C. 6601 note; Public Law 116–92),  
17 shall publish and widely distribute a uniform set of guide-  
18 lines for Federal research agencies regarding foreign tal-  
19 ent recruitment programs. Such policy guidelines shall—

20               (1) prohibit all personnel of each Federal re-  
21 search agency, including Federal employees, contract  
22 employees, independent contractors, individuals serv-  
23 ing under the Intergovernmental Personnel Act of  
24 1970 (42 U.S.C. 4701 et seq), Visiting Scientist,  
25 Engineering, and Educator appointments, and spe-

1       cial government employees other than peer review-  
2       ers, from participating in a foreign talent recruit-  
3       ment program;

4               (2) as part of the requirements under section  
5       223 of the William (Mac) Thornberry NDAA of Fis-  
6       cal Year 2021 (10 U.S.C. 6605; Public Law 116-  
7       283), require covered individuals to disclose if such  
8       individuals are a party to a foreign talent recruit-  
9       ment program contract, agreement, or other ar-  
10      rangement;

11              (3) prohibit research and development awards  
12      from being made for any proposal in which a covered  
13      individual is participating in a malign foreign talent  
14      recruitment program; and

15              (4) to the extent practicable, require recipient  
16      institutions to prohibit covered individuals partici-  
17      pating in malign foreign talent recruitment pro-  
18      grams from working on projects supported by re-  
19      search and development awards.

20      (c) DEFINITION OF FOREIGN TALENT RECRUITMENT  
21      PROGRAMS.—As part of the guidance under subsection  
22      (b), the Director of the Office of Science and Technology  
23      Policy shall define and describe the characteristics of a  
24      foreign talent recruitment program.

1 (d) IMPLEMENTATION.—Not later than one year  
2 after the date of the enactment of this Act, each Federal  
3 research agency shall issue a policy utilizing the guidelines  
4 under subsection (b).

5 (e) CONSISTENCY.—The Director of the Office of  
6 Science and Technology Policy shall ensure that the poli-  
7 cies issued by the Federal research agencies under sub-  
8 section (d) are consistent to the greatest extent prac-  
9 ticable.

10 **SEC. 10632. MALIGN FOREIGN TALENT RECRUITMENT PRO-**  
11 **GRAM PROHIBITION.**

12 (a) IN GENERAL.—Not later than 24 months after  
13 the date of enactment of this Act, each Federal research  
14 agency shall establish a policy that, as part of a proposal  
15 for a research and development award from the agency—

16 (1) each covered individual listed in such pro-  
17 posal certify that each such individual is not a party  
18 to a malign foreign talent recruitment program in  
19 the proposal submission of each such individual and  
20 annually thereafter for the duration of the award;  
21 and

22 (2) each institution of higher education or other  
23 organization applying for such an award certify that  
24 each covered individual who is employed by such in-  
25 stitution of higher education or other organization

1       has been made aware of the requirements under this  
2       section and complied with the requirement under  
3       paragraph (1).

4       (b) **STAKEHOLDER INPUT.**—In establishing a policy  
5       under subsection (a), Federal research agencies shall pub-  
6       lish a description of the proposed policy in the Federal  
7       Register and provide an opportunity for submission of  
8       public comment for a period of not more than 60 days.

9       (c) **COMPLIANCE WITH EXISTING LAW.**—Each Fed-  
10      eral research agency and recipient shall comply with title  
11      VI of the Civil Rights Act of 1964 (42 U.S.C. 2000d et  
12      seq.) in the establishment of policies pursuant to under  
13      subsection (a).

14      (d) **INTERNATIONAL COLLABORATION.**—Each policy  
15      developed under subsection (a) shall not prohibit, unless  
16      such activities are funded, organized, or managed by an  
17      academic institution or a foreign talent recruitment pro-  
18      gram on the lists developed under paragraphs (8) and (9)  
19      of section 1286(c) of the John S. McCain National De-  
20      fense Authorization Act for Fiscal Year 2019 (10 U.S.C.  
21      4001 note; Public Law 115–232)—

22              (1) making scholarly presentations and pub-  
23      lishing written materials regarding scientific infor-  
24      mation not otherwise controlled under current law;

1           (2) participation in international conferences or  
2           other international exchanges, research projects or  
3           programs that involve open and reciprocal exchange  
4           of scientific information, and which are aimed at ad-  
5           vancing international scientific understanding and  
6           not otherwise controlled under current law;

7           (3) advising a foreign student enrolled at an in-  
8           stitution of higher education or writing a rec-  
9           ommendation for such a student, at such student's  
10          request; and

11          (4) other international activities determined ap-  
12          propriate by the Federal research agency head or  
13          designee.

14          (e) LIMITATION.—The certifications required under  
15          subsection (a) shall not apply retroactively to research and  
16          development awards made or applied for prior to the es-  
17          tablishment of the policy by the Federal research agency.

18          (f) TRAINING.—Each Federal research agency shall  
19          ensure that, as a requirement of an award from each such  
20          agency, recipient institutions provide training on the risks  
21          of malign foreign talent recruitment programs to covered  
22          individuals employed at such institutions, including those  
23          individuals who are participating in activities described in  
24          subsection (d).

1 **SEC. 10633. REVIEW OF CONTRACTS AND AGREEMENTS.**

2 (a) IN GENERAL.—In addition to existing authorities  
3 for preventing waste, fraud, abuse, and mismanagement  
4 of Federal funds, each Federal research agency shall have  
5 the authority to—

6 (1) require, upon request, the submission to  
7 such agency, by an institution of higher education or  
8 other organization applying for a research and devel-  
9 opment award, of supporting documentation, includ-  
10 ing copies of contracts, grants, or any other agree-  
11 ment specific to foreign appointments, employment  
12 with a foreign institution, participation in a foreign  
13 talent recruitment program and other information  
14 reported as current and pending support for all cov-  
15 ered individuals in a research and development  
16 award application;

17 (2) require such institution of higher education  
18 or other organization to review any documents re-  
19 quested under paragraph (1) for compliance with the  
20 Federal research agency's award terms and condi-  
21 tions, including guidance on conflicts of interest and  
22 conflicts of commitment; and

23 (3) upon receipt and review of the information  
24 provided under paragraph (1) and in consultation  
25 with the institution of higher education or other or-  
26 ganization submitting such information, initiate the

1 substitution or removal of a covered individual from  
2 a research and development award, reduce the award  
3 funding amount, or suspend or terminate the award  
4 if the agency head determines such contracts,  
5 grants, or agreements include obligations that—

6 (A) interfere with the capacity for agency-  
7 supported activities to be carried out; or

8 (B) create duplication with agency-sup-  
9 ported activities.

10 (b) LIMITATIONS.—In exercising the authorities  
11 under subsection (a), each Federal research agency  
12 shall—

13 (1) take necessary steps, as practicable, to pro-  
14 tect the privacy of all covered individuals and other  
15 parties specified in the documentation submitted  
16 under paragraph (1) of such subsection;

17 (2) endeavor to provide justification for re-  
18 quests for supporting documentation made under  
19 such paragraph;

20 (3) require that allegations be proven by a pre-  
21 ponderance of evidence; and

22 (4) as practicable, afford subjects an oppor-  
23 tunity to provide comments and rebuttal and an op-  
24 portunity to appeal before final administrative action  
25 is taken.



1 **SEC. 10634. RESEARCH SECURITY TRAINING REQUIREMENT**  
2 **FOR FEDERAL RESEARCH AWARD PER-**  
3 **SONNEL.**

4 (a) ANNUAL TRAINING REQUIREMENT.—

5 (1) IN GENERAL.—Not later than 12 months  
6 after the date of the enactment of this Act, each  
7 Federal research agency shall establish a require-  
8 ment that, as part of an application for a research  
9 and development award from the agency—

10 (A) each covered individual listed on the  
11 application for a research and development  
12 award certify that each such individual has  
13 completed within one year of such application  
14 research security training that meets the guide-  
15 lines developed under subsection (b); and

16 (B) each institution of higher education or  
17 other organization applying for such an award  
18 certify that each covered individual who is em-  
19 ployed by such institution or organization and  
20 listed on the application has completed such  
21 training.

22 (2) CONSISTENCY.—The Director of the Office  
23 of Science and Technology Policy shall ensure that  
24 the training requirements established by Federal re-  
25 search agencies pursuant to paragraph (1) are con-  
26 sistent.

1           (b) TRAINING GUIDELINES.—The Director of the Of-  
2     fice of Science and Technology Policy, acting through the  
3     National Science and Technology Council and in accord-  
4     ance with the authority provided under section 1746(a)  
5     of the National Defense Authorization Act for Fiscal Year  
6     2020 (Public Law 116–92; 42 U.S.C. 6601 note), shall,  
7     taking into consideration stakeholder input, develop guide-  
8     lines for institutions of higher education and other organi-  
9     zations receiving Federal research and development funds  
10    to use in developing their own training programs to ad-  
11    dress the unique needs, challenges, and risk profiles of  
12    such institutions and other organizations, including adop-  
13    tion of security training modules developed under sub-  
14    section (c), to ensure compliance with National Security  
15    Presidential Memorandum–33 (relating to strengthening  
16    protections of the United States Government-supported  
17    research and development against foreign government in-  
18    terference and exploitation) or any successor documents.

19           (c) SECURITY TRAINING MODULES.—

20           (1) IN GENERAL.—Not later than 90 days after  
21    the date of the enactment of this Act, the Director  
22    of the Office of Science and Technology Policy, in  
23    coordination with the Director of the National  
24    Science Foundation, the Director of the National In-  
25    stitutes of Health, the Secretary of Energy, and the

1 Secretary of Defense, and in consultation with the  
2 heads of relevant Federal research agencies, shall  
3 enter into an agreement or contract with a qualified  
4 entity for the development of online research secu-  
5 rity training modules for the research community  
6 and participants in the United States research and  
7 development enterprise to ensure compliance with  
8 National Security Presidential Memorandum–33 or  
9 successor documents, including modules—

10 (A) focused on cybersecurity, international  
11 collaboration and international travel, foreign  
12 interference, and rules for proper use of funds,  
13 disclosure, conflict of commitment, and conflict  
14 of interest; and

15 (B) tailored to the unique needs of—

16 (i) covered individuals;

17 (ii) undergraduate students, graduate  
18 students, and postdoctoral researchers; and

19 (iii) applicants for awards under the  
20 SBIR and STTR programs (as such terms  
21 are defined in section 9(e) of the Small  
22 Business Act (15 U.S.C. 638(e)).

23 (2) STAKEHOLDER INPUT.—Prior to entering  
24 into the agreement under paragraph (1), the Direc-  
25 tor of the Office of Science and Technology Policy

1 shall seek input from academic, private sector, intel-  
2 ligence, and law enforcement stakeholders regarding  
3 the scope and content of security training modules,  
4 including the diversity of needs across institutions of  
5 higher education and other recipients of different  
6 sizes and types, and recommendations for mini-  
7 mizing administrative burden on recipients and re-  
8 searchers.

9 (3) DEVELOPMENT.—The Director of the Office  
10 of Science and Technology Policy shall ensure that  
11 the entity referred to in paragraph (1)—

12 (A) develops security training modules that  
13 can be adapted and utilized across Federal re-  
14 search agencies; and

15 (B) develops and implements a plan for  
16 regularly updating such modules as needed.

17 **SEC. 10635. RESEARCH FUNDS ACCOUNTING.**

18 (a) STUDY PERIOD DEFINED.—In this section the  
19 term “study period” means the 5-year period ending on  
20 the date of the enactment of this Act.

21 (b) STUDY.—The Comptroller General of the United  
22 States shall conduct a study on Federal funding made  
23 available to foreign entities of concern for research, during  
24 the study period.

1 (c) MATTERS TO BE INCLUDED.—The study con-  
2 ducted under subsection (b) shall include, to the extent  
3 practicable with respect to the study period, an assessment  
4 of—

5 (1) the total amount of Federal funding made  
6 available to foreign entities of concern for research;

7 (2) the total number and types of foreign enti-  
8 ties of concern to which such funding was made  
9 available;

10 (3) the requirements relating to the awarding,  
11 tracking, and monitoring of such funding;

12 (4) any other data available with respect to  
13 Federal funding made available to foreign entities of  
14 concern for research; and

15 (5) such other matters as the Comptroller Gen-  
16 eral of the United States determines appropriate.

17 (d) BRIEFING ON AVAILABLE DATA.—Not later than  
18 120 days after the date of the enactment of this Act, the  
19 Comptroller General of the United States shall brief the  
20 Committee on Commerce, Science, and Transportation,  
21 the Committee on Health, Education, Labor, and Pen-  
22 sions, and the Committee on Foreign Relations of the Sen-  
23 ate and the Committee on Science, Space, and Technology,  
24 the Committee on Energy and Commerce, and the Com-  
25 mittee on Foreign Affairs of the House of Representatives

1 on the study conducted under subsection (b) and the data  
2 that is available with respect to Federal funding made  
3 available to foreign entities of concern for research.

4 (e) REPORT.—The Comptroller General of the United  
5 States shall submit to the congressional committees speci-  
6 fied in subsection (d), by a date agreed upon by the Comp-  
7 troller General and the committees on the date of the  
8 briefing under such subsection, a report on the findings  
9 of the study conducted under subsection (b).

10 **SEC. 10636. PERSON OR ENTITY OF CONCERN PROHIBI-**  
11 **TION.**

12 No person published on the list under section 1237(b)  
13 of the Strom Thurmond National Defense Authorization  
14 Act for Fiscal Year 1999 (Public Law 105–261; 50 U.S.C.  
15 1701 note) or entity identified under section 1260h of the  
16 William M. (Mac) Thornberry National Defense Author-  
17 ization Act for Fiscal Year 2021 (10 U.S.C. 113 note;  
18 Public Law 116–283) may receive or participate in any  
19 grant, award, program, support, or other activity under—

20 (1) the Directorate established in subtitle G of  
21 title III of this division;

22 (2) section 28(b)(1) of the Stevenson-Wydler  
23 Technology Innovation Act of 1980 (15 U.S.C. 3701  
24 et seq.), as added by section 10621; or

1           (3) the Manufacturing USA Program, as im-  
2           proved and expanded under subtitle E of title II of  
3           this division.

4 **SEC. 10637. NONDISCRIMINATION.**

5           In carrying out requirements under this subtitle, each  
6           Federal research agency shall ensure that policies and ac-  
7           tivities developed and implemented pursuant to this sub-  
8           title are carried out in a manner that does not target, stig-  
9           matize, or discriminate against individuals on the basis of  
10          race, ethnicity, or national origin, consistent with title VI  
11          of the Civil Rights Act of 1964 (42 U.S.C. 2000d et seq.).

12 **SEC. 10638. DEFINITIONS.**

13          In this subtitle:

14           (1) COVERED INDIVIDUAL.—The term “covered  
15          individual” means an individual who—

16                   (A) contributes in a substantive, meaning-  
17                   ful way to the scientific development or execu-  
18                   tion of a research and development project pro-  
19                   posed to be carried out with a research and de-  
20                   velopment award from a Federal research agen-  
21                   cy; and

22                   (B) is designated as a covered individual  
23                   by the Federal research agency concerned.

24           (2) FOREIGN COUNTRY OF CONCERN.—The  
25          term “foreign country of concern” means the Peo-

1       ple’s Republic of China, the Democratic People’s Re-  
2       public of Korea, the Russian Federation, the Islamic  
3       Republic of Iran, or any other country determined to  
4       be a country of concern by the Secretary of State.

5           (3) FOREIGN ENTITY OF CONCERN.—The term  
6       “foreign entity of concern” means a foreign entity  
7       that is—

8           (A) designated as a foreign terrorist orga-  
9       nization by the Secretary of State under section  
10       219(a) of the Immigration and Nationality Act  
11       (8 U.S.C. 1189(a));

12          (B) included on the list of specially des-  
13       ignated nationals and blocked persons main-  
14       tained by the Office of Foreign Assets Control  
15       of the Department of the Treasury (commonly  
16       known as the SDN list);

17          (C) owned by, controlled by, or subject to  
18       the jurisdiction or direction of a government of  
19       a foreign country that is a covered nation (as  
20       such term is defined in section 4872 of title 10,  
21       United States Code);

22          (D) alleged by the Attorney General to  
23       have been involved in activities for which a con-  
24       viction was obtained under—



1 (i) chapter 37 of title 18, United  
2 States Code (commonly known as the Es-  
3 pionage Act);

4 (ii) section 951 or 1030 of title 18,  
5 United States Code;

6 (iii) chapter 90 of title 18, United  
7 States Code (commonly known as the Eco-  
8 nomic Espionage Act of 1996);

9 (iv) the Arms Export Control Act (22  
10 U.S.C. 2751 et seq.);

11 (v) section 224, 225, 226, 227, or 236  
12 of the Atomic Energy Act of 1954 (42  
13 U.S.C. 2274, 2275, 2276, 2277, and  
14 2284);

15 (vi) the Export Control Reform Act of  
16 2018 (50 U.S.C. 4801 et seq.); or

17 (vii) the International Emergency  
18 Economic Powers Act (50 U.S.C. 1701 et  
19 seq.); or

20 (E) determined by the Secretary of Com-  
21 merce, in consultation with the Secretary of De-  
22 fense and the Director of National Intelligence,  
23 to be engaged in unauthorized conduct that is  
24 detrimental to the national security or foreign  
25 policy of the United States.

1           (4) MALIGN FOREIGN TALENT RECRUITMENT  
2 PROGRAM.—The term “malign foreign talent recruit-  
3 ment program” means—

4           (A) any program, position, or activity that  
5 includes compensation in the form of cash, in-  
6 kind compensation, including research funding,  
7 promised future compensation, complimentary  
8 foreign travel, things of non de minimis value,  
9 honorific titles, career advancement opportuni-  
10 ties, or other types of remuneration or consider-  
11 ation directly provided by a foreign country at  
12 any level (national, provincial, or local) or their  
13 designee, or an entity based in, funded by, or  
14 affiliated with a foreign country, whether or not  
15 directly sponsored by the foreign country, to the  
16 targeted individual, whether directly or indi-  
17 rectly stated in the arrangement, contract, or  
18 other documentation at issue, in exchange for  
19 the individual—

20           (i) engaging in the unauthorized  
21 transfer of intellectual property, materials,  
22 data products, or other nonpublic informa-  
23 tion owned by a United States entity or  
24 developed with a Federal research and de-  
25 velopment award to the government of a

1 foreign country or an entity based in,  
2 funded by, or affiliated with a foreign  
3 country regardless of whether that govern-  
4 ment or entity provided support for the de-  
5 velopment of the intellectual property, ma-  
6 terials, or data products;

7 (ii) being required to recruit trainees  
8 or researchers to enroll in such program,  
9 position, or activity;

10 (iii) establishing a laboratory or com-  
11 pany, accepting a faculty position, or un-  
12 dertaking any other employment or ap-  
13 pointment in a foreign country or with an  
14 entity based in, funded by, or affiliated  
15 with a foreign country if such activities are  
16 in violation of the standard terms and con-  
17 ditions of a Federal research and develop-  
18 ment award;

19 (iv) being unable to terminate the for-  
20 eign talent recruitment program contract  
21 or agreement except in extraordinary cir-  
22 cumstances;

23 (v) through funding or effort related  
24 to the foreign talent recruitment program,  
25 being limited in the capacity to carry out

1 a research and development award or re-  
2 quired to engage in work that would result  
3 in substantial overlap or duplication with a  
4 Federal research and development award;

5 (vi) being required to apply for and  
6 successfully receive funding from the spon-  
7 soring foreign government's funding agen-  
8 cies with the sponsoring foreign organiza-  
9 tion as the recipient;

10 (vii) being required to omit acknowl-  
11 edgment of the recipient institution with  
12 which the individual is affiliated, or the  
13 Federal research agency sponsoring the re-  
14 search and development award, contrary to  
15 the institutional policies or standard terms  
16 and conditions of the Federal research and  
17 development award;

18 (viii) being required to not disclose to  
19 the Federal research agency or employing  
20 institution the participation of such indi-  
21 vidual in such program, position, or activ-  
22 ity; or

23 (ix) having a conflict of interest or  
24 conflict of commitment contrary to the

1 standard terms and conditions of the Fed-  
2 eral research and development award; and

3 (B) a program that is sponsored by—

4 (i) a foreign country of concern or an  
5 entity based in a foreign country of con-  
6 cern, whether or not directly sponsored by  
7 the foreign country of concern;

8 (ii) an academic institution on the list  
9 developed under section 1286(c)(8) of the  
10 John S. McCain National Defense Author-  
11 ization Act for Fiscal Year 2019 (10  
12 U.S.C. 2358 note; Public Law 115-232);  
13 or

14 (iii) a foreign talent recruitment pro-  
15 gram on the list developed under section  
16 1286(c)(9) of the John S. McCain Na-  
17 tional Defense Authorization Act for Fiscal  
18 Year 2019 (10 U.S.C. 2358 note; Public  
19 Law 115-232).

20 **Subtitle E—Coastal and Ocean**  
21 **Acidification Research and In-**  
22 **novation**

23 **SEC. 10641. SHORT TITLE.**

24 This subtitle may be cited as the “Coastal and Ocean  
25 Acidification Research and Innovation Act of 2021”.

1 **SEC. 10642. PURPOSES.**

2 (a) IN GENERAL.—Section 12402(a) of the Federal  
3 Ocean Acidification Research and Monitoring Act of 2009  
4 (33 U.S.C. 3701(a)) is amended—

5 (1) in paragraph (1)—

6 (A) in the matter preceding subparagraph  
7 (A), by striking “development and coordina-  
8 tion” and inserting “development coordination  
9 and implementation”;

10 (B) in subparagraph (A), by striking  
11 “acidification on marine organisms” and insert-  
12 ing “acidification and coastal acidification on  
13 marine organisms”; and

14 (C) in subparagraph (B), by striking “es-  
15 tablish” and all that follows through the semi-  
16 colon and inserting “maintain and advise an  
17 interagency research, monitoring, and public  
18 outreach program on ocean acidification and  
19 coastal acidification;”;

20 (2) in paragraph (2), by striking “establis-  
21 hment” and inserting “maintenance”;

22 (3) in paragraph (3), by inserting “and coastal  
23 acidification” after “ocean acidification”; and

24 (4) in paragraph (4), by striking “techniques  
25 for” and all that follows through the period and in-  
26 serting “mitigating the impacts of ocean and coastal

1 acidification and related co-stressors on marine eco-  
2 systems.”.

3 (b) **TECHNICAL AND CONFORMING AMENDMENT.**—  
4 Section 12402 of the Federal Ocean Acidification Re-  
5 search and Monitoring Act of 2009 (33 U.S.C. 3701(a))  
6 is amended by striking “(a) PURPOSES.—”.

7 **SEC. 10643. DEFINITIONS.**

8 Section 12403 of the Federal Ocean Acidification Re-  
9 search and Monitoring Act of 2009 (33 U.S.C. 3702) is  
10 amended—

11 (1) in paragraph (1), by striking “of the  
12 Earth’s oceans” and all that follows before the pe-  
13 riod at the end and inserting “and changes in the  
14 water chemistry of the Earth’s oceans, coastal estu-  
15 aries, marine waterways, and Great Lakes caused by  
16 carbon dioxide from the atmosphere and the break-  
17 down of organic matter”;

18 (2) in paragraph (3), by striking “Joint Sub-  
19 committee on Ocean Science and Technology of the  
20 National Science and Technology Council” and in-  
21 sserting “National Science and Technology Council  
22 Subcommittee on Ocean Science and Technology”;

23 (3) by redesignating paragraphs (1), (2), and  
24 (3) as paragraphs (2), (3), and (4), respectively;

1           (4) by inserting before paragraph (2), as so re-  
2 designated, the following:

3           “(1) COASTAL ACIDIFICATION.—The term  
4 ‘coastal acidification’ means the decrease in pH and  
5 changes in the water chemistry of coastal oceans, es-  
6 tuaries, and Great Lakes from atmospheric pollu-  
7 tion, freshwater inputs, and excess nutrient run-off  
8 from land.”; and

9           (5) by adding at the end the following:

10          “(5) STATE.—The term ‘State’ means each  
11 State of the United States, the District of Columbia,  
12 the Commonwealth of Puerto Rico, American  
13 Samoa, Guam, the Commonwealth of the Northern  
14 Mariana Islands, the Virgin Islands of the United  
15 States, and any other territory or possession of the  
16 United States.”.

17 **SEC. 10644. INTERAGENCY WORKING GROUP.**

18          Section 12404 of the Federal Ocean Acidification Re-  
19 search and Monitoring Act of 2009 (33 U.S.C. 3703) is  
20 amended—

21           (1) in the heading, by striking “**SUB-**  
22 **COMMITTEE**” and inserting “**WORKING GROUP**”;

23           (2) in subsection (a)—

24                 (A) in paragraph (1), by striking “Joint  
25 Subcommittee on Ocean Science and Tech-



1 nology of the National Science and Technology  
2 Council shall coordinate Federal activities on  
3 ocean acidification and establish” and insert  
4 “Subcommittee shall coordinate Federal activi-  
5 ties on ocean and coastal acidification and es-  
6 tablish and maintain”;

7 (B) in paragraph (2), by striking “Wildlife  
8 Service,” and inserting “Wildlife Service, the  
9 Bureau of Ocean Energy Management, the En-  
10 vironmental Protection Agency, the Department  
11 of Agriculture, the Department of State, the  
12 Department of Energy, the Department of the  
13 Navy, the National Park Service, the Bureau of  
14 Indian Affairs, the National Institute of Stand-  
15 ards and Technology, the Smithsonian Institu-  
16 tion,”; and

17 (C) in paragraph (3), in the heading, by  
18 striking “CHAIRMAN” and inserting “CHAIR”;

19 (3) in subsection (b)—

20 (A) in paragraph (2)—

21 (i) in subparagraph (A), by inserting  
22 “and coastal acidification” after “ocean  
23 acidification”; and

1 (ii) in subparagraph (B), by inserting  
2 “and coastal acidification” after “ocean  
3 acidification”;

4 (B) in paragraph (4), by striking “; and”  
5 and inserting a semicolon; and

6 (C) in paragraph (5)—

7 (i) by inserting “, and contribute to as  
8 appropriate,” after “designate”;

9 (ii) by striking “developed” and in-  
10 sserting “and coastal acidification devel-  
11 oped”; and

12 (iii) by striking the period at the end  
13 and inserting “and coastal acidification;  
14 and”.

15 (4) in subsection (c)—

16 (A) in paragraph (2)—

17 (i) by inserting “until 2032” after  
18 “every 2 years thereafter”;

19 (ii) by inserting “, and to the Office  
20 of Management and Budget,” after  
21 “House of Representatives”; and

22 (iii) in subparagraph (B), by striking  
23 “the interagency research” and inserting  
24 “interagency strategic research”;

1 (B) in paragraph (3), by inserting “until  
2 2031” after “at least once every 5 years”; and

3 (C) in paragraph (4), by inserting “until  
4 2032” after “and every 6 years thereafter”;

5 (5) by redesignating subsection (c) as sub-  
6 section (e); and

7 (6) by inserting after subsection (b) the fol-  
8 lowing:

9 “(c) ADVISORY BOARD.—

10 “(1) ESTABLISHMENT.—The Chair of the Sub-  
11 committee shall establish an Ocean Acidification Ad-  
12 visory Board.

13 “(2) DUTIES.—The Advisory Board shall—

14 “(A) maintain a process for reviewing and  
15 making recommendations to the Subcommittee  
16 on—

17 “(i) the biennial report specified in  
18 subsection (d)(2); and

19 “(ii) the strategic research plan in  
20 subsection (d)(3);

21 “(B) provide ongoing advice to the Sub-  
22 committee and the interagency working group  
23 on matters related to Federal activities on  
24 ocean and coastal acidification, including im-

1           pacts and mitigation of ocean and coastal acidi-  
2           fication; and

3           “(C) advise the Subcommittee and the  
4           interagency working group on—

5           “(i) efforts to coordinate research and  
6           monitoring activities related to ocean acidi-  
7           fication and coastal acidification; and

8           “(ii) the best practices for the stand-  
9           ards developed for data archiving under  
10          section 12406(d).

11          “(3) MEMBERSHIP.—The Advisory Board shall  
12          consist of 25 members as follows:

13           “(A) Two representatives of the shellfish,  
14           lobster, or crab industry.

15           “(B) One representative of the finfish in-  
16           dustry.

17           “(C) One representative of seafood proc-  
18           essors.

19           “(D) Three representatives from academia,  
20           including both natural and social sciences.

21           “(E) One representative of recreational  
22           fishing.

23           “(F) One representative of a relevant non-  
24           governmental organization.

1           “(G) Six representatives from relevant  
2 State and local governments with policy or reg-  
3 ulatory authorities related to ocean acidification  
4 and coastal acidification.

5           “(H) One representative from the Alaska  
6 Ocean Acidification Network or a subsequent  
7 entity that represents the same geographical re-  
8 gion and has a similar purpose.

9           “(I) One representative from the California  
10 Current Acidification Network or a subsequent  
11 entity that represents the same geographical re-  
12 gion and has a similar purpose.

13           “(J) One representative from the North-  
14 east Coastal Acidification Network or a subse-  
15 quent entity that represents the same geo-  
16 graphical region and has a similar purpose.

17           “(K) One representative from the South-  
18 east Coastal Acidification Network or a subse-  
19 quent entity that represents the same geo-  
20 graphical region and has a similar purpose.

21           “(L) One representative from the Gulf of  
22 Mexico Coastal Acidification Network or a sub-  
23 sequent entity that represents the same geo-  
24 graphical region and has a similar purpose.

1           “(M) One representative from the Mid-At-  
2           lantic Coastal Acidification Network or a subse-  
3           quent entity that represents the same geo-  
4           graphical region and has a similar purpose.

5           “(N) One representative from the Pacific  
6           Islands Ocean Observing System or a subse-  
7           quent entity that represents the island terri-  
8           tories and possessions of the United States in  
9           the Pacific Ocean, and the State of Hawaii and  
10          has a similar purpose.

11          “(O) One representative from the Carib-  
12          bean Regional Association for Coastal Ocean  
13          Observing or a subsequent entity that rep-  
14          resents Puerto Rico and the United States Vir-  
15          gin Islands and has a similar purpose.

16          “(P) One representative from the National  
17          Oceanic and Atmospheric Administration Olym-  
18          pic Coast Ocean Acidification Sentinel Site or a  
19          subsequent entity that represents the same geo-  
20          graphical representation.

21          “(Q) One representative from the National  
22          Oceanic and Atmospheric Administration shall  
23          serve as an ex-officio member of the Advisory  
24          Board without a vote.

1           “(4) APPOINTMENT OF MEMBERS.—The Chair  
2 of the Subcommittee shall—

3           “(A) appoint members to the Advisory  
4 Board (taking into account the geographical in-  
5 terests of each individual to be appointed as a  
6 member of the Advisory Board to ensure that  
7 an appropriate balance of geographical interests  
8 are represented by the members of the Advisory  
9 Board) who—

10           “(i) represent the interest group for  
11 which each seat is designated;

12           “(ii) demonstrate expertise on ocean  
13 acidification or coastal acidification and its  
14 scientific, economic, industry, cultural, and  
15 community impacts; and

16           “(iii) have a record of distinguished  
17 service with respect to ocean acidification  
18 or coastal acidification, and such impacts;

19           “(B) give consideration to nominations and  
20 recommendations from the members of the  
21 interagency working group and the public for  
22 such appointments; and

23           “(C) ensure that an appropriate balance of  
24 scientific, industry, State and local resource  
25 managers, and geographical interests are rep-

1           resented by the members of the Advisory  
2           Board.

3           “(5) TERM OF MEMBERSHIP.—Each member of  
4           the Advisory Board—

5                   “(A) shall be appointed for a 5-year term;  
6           and

7                   “(B) may be appointed to no more than  
8           two terms.

9           “(6) CHAIR.—The Chair of the Subcommittee  
10          shall appoint one member of the Advisory Board to  
11          serve as the Chair of the Advisory Board.

12          “(7) MEETINGS.—Not less than once each cal-  
13          endar year, the Advisory Board shall meet at such  
14          times and places as may be designated by the Chair  
15          of the Advisory Board, in consultation with the  
16          Chair of the Subcommittee and the Chair of the  
17          interagency working group.

18          “(8) BRIEFING.—The Chair of the Advisory  
19          Board shall brief the Subcommittee and the inter-  
20          agency working group on the progress of the Advi-  
21          sory Board as necessary or at the request of the  
22          Subcommittee.

23          “(9) TRIBAL GOVERNMENT ENGAGEMENT AND  
24          COORDINATION.—



1           “(A) IN GENERAL.—The Advisory Board  
2           shall maintain mechanisms for coordination,  
3           and engagement with Tribal governments.

4           “(i) RULE OF CONSTRUCTION.—Nothing in  
5           subparagraph (A) may be construed as affect-  
6           ing any requirement to consult with Indian  
7           Tribes under Executive Order 13175 (25  
8           U.S.C. 5301 note; relating to consultation and  
9           coordination with Tribal governments) or any  
10          other applicable law or policy.

11          “(10) FEDERAL ADVISORY COMMITTEE ACT.—  
12          Section 14 of the Federal Advisory Committee Act  
13          shall not apply to the Advisory Board for 10 years  
14          from the date of enactment of this Act.

15          “(d) PRIZE COMPETITIONS.—

16          “(1) IN GENERAL.—Any Federal agency with a  
17          representative serving on the interagency working  
18          group established under this section may, either in-  
19          dividually or in cooperation with one or more agen-  
20          cies, carry out a program to award prizes competi-  
21          tively under section 24 of the Stevenson-Wydler  
22          Technology Innovation Act of 1980 (15 U.S.C.  
23          3719). An agency seeking to carry out such a pro-  
24          gram shall carry out such program in coordination  
25          with the chair of such interagency working group.



1                   until 2035” after “the date of enactment  
2                   of this Act”;

3                   (ii) by inserting “address the socio-  
4                   economic impacts of ocean acidification  
5                   and coastal acidification and to” after  
6                   “mitigation strategies to”; and

7                   (iii) by striking “marine ecosystems”  
8                   each place it appears and inserting “eco-  
9                   systems”; and

10                  (C) in the second sentence, by striking  
11                  “National Academy of Sciences in the review of  
12                  the plan required under subsection (d)”, and in-  
13                  serting “Advisory Board established in section  
14                  12404(c)”;

15                  (2) in subsection (b)—

16                   (A) in paragraph (1), by inserting “and so-  
17                   cial sciences” after “among the ocean sciences”;

18                   (B) in paragraph (2)—

19                   (i) in subparagraph (B)—

20                   (I) by striking “improve the abil-  
21                   ity to assess the” and inserting “as-  
22                   sess the short-term and long-term”;  
23                   and

24                   (II) by striking “; and” at the  
25                   end and inserting a semicolon;

1 (ii) by amending subparagraph (C) to  
2 read as follows:

3 “(C) provide information for the develop-  
4 ment of adaptation and mitigation strategies to  
5 address—

6 “(i) socioeconomic impacts of ocean  
7 acidification and coastal acidification;

8 “(ii) conservation of marine organisms  
9 and ecosystems;

10 “(iii) assessment of the effectiveness  
11 of such adaptation and mitigation strate-  
12 gies; and”;

13 (iii) by adding at the end the fol-  
14 lowing new subparagraph:

15 “(D) improve research on—

16 “(i) ocean acidification and coastal  
17 acidification;

18 “(ii) the interactions between and ef-  
19 fects of ocean and coastal acidification and  
20 multiple combined stressors including  
21 changes in water chemistry, changes in  
22 sediment delivery, hypoxia, and harmful  
23 algal blooms, on ocean acidification and  
24 coastal acidification; and

1 “(iii) the effect or effects of clauses (i)  
2 and (ii) on marine resources and eco-  
3 systems;”;

4 (C) in paragraph (3)—

5 (i) in subparagraph (F), by striking  
6 “database development” and inserting  
7 “data management”;

8 (ii) in subparagraph (H) by striking  
9 “and” at the end; and

10 (iii) by adding at the end the fol-  
11 lowing new subparagraphs:

12 “(J) assessment of adaptation and mitiga-  
13 tion strategies; and

14 “(K) education and outreach activities;”;

15 (D) in paragraph (4), by striking “set  
16 forth” and inserting “ensure an appropriate  
17 balance of contribution in establishing”;

18 (E) in paragraph (5), by striking “reports”  
19 and inserting “the best available peer-reviewed  
20 scientific reports”;

21 (F) in paragraph (6)—

22 (i) by inserting “and coastal acidifica-  
23 tion” after “ocean acidification”; and

24 (ii) by striking “of the United States”  
25 and inserting “within the United States”;

1 (G) in paragraph (8)—

2 (i) by inserting “and coastal acidifica-  
3 tion” after “ocean acidification” each place  
4 it appears;

5 (ii) by striking “its” and inserting  
6 “their”; and

7 (iii) by striking “; and” at the end  
8 and inserting a semicolon;

9 (H) in paragraph (9), by striking “and” at  
10 the end

11 (I) in paragraph (10), by striking the pe-  
12 riod at the end and inserting a semicolon; and

13 (J) by adding at the end the following:

14 “(11) describe monitoring needs necessary to  
15 support potentially affected industry members,  
16 coastal stakeholders, fishery management councils  
17 and commissions, Tribal governments, non-Federal  
18 resource managers, and scientific experts on deci-  
19 sion-making and adaptation related to ocean acidifi-  
20 cation and coastal acidification; and

21 “(12) describe the extent to which the Sub-  
22 committee incorporated feedback from the Advisory  
23 Board established in section 12404(c).”;

24 (3) in subsection (c)—

1 (A) in paragraph (1)(C), by striking “sur-  
2 face”;

3 (B) in paragraph (2), by inserting “and  
4 coastal acidification” after “ocean acidification”  
5 each place it appears;

6 (C) in paragraph (3)—

7 (i) by striking “input, and” and in-  
8 serting “inputs,”;

9 (ii) by inserting “, marine food webs,”  
10 after “marine ecosystems”; and

11 (iii) by inserting “, and modeling that  
12 supports fisheries management” after  
13 “marine organisms”;

14 (D) in paragraph (5), by inserting “and  
15 coastal acidification” after “ocean acidifica-  
16 tion”; and

17 (E) by adding at the end the following new  
18 paragraph:

19 “(8) Research to understand related and cumu-  
20 lative stressors and other biogeochemical processes  
21 occurring in conjunction with ocean acidification and  
22 coastal acidification.”; and

23 (4) by striking subsections (d) and (e) and in-  
24 serting the following:

1           “(d) PUBLICATION.—Concurrent with the submission  
2 of the plan to Congress, the Subcommittee shall publish  
3 the plan on a public website.”.

4 **SEC. 10646. NOAA OCEAN ACIDIFICATION ACTIVITIES.**

5           Section 12406 of the Federal Ocean Acidification Re-  
6 search and Monitoring Act of 2009 (33 U.S.C. 3705) is  
7 amended—

8           (1) in subsection (a)—

9                   (A) in the matter preceding paragraph (1),  
10           by inserting “coordination,” after “research,  
11           monitoring,”;

12                   (B) in paragraph (1)—

13                           (i) in subparagraph (B), by inserting  
14                   “including leveraging, as appropriate, the  
15                   Integrated Ocean Observing System and  
16                   the ocean observing assets of other Fed-  
17                   eral, State, and Tribal agencies,” after  
18                   “ocean observing assets,”;

19                           (ii) by redesignating subparagraphs  
20                   (C), (D), (E), and (F) as subparagraphs  
21                   (E), (G), (H), and (I), respectively;

22                           (iii) by inserting after subparagraph  
23                   (B) the following new subparagraphs:

24                                   “(C) prioritization of the location of moni-  
25                   toring instruments, assets, and projects to



1 maximize the efficiency of resources and agency  
2 and department missions;

3 “(D) an optimization of understanding of  
4 socioeconomic impacts and ecosystem health”.

5 (iv) in subparagraph (E), as so redes-  
6 igned, by striking “adaptation” and in-  
7 serting “adaptation and mitigation”;

8 (v) by inserting after subparagraph  
9 (E), as so redesignated, the following new  
10 subparagraph:

11 “(F) technical assistance to  
12 socioeconomically vulnerable States, local gov-  
13 ernments, Tribal governments, communities,  
14 and industries impacted by ocean and coastal  
15 acidification to support their development of  
16 ocean and coastal acidification mitigation strat-  
17 egies;”.

18 (vi) in subparagraph (H), as so redes-  
19 igned—

20 (I) by striking “its impacts” and  
21 inserting “their respective impacts”;

22 (II) by striking “and” at the end;

23 (vii) in subparagraph (I), as so redes-  
24 igned—

1 (I) by striking “monitoring and  
2 impacts research” and inserting “re-  
3 search, monitoring, and adaptation  
4 and mitigation strategies”; and

5 (II) by striking the period at the  
6 end and inserting a semicolon; and

7 (viii) by adding at the end the fol-  
8 lowing new subparagraphs:

9 “(J) research to improve understanding  
10 of—

11 “(i) the impact of ocean acidification  
12 and coastal acidification; and

13 “(ii) how multiple environmental  
14 stressors may contribute to and exacerbate  
15 ocean and coastal acidification on living  
16 marine resources and coastal ecosystems;  
17 and

18 “(K) research to support the development  
19 of adaptation and mitigation strategies to ad-  
20 dress the socioeconomic impacts of ocean and  
21 coastal acidification on coastal communities;”;

22 (C) in paragraph (2), by striking “critical  
23 research projects that explore” and inserting  
24 “critical research, education, and outreach  
25 projects that explore and communicate”; and

1 (D) in paragraphs (1) and (2), by striking  
2 “acidification” each place it appears and insert-  
3 ing “acidification and coastal acidification”;  
4 and

5 (2) by adding at the end the following new sub-  
6 sections:

7 “(c) RELATIONSHIP TO INTERAGENCY WORKING  
8 GROUP.—The National Oceanic and Atmospheric Admin-  
9 istration shall serve as the lead Federal agency responsible  
10 for coordinating the Federal response to ocean and coastal  
11 acidification. The Administration may enter into Memo-  
12 randa of Understanding to—

13 “(1) coordinate monitoring and research efforts  
14 among Federal agencies in cooperation with State,  
15 local, and Tribal governments and international  
16 partners; this may include analysis and synthesis of  
17 the results of monitoring and research;

18 “(2) maintain an Ocean Acidification Informa-  
19 tion Exchange described under section 12404(b)(5)  
20 to allow for information to be electronically acces-  
21 sible, including information—

22 “(A) on ocean acidification developed  
23 through or used by the ocean acidification pro-  
24 gram described under subsection (a); or

1           “(B) that would be useful to State govern-  
2           ments, local governments, Tribal governments,  
3           resource managers, policymakers, researchers,  
4           and other stakeholders in mitigating or adapt-  
5           ing to the impacts of ocean acidification and  
6           coastal acidification; and

7           “(3) establishing and maintaining the data ar-  
8           chive system under subsection (d).

9           “(d) DATA ARCHIVE SYSTEM.—

10           “(1) IN GENERAL.—The Secretary, in coordina-  
11           tion with the members of the interagency working  
12           group, shall support the long-term stewardship of,  
13           and access to, data relating to ocean and coastal  
14           acidification through providing the data on a pub-  
15           licly accessible data archive system. To the extent  
16           possible, this data archive system shall collect and  
17           provide access to ocean and coastal acidification  
18           data—

19           “(A) from relevant federally funded re-  
20           search;

21           “(B) provided by a Federal, State, or local  
22           government, academic scientist, citizen scientist,  
23           or industry organization;

24           “(C) voluntarily submitted by Tribes or  
25           Tribal governments; and

1           “(D) from existing global or national data  
2           assets that are currently maintained within  
3           Federal agencies.

4           “(2) DATA STANDARDS.—The Secretary to, the  
5           extent possible, shall ensure all such data adheres to  
6           data and metadata standards to support the public  
7           findability, accessibility, interoperability, and  
8           reusability of such data.”.

9   **SEC. 10647. NSF OCEAN ACIDIFICATION ACTIVITIES.**

10          Section 12407 of the Federal Ocean Acidification Re-  
11          search and Monitoring Act of 2009 (33 U.S.C. 3706) is  
12          amended—

13               (1) by striking “ocean acidification” each place  
14               it appears and inserting “ocean acidification and  
15               coastal acidification”;

16               (2) in subsection (a)—

17                       (A) in the matter preceding paragraph (1),  
18                       by striking “its impacts” and inserting “their  
19                       respective impacts”;

20                       (B) in paragraph (3), by striking “and its  
21                       impacts” and inserting “and their respective  
22                       impacts”;

23                       (C) in paragraph (4), by striking the pe-  
24                       riod at the end and inserting “; and”; and

1 (D) by adding at the end the following new  
2 paragraph:

3 “(5) adaptation and mitigation strategies to ad-  
4 dress socioeconomic effects of ocean acidification and  
5 coastal acidification.”; and

6 (3) by adding at the end the following:

7 “(d) REQUIREMENT.—Recipients of grants from the  
8 National Science Foundation under this subtitle that col-  
9 lect data described under section 12406(d) shall—

10 “(1) collect data in accordance with the stand-  
11 ards, protocols, or procedures established pursuant  
12 to section 12406(d); and

13 “(2) submit such data to the Director and the  
14 Secretary after publication, in accordance with any  
15 rules promulgated by the Director or the Sec-  
16 retary.”.

17 **SEC. 10648. NASA OCEAN ACIDIFICATION ACTIVITIES.**

18 Section 12408 of the Federal Ocean Acidification Re-  
19 search and Monitoring Act of 2009 (33 U.S.C. 3707) is  
20 amended—

21 (1) by striking “ocean acidification” each place  
22 it appears and inserting “ocean acidification and  
23 coastal acidification”;

24 (2) in subsection (a), by striking “its impacts”  
25 and inserting “their respective impacts”; and

1           (3) by adding at the end the following new sub-  
2           section:

3           “(d) REQUIREMENT.—Researchers from the National  
4 Aeronautics and Space Administration under this subtitle  
5 that collect data described under section 12406(d) shall—

6           “(1) collect such data in accordance with the  
7 standards, protocols, or procedures established pur-  
8 suant to section 12406(d); and

9           “(2) submit such data to the Administrator and  
10 the Secretary, in accordance with any rules promul-  
11 gated by the Administrator or the Secretary.”.

12 **SEC. 10649. AUTHORIZATION OF APPROPRIATIONS.**

13           Section 12409 of the Federal Ocean Acidification Re-  
14 search and Monitoring Act of 2009 (33 U.S.C. 3708) is  
15 amended—

16           (1) in subsection (a), by striking “subtitle—”  
17 and all that follows through paragraph (4) and in-  
18 serting the following: “subtitle—

19           “(1) \$20,500,000 for fiscal year 2023;

20           “(2) \$22,000,000 for fiscal year 2024;

21           “(3) \$24,000,000 for fiscal year 2025;

22           “(4) \$26,000,000 for fiscal year 2026; and

23           “(5) \$28,000,000 for fiscal year 2027.”; and

24           (2) in subsection (b), by striking “subtitle—”  
25 and all that follows through paragraph (4) and in-

1       serting the following: “subtitle, \$20,000,000 for  
2       each of the fiscal years 2023 through 2027.”.

3       **Subtitle F—Interagency Working**  
4       **Group**

5       **SEC. 10651. INTERAGENCY WORKING GROUP.**

6       (a) ESTABLISHMENT.—The Director of the Office of  
7       Science and Technology Policy, acting through the Na-  
8       tional Science and Technology Council, shall establish or  
9       designate an interagency working group to coordinate the  
10      activities specified in subsection (c).

11      (b) COMPOSITION.—The interagency working group  
12      shall be composed of the following members (or their des-  
13      ignees), who may be organized into subcommittees, as ap-  
14      propriate:

15              (1) The Secretary of Commerce.

16              (2) The Director of the National Science Foun-  
17      dation.

18              (3) The Secretary of Energy.

19              (4) The Secretary of Defense.

20              (5) The Director of the National Economic  
21      Council.

22              (6) The Director of the Office of Management  
23      and Budget.

24              (7) The Secretary of Health and Human Serv-  
25      ices.



1           (8) The Administrator of the National Aero-  
2           nautics and Space Administration.

3           (9) The Secretary of Agriculture.

4           (10) The Director of National Intelligence.

5           (11) The Director of the Federal Bureau of In-  
6           vestigation.

7           (12) Such other Federal officials as the Direc-  
8           tor of the Office of Science and Technology Policy  
9           considers appropriate, including members of the Na-  
10          tional Science and Technology Council Committee on  
11          Technology.

12          (c) COORDINATION.—The interagency working group  
13          shall seek to ensure that the activities of different Federal  
14          agencies enhance and complement, but, as appropriate, do  
15          not duplicate, efforts being carried out by another Federal  
16          agency, with a focus on the following:

17                (1) The activities of the National Science Foun-  
18                dation Technology, Innovation, and Partnerships Di-  
19                rectorate in the key technology focus areas, such as  
20                within the Regional Innovation Engines under sec-  
21                tion 10388 and test beds under section 10390.

22                (2) The activities of the Department of Com-  
23                merce under this division, including regional tech-  
24                nology hubs under section 28 of the Stevenson-  
25                Wylder Act of 1980 (15 U.S.C. 13701 et seq.), as

1 added by section 10621, the Manufacturing USA  
2 Program established under section 34(b)(1) of the  
3 National Institute of Standards and Technology Act  
4 (15 U.S.C. 278s(b)(1)), and the Hollings Manufac-  
5 turing Extension Partnership (15 U.S.C. 278k).

6 (3) The activities of the Department of Energy  
7 in the key technology focus areas, including at the  
8 national laboratories, and at Federal laboratories, as  
9 defined in section 4 of the Stevenson-Wydler Tech-  
10 nology Innovation Act of 1980 (15 U.S.C. 3703),  
11 and facilities and user facilities operated in partner-  
12 ship with such national laboratories or the Depart-  
13 ment of Energy.

14 (4) Any other program that the Director of the  
15 Office of Science and Technology Policy determines  
16 involves research and development with respect to  
17 the key technology focus areas.

18 (d) REPORT.—The interagency working group  
19 shall—

20 (1) by not later than 180 days after the date  
21 of enactment of this division—

22 (A) conduct an initial review of Federal  
23 programs and resources with respect to the key  
24 technology focus areas identified pursuant to  
25 section 10387(a)(2), in order to—

1 (i) assess current level of efforts and  
2 characterize existing research infrastruc-  
3 ture, as of the date of the review;

4 (ii) identify potential areas of overlap  
5 or duplication with respect to the key tech-  
6 nology focus areas; and

7 (iii) identify potential cross-agency  
8 collaborations and joint funding opportuni-  
9 ties; and

10 (B) submit a report regarding the review  
11 described in subparagraph (A) to Congress; and

12 (C) seek stakeholder input and rec-  
13 ommendations in the course of such review; and

14 (2) shall carry out the annual reviews and up-  
15 dates required under section 10387(e).

16 (e) CONFLICTS.—If any conflicts between Federal  
17 agencies arise while carrying out the activities under this  
18 section, the President shall make the final decision regard-  
19 ing resolution of the conflict.

20 **Subtitle G—Quantum Networking**  
21 **and Communications**

22 **SEC. 10661. QUANTUM NETWORKING AND COMMUNICA-**  
23 **TIONS.**

24 (a) DEFINITIONS.—In this section:

1           (1) DIRECTOR.—The term “Director” means  
2           the Director of the National Science Foundation.

3           (2) APPROPRIATE COMMITTEES OF CON-  
4           GRESS.—The term “appropriate committees of Con-  
5           gress” has the meaning given such term in section  
6           2 of the National Quantum Initiative Act (15 U.S.C.  
7           8801).

8           (3) Q2WORK PROGRAM.—The term “Q2Work  
9           Program” means the Q2Work Program supported  
10          by the Foundation.

11          (b) QUANTUM NETWORKING WORKING GROUP RE-  
12          PORT ON QUANTUM NETWORKING AND COMMUNICA-  
13          TIONS.—

14           (1) REPORT.—Section 103 of the National  
15          Quantum Initiative Act (15 U.S.C. 8813) is amend-  
16          ed by adding the following at the end the following  
17          new subsection:

18          “(h) REPORT ON QUANTUM NETWORKING AND COM-  
19          MUNICATIONS.—

20           “(1) IN GENERAL.—Not later than January 1,  
21          2026, the Quantum Networking Working Group  
22          within the Subcommittee on Quantum Information  
23          Science of the National Science and Technology  
24          Council, in coordination with the Subcommittee on  
25          the Economic and Security Implications of Quantum

1 Information Science, shall submit to the appropriate  
2 committees of Congress a report detailing a plan for  
3 the advancement of quantum networking and com-  
4 munications technology in the United States, build-  
5 ing on the report entitled *A Strategic Vision for*  
6 *America’s Quantum Networks and A Coordinated Ap-*  
7 *proach for Quantum Networking Research.*

8 “(2) REQUIREMENTS.—The report under para-  
9 graph (1) shall include the following:

10 “(A) An update to the report entitled *Co-*  
11 *ordinated Approach to Quantum Networking Re-*  
12 *search Report* focusing on a framework for  
13 interagency collaboration regarding the ad-  
14 vancement of quantum networking and commu-  
15 nications research.

16 “(B) A plan for Federal Government part-  
17 nership with the private sector and interagency  
18 collaboration regarding engagement in inter-  
19 national standards for quantum networking and  
20 communications technology, including a list of  
21 Federal priorities for standards relating to such  
22 networking and technology.

23 “(C) A proposal for the protection of na-  
24 tional security interests relating to the advance-

1           ment of quantum networking and communica-  
2           tions technology.

3           “(D) An assessment of the relative position  
4           of the United States with respect to other coun-  
5           tries in the global race to develop, demonstrate,  
6           and utilize quantum networking and commu-  
7           nications technology.

8           “(E) Recommendations to Congress for  
9           legislative action relating to the matters consid-  
10          ered under subparagraphs (A), (B), (C), and  
11          (D).

12          “(F) Such other matters as the Quantum  
13          Network Working Group considers necessary to  
14          advance the security of communications and  
15          network infrastructure, remain at the forefront  
16          of scientific discovery in the quantum informa-  
17          tion science domain, and transition quantum in-  
18          formation science research into the emerging  
19          quantum technology economy.”.

20          (c) QUANTUM NETWORKING AND COMMUNICATIONS  
21          RESEARCH AND STANDARDIZATION.—

22                 (1) RESEARCH.—Subsection (a) of section 201  
23          of the National Quantum Initiative Act (15 U.S.C.  
24          8831) is amended by—

1 (A) redesignating paragraphs (3) and (4)  
2 as paragraphs (6) and (7), respectively; and

3 (B) inserting after paragraph (2) the fol-  
4 lowing new paragraphs:

5 “(3) shall carry out research to facilitate the  
6 development and standardization of quantum cryp-  
7 tography and post-quantum classical cryptography;

8 “(4) shall carry out research to facilitate the  
9 development and standardization of quantum net-  
10 working, communications, and sensing technologies  
11 and applications;

12 “(5) for quantum technologies determined by  
13 the Director of the National Institute of Standards  
14 and Technology to be at a readiness level sufficient  
15 for standardization, shall provide technical review  
16 and assistance to such other Federal agencies as the  
17 Director considers appropriate for the development  
18 of quantum networking infrastructure standards;”.

19 (2) AUTHORIZATION OF APPROPRIATIONS.—  
20 There is authorized to be appropriated to the Sci-  
21 entific and Technical Research and Services account  
22 of the National Institute of Standards and Tech-  
23 nology to carry out paragraphs (3) through (5) of  
24 subsection (a) of section 201 of the National Quan-  
25 tum Initiative Act (as inserted pursuant to the

1 amendments made by paragraph (1) of this sub-  
2 section) \$15,000,000 for each of fiscal years 2023  
3 through 2027.

4 (d) QUANTUM INFORMATION SCIENCE WORKFORCE  
5 EVALUATION AND ACCELERATION.—

6 (1) IN GENERAL.—Not later than 180 days  
7 after the date of the enactment of this Act, the Di-  
8 rector shall enter into an agreement with the Na-  
9 tional Academies of Sciences, Engineering, and Med-  
10 icine to conduct a study to evaluate and make rec-  
11 ommendations for the quantum information science  
12 workforce. The study shall—

13 (A) characterize the quantum information  
14 science workforce, including by—

15 (i) describing what constitutes a  
16 quantum information science qualified  
17 worker across sectors, including academia,  
18 the Federal Government, and industry;  
19 and

20 (ii) describing the size and makeup of  
21 the quantum information science work-  
22 force, including an assessment of current  
23 and future trends;

24 (B) identify near- and long-term quantum  
25 information science workforce needs across gov-



1 ernment, academia, and industry sectors, in-  
2 cluding identifying the cross-disciplinary aca-  
3 demic degrees or academic courses necessary  
4 to—

5 (i) prepare students for multiple ca-  
6 reer pathways in quantum information  
7 sciences and related fields;

8 (ii) ensure the United States is com-  
9 petitive in the field of quantum informa-  
10 tion science while preserving national secu-  
11 rity; and

12 (iii) support the development of quan-  
13 tum applications;

14 (C) assess the state of quantum informa-  
15 tion science education and skills training at all  
16 education levels and identify gaps in meeting  
17 current and future workforce needs, including  
18 with respect to—

19 (i) elementary, middle, and high-  
20 school student access to foundational  
21 courses, age-appropriate quantum con-  
22 cepts, and hands-on learning opportunities;

23 (ii) elementary, middle, and high-  
24 school teacher professional development

1 and access to resources, materials, lesson  
2 plans, modules, and curricula;

3 (iii) career pivot and skills training  
4 opportunities, including professional certifi-  
5 cates and internships; and

6 (iv) higher education curricula, lab-  
7 oratory experiences in academia, the Fed-  
8 eral Government, and industry settings,  
9 and cross-discipline degree programs  
10 aligned with workforce needs; and

11 (D) make recommendations for developing  
12 a diverse, flexible, and sustainable quantum in-  
13 formation science workforce that meets the  
14 evolving needs of academia, the Federal Gov-  
15 ernment, and industry.

16 (2) REPORT.—Not later than two years after  
17 the date of the enactment of this Act, the National  
18 Academies of Science, Engineering, and Medicine  
19 shall submit to Congress and the Director a report  
20 containing the results of the study conducted pursu-  
21 ant to paragraph (1).

22 (e) INCORPORATING QISE INTO STEM CUR-  
23 RICULUM.—

1           (1) IN GENERAL.—Section 301 of the National  
2           Quantum Initiative Act (15 U.S.C. 8841) is amend-  
3           ed by adding the following at the end:

4           “(d) INCORPORATING QISE INTO STEM CUR-  
5           RICULUM.—

6           “(1) IN GENERAL.—The Director of the Na-  
7           tional Science Foundation shall, through programs  
8           carried out or supported by the National Science  
9           Foundation, seek to increase the integration of  
10          quantum information science and engineering (re-  
11          ferred to in this subsection as ‘QISE’) into the  
12          STEM curriculum at all education levels, including  
13          community colleges, as considered appropriate by the  
14          Director.

15          “(2) CURRICULUM INTEGRATION.—The cur-  
16          riculum integration under paragraph (1) may in-  
17          clude the following:

18                 “(A) Methods to conceptualize QISE for  
19                 elementary, middle, and high school curricula.

20                 “(B) Methods for strengthening  
21                 foundational mathematics and science curricula.

22                 “(C) Methods for integrating students who  
23                 are underserved or historically underrepresented  
24                 groups in STEM.

1           “(D) Age-appropriate materials that apply  
2           the principles of quantum information science  
3           in STEM fields.

4           “(E) Recommendations for the standard-  
5           ization of key concepts, definitions, and cur-  
6           riculum criteria across government, academia,  
7           and industry.

8           “(F) Materials that specifically address the  
9           findings and outcomes of the study to evaluate  
10          and make recommendations for the quantum  
11          information science workforce pursuant to sub-  
12          section (d) of section 10661 of the Research  
13          and Development, Competition, and Innovation  
14          Act and strategies to account for the skills and  
15          workforce needs identified through such study.

16          “(3) COORDINATION.—In carrying out this sub-  
17          section, the Director shall coordinate with relevant  
18          Federal agencies, and consult with nongovernmental  
19          entities with expertise in QISE, as appropriate,  
20          which may include institutions eligible to participate  
21          in the Established Program to Stimulate Competi-  
22          tive Research (EPSCoR).

23          “(4) DEFINITION.—In this subsection, the term  
24          ‘STEM’ means the academic and professional dis-

1       ciplines of science, technology, engineering, and  
2       mathematics, including computer science.”.

3       (f) QUANTUM EDUCATION PILOT PROGRAM.—

4             (1) IN GENERAL.—Not later than one year  
5       after the date of the enactment of this Act, the Di-  
6       rector, building on the National Science Founda-  
7       tion’s role in the National Q–12 Education Partner-  
8       ship and programs such as Q2Work Program, shall  
9       make awards to institutions of higher education,  
10      non-profit organizations, or consortia thereof to  
11      carry out a pilot program, to be known as the “Next  
12      Generation Quantum Leaders Pilot Program” (in  
13      this subsection referred to as the “Program”), for  
14      the education and training of the next generation of  
15      students and teachers in the fundamental principles  
16      of quantum mechanics.

17             (2) REQUIREMENTS.—

18             (A) IN GENERAL.—In carrying out the  
19      Program, the Director shall—

20             (i) encourage awardees to coordinate  
21             with educational service agencies (as such  
22             term “educational service agency” is de-  
23             fined in section 602(5) of the Individuals  
24             with Disabilities Education Improvement  
25             Act of 2004 (20 U.S.C. 1401(5))), associa-

1 tions that support STEM educators or  
2 local educational agencies, and partner-  
3 ships through the Q–12 Education Part-  
4 nership, to encourage elementary schools,  
5 middle schools, and secondary schools, and  
6 State educational agencies to participate in  
7 the Program;

8 (ii) require that awardees partner  
9 with elementary schools, middle schools, or  
10 secondary schools, or consortia thereof,  
11 and State educational agencies, to carry  
12 out activities under the Program;

13 (B) USE OF FUNDS.—In carrying out the  
14 Program, the Director shall make competitive,  
15 merit-reviewed awards to—

16 (i) support testing, evaluation, dis-  
17 semination, and implementation of age-ap-  
18 propriate quantum information sciences  
19 curricula and resources, including the inte-  
20 gration of quantum information science  
21 and engineering into the STEM curriculum  
22 pursuant to subsection (d) of section 301  
23 of the National Quantum Initiative Act (15  
24 U.S.C. 8841), as added by subsection (e);

1 (ii) support opportunities for informal  
2 education on quantum concepts, including  
3 informal hands-on learning opportunities;

4 (iii) support opportunities for students  
5 to further explore quantum information  
6 science education and related careers;

7 (iv) develop and implement training,  
8 research, and professional development  
9 programs for teachers, including innovative  
10 pre-service and in-service programs, in  
11 quantum information science and related  
12 fields; and

13 (v) carry out such other activities as  
14 the Director determines appropriate.

15 (C) DISTRIBUTION.—In carrying out the  
16 Program and to the extent practicable, the Di-  
17 rector shall ensure there is a wide, equitable  
18 distribution of Program participants across di-  
19 verse geographic areas and that the Program  
20 includes a diverse representation of students,  
21 including students from groups historically  
22 underrepresented in STEM.

23 (3) CONSULTATION.—The Director shall carry  
24 out the Program in consultation with the QIS Work-  
25 force Working Group of the Subcommittee on Quan-

1        tum Information Science of the National Science  
2        and Technology Council and the Advancing Informal  
3        STEM Learning Program.

4            (4) REPORTING.—Not later than four years  
5        after the date of the enactment of this section, the  
6        Director shall submit to Congress a report that in-  
7        cludes the following:

8            (A) An assessment, that includes feedback  
9        from a wide range of stakeholders in academia,  
10       K-12 education, and the private sector, of the  
11       effectiveness of the Program in scaling up im-  
12       plementation of effective quantum education  
13       and training innovations.

14           (B) If determined to be effective, a plan  
15       for integrating the Program into existing pro-  
16       grams, including the feasibility and advisability  
17       of expanding the scope of the Program to in-  
18       clude additional technology areas, grade levels,  
19       and educational institutions beyond those origi-  
20       nally selected to participate in the Program.

21           (5) AUTHORIZATION OF APPROPRIATIONS.—  
22       There are authorized to be appropriated to the Di-  
23       rector \$8,000,000 for each of fiscal years 2023  
24       through 2026 to carry out this section.



1           (6) TERMINATION.—This subsection shall ter-  
2           minate on the date that is four years after the date  
3           of the enactment of this Act.

## 4     **Subtitle H—Blockchain Specialist**

### 5     **SEC. 10671. ESTABLISHMENT OF BLOCKCHAIN AND** 6           **CRYPTOCURRENCY SPECIALIST POSITION** 7           **WITHIN OSTP.**

8           The Director of the Office of Science and Technology  
9     Policy shall establish or designate a blockchain and  
10    cryptocurrencies advisory specialist position within the Of-  
11    fice to coordinate Federal activities and advise the Presi-  
12    dent on matters of research and development relating to  
13    blockchain, cryptocurrencies, and distributed ledger tech-  
14    nologies.

## 15           **Subtitle I—Partnerships for** 16           **Energy Security and Innovation**

### 17     **SEC. 10691. FOUNDATION FOR ENERGY SECURITY AND IN-** 18           **NOVATION.**

19           (a) DEFINITIONS.—In this section:

20                   (1) BOARD.—The term “Board” means the  
21           Board of Directors described in subsection

22           (b)(2)(A).

23                   (2) DEPARTMENT.—The term “Department”  
24           means the Department of Energy.

1           (3) EXECUTIVE DIRECTOR.—The term “Execu-  
2           tive Director” means the Executive Director de-  
3           scribed in subsection (b)(5)(A).

4           (4) FOUNDATION.—The term “Foundation”  
5           means the Foundation for Energy Security and In-  
6           novation established under subsection (b)(1).

7           (5) HISTORICALLY BLACK COLLEGE OR UNI-  
8           VERSITY.—The term “historically Black college or  
9           university” has the meaning given the term “part B  
10          institution” in section 322 of the Higher Education  
11          Act of 1965 (20 U.S.C. 1061).

12          (6) INDIVIDUAL LABORATORY-ASSOCIATED  
13          FOUNDATION.—The term “Individual Laboratory-  
14          Associated Foundation” means a Laboratory Foun-  
15          dation established by an operating contractor of a  
16          National Laboratory.

17          (7) MINORITY-SERVING INSTITUTION.—The  
18          term “minority serving institution” means a His-  
19          panic-serving institution as defined in section 502 of  
20          the Higher Education Act of 1965 (20 U.S.C.  
21          1101a), an Alaska Native-serving institution and a  
22          Native Hawaiian-serving institution as defined in  
23          section in 317 of the Higher Education Act of 1965  
24          (20 U.S.C. 1059d), or a Predominantly Black Insti-  
25          tution, Asian American and Native American Pacific

1 Islander-serving institution, or a Native American-  
2 serving nontribal institution as defined in section  
3 371 of the Higher Education Act of 1965 (20  
4 U.S.C. 1067q).

5 (8) NATIONAL LABORATORY.—The term “Na-  
6 tional Laboratory” has the meaning given the term  
7 in section 2 of the Energy Policy Act of 2005 (42  
8 U.S.C. 15801).

9 (9) SECRETARY.—The term “Secretary” means  
10 the Secretary of Energy.

11 (10) TRIBAL COLLEGE OR UNIVERSITY.—The  
12 term “Tribal College or University” has the meaning  
13 given in section 316 of the Higher Education Act of  
14 1965 (20 U.S.C. 1059e).

15 (b) FOUNDATION FOR ENERGY SECURITY AND INNO-  
16 VATION.—

17 (1) ESTABLISHMENT.—

18 (A) IN GENERAL.—Not later than 180  
19 days after the date of enactment of this Act,  
20 the Secretary shall establish a nonprofit cor-  
21 poration to be known as the “Foundation for  
22 Energy Security and Innovation”.

23 (B) MISSION.—The mission of the Foun-  
24 dation shall be—

1 (i) to support the mission of the De-  
2 partment; and

3 (ii) to advance collaboration with en-  
4 ergy researchers, institutions of higher  
5 education, industry, and nonprofit and  
6 philanthropic organizations to accelerate  
7 the commercialization of energy tech-  
8 nologies.

9 (C) LIMITATION.—The Foundation shall  
10 not be an agency or instrumentality of the Fed-  
11 eral Government.

12 (D) TAX-EXEMPT STATUS.—The Board  
13 shall take all necessary and appropriate steps to  
14 ensure that the Foundation is an organization  
15 that is described in section 501(c) of the Inter-  
16 nal Revenue Code of 1986 and exempt from  
17 taxation under section 501(a) of that Code.

18 (E) COLLABORATION WITH EXISTING OR-  
19 GANIZATIONS.—The Secretary may collaborate  
20 with 1 or more organizations to establish the  
21 Foundation and carry out the activities of the  
22 Foundation.

23 (2) BOARD OF DIRECTORS.—

24 (A) ESTABLISHMENT.—The Foundation  
25 shall be governed by a Board of Directors.

1 (B) COMPOSITION.—

2 (i) IN GENERAL.—The Board shall be  
3 composed of the ex officio nonvoting mem-  
4 bers described in clause (ii) and the ap-  
5 pointed voting members described in clause  
6 (iii).

7 (ii) EX OFFICIO MEMBERS.—The ex  
8 officio members of the Board shall be the  
9 following individuals or designees of those  
10 individuals:

11 (I) The Secretary.

12 (II) The Under Secretary for  
13 Science.

14 (III) The Under Secretary for  
15 Nuclear Security.

16 (IV) The Chief Commercializa-  
17 tion Officer.

18 (iii) APPOINTED MEMBERS.—

19 (I) INITIAL MEMBERS.—The Sec-  
20 retary and the other ex officio mem-  
21 bers of the Board shall—

22 (aa) seek to enter into an  
23 agreement with the National  
24 Academies of Sciences, Engineer-  
25 ing, and Medicine to develop a

1 list of individuals to serve as  
2 members of the Board who are  
3 well-qualified and will meet the  
4 requirements of subclauses (II)  
5 and (III); and

6 (bb) appoint the initial  
7 members of the Board from that  
8 list, if applicable, in consultation  
9 with the National Academies of  
10 Sciences, Engineering, and Medi-  
11 cine.

12 (II) REPRESENTATION.—The ap-  
13 pointed members of the Board shall  
14 reflect a broad cross-section of stake-  
15 holders from academia, National Lab-  
16 oratories, industry, nonprofit organi-  
17 zations, State or local governments,  
18 the investment community, and the  
19 philanthropic community.

20 (III) EXPERIENCE.—The Sec-  
21 retary shall ensure that a majority of  
22 the appointed members of the  
23 Board—

24 (aa)(AA) has experience in  
25 the energy sector;

1 (BB) has research experi-  
2 ence in the energy field; or

3 (CC) has experience in tech-  
4 nology commercialization or foun-  
5 dation operations; and

6 (bb) to the extent prac-  
7 ticable, represents diverse re-  
8 gions, sectors, and communities.

9 (C) CHAIR AND VICE CHAIR.—

10 (i) IN GENERAL.—The Board shall  
11 designate from among the members of the  
12 Board—

13 (I) an individual to serve as  
14 Chair of the Board; and

15 (II) an individual to serve as Vice  
16 Chair of the Board.

17 (ii) TERMS.—The term of service of  
18 the Chair and Vice Chair of the Board  
19 shall end on the earlier of—

20 (I) the date that is 3 years after  
21 the date on which the Chair or Vice  
22 Chair of the Board, as applicable, is  
23 designated for the position; and

24 (II) the last day of the term of  
25 service of the member, as determined

1 under subparagraph (D)(i), who is  
2 designated to be Chair or Vice Chair  
3 of the Board, as applicable.

4 (iii) REPRESENTATION.—The Chair  
5 and Vice Chair of the Board—

6 (I) shall not be representatives of  
7 the same area of subject matter ex-  
8 pertise, or entity, as applicable, under  
9 subparagraph (B)(iii)(II); and

10 (II) shall not be representatives  
11 of any area of subject matter exper-  
12 tise, or entity, as applicable, rep-  
13 resented by the immediately preceding  
14 Chair and Vice Chair of the Board.

15 (D) TERMS AND VACANCIES.—

16 (i) TERMS.—

17 (I) IN GENERAL.—The term of  
18 service of each appointed member of  
19 the Board shall be not more than 5  
20 years.

21 (II) INITIAL APPOINTED MEM-  
22 BERS.—Of the initial members of the  
23 Board appointed under subparagraph  
24 (B)(iii)(I), half of the members shall  
25 serve for 4 years and half of the mem-



1                   bers shall serve for 5 years, as deter-  
2                   mined by the Chair of the Board.

3                   (ii) VACANCIES.—Any vacancy in the  
4                   membership of the appointed members of  
5                   the Board—

6                   (I) shall be filled in accordance  
7                   with the bylaws of the Foundation by  
8                   an individual capable of representing  
9                   the same area or entity, as applicable,  
10                  as represented by the vacating board  
11                  member        under        subparagraph  
12                  (B)(iii)(II);

13                  (II) shall not affect the power of  
14                  the remaining appointed members to  
15                  execute the duties of the Board; and

16                  (III) shall be filled by an indi-  
17                  vidual selected by the Board.

18                  (E) MEETINGS; QUORUM.—

19                  (i) INITIAL MEETING.—Not later than  
20                  60 days after the Board is established, the  
21                  Secretary shall convene a meeting of the ex  
22                  officio and appointed members of the  
23                  Board to incorporate the Foundation.

24                  (ii) QUORUM.—A majority of the ap-  
25                  pointed members of the Board shall con-

1           stitute a quorum for purposes of con-  
2           ducting the business of the Board.

3           (F) DUTIES.—The Board shall—

4                 (i) establish bylaws for the Founda-  
5           tion in accordance with subparagraph (G);

6                 (ii) provide overall direction for the  
7           activities of the Foundation and establish  
8           priority activities;

9                 (iii) carry out any other necessary ac-  
10          tivities of the Foundation;

11                (iv) evaluate the performance of the  
12          Executive Director; and

13                (v) actively solicit and accept funds,  
14          gifts, grants, devises, or bequests of real or  
15          personal property to the Foundation, in-  
16          cluding from private entities.

17          (G) BYLAWS.—

18                (i) IN GENERAL.—The bylaws estab-  
19          lished under subparagraph (F)(i) may in-  
20          clude—

21                   (I) policies for the selection of  
22           Board members, officers, employees,  
23           agents, and contractors of the Foun-  
24           dation;

1 (II) policies, including ethical  
2 standards, for—

3 (aa) the acceptance, sollicita-  
4 tion, and disposition of donations  
5 and grants to the Foundation, in-  
6 cluding appropriate limits on the  
7 ability of donors to designate, by  
8 stipulation or restriction, the use  
9 or recipient of donated funds;  
10 and

11 (bb) the disposition of assets  
12 of the Foundation;

13 (III) policies that subject all em-  
14 ployees, fellows, trainees, and other  
15 agents of the Foundation (including  
16 ex officio and appointed members of  
17 the Board) to conflict of interest  
18 standards; and

19 (IV) the specific duties of the Ex-  
20 ecutive Director.

21 (ii) REQUIREMENTS.—The Board  
22 shall ensure that the bylaws of the Foun-  
23 dation and the activities carried out under  
24 those bylaws shall not—

1 (I) reflect unfavorably on the  
2 ability of the Foundation to carry out  
3 activities in a fair and objective man-  
4 ner; or

5 (II) compromise, or appear to  
6 compromise, the integrity of any gov-  
7 ernmental agency or program, or any  
8 officer or employee employed by, or  
9 involved in, a governmental agency or  
10 program.

11 (H) COMPENSATION.—

12 (i) IN GENERAL.—No member of the  
13 Board shall receive compensation for serv-  
14 ing on the Board.

15 (ii) CERTAIN EXPENSES.—In accord-  
16 ance with the bylaws of the Foundation,  
17 members of the Board may be reimbursed  
18 for travel expenses, including per diem in  
19 lieu of subsistence, and other necessary ex-  
20 penses incurred in carrying out the duties  
21 of the Board.

22 (I) RESTRICTION ON MEMBERSHIP.—No  
23 employee of the Department shall be appointed  
24 as a member of the Board of Directors.

1           (3) PURPOSES.—The purposes of the Founda-  
2           tion are—

3                   (A) to support the Department in carrying  
4                   out the mission of the Department to ensure  
5                   the security and prosperity of the United States  
6                   by addressing energy and environmental chal-  
7                   lenges through transformative science and tech-  
8                   nology solutions; and

9                   (B) to increase private and philanthropic  
10                  sector investments that support efforts to cre-  
11                  ate, characterize, develop, test, validate, and de-  
12                  ploy or commercialize innovative technologies  
13                  that address crosscutting national energy chal-  
14                  lenges, including those affecting minority, rural,  
15                  and other underserved communities, by methods  
16                  that include—

17                           (i) fostering collaboration and part-  
18                           nerships with researchers from the Federal  
19                           Government, State governments, institu-  
20                           tions of higher education, including histori-  
21                           cally Black colleges or universities, Tribal  
22                           Colleges or Universities, and minority-serv-  
23                           ing institutions, federally funded research  
24                           and development centers, industry, and  
25                           nonprofit organizations for the research,

1 development, or commercialization of  
2 transformative energy and associated tech-  
3 nologies;

4 (ii) strengthening and sharing best  
5 practices relating to regional economic de-  
6 velopment through scientific and energy in-  
7 novation, including in partnership with an  
8 Individual Laboratory-Associated Founda-  
9 tion;

10 (iii) promoting new product develop-  
11 ment that supports job creation;

12 (iv) administering prize competi-  
13 tions—

14 (I) to accelerate private sector  
15 competition and investment; and

16 (II) that complement the use of  
17 prize authority by the Department;

18 (v) supporting programs that advance  
19 technology maturation, especially where  
20 there may be gaps in Federal or private  
21 funding in advancing a technology to de-  
22 ployment or commercialization from the  
23 prototype stage to a commercial stage;

24 (vi) supporting efforts to broaden par-  
25 ticipation in energy technology develop-

1                   ment among individuals from historically  
2                   underrepresented groups or regions; and

3                   (vii) facilitating access to Department  
4                   facilities, equipment, and expertise to as-  
5                   sist in tackling national challenges.

6                   (4) ACTIVITIES.—

7                   (A) STUDIES, COMPETITIONS, AND  
8                   PROJECTS.—The Foundation may conduct and  
9                   support studies, competitions, projects, and  
10                  other activities that further the purposes of the  
11                  Foundation described in paragraph (3).

12                  (B) FELLOWSHIPS AND GRANTS.—

13                  (i) IN GENERAL.—The Foundation  
14                  may award fellowships and grants for ac-  
15                  tivities relating to research, development,  
16                  demonstration, maturation, or commer-  
17                  cialization of energy and other Depart-  
18                  ment-supported technologies.

19                  (ii) FORM OF AWARD.—A fellowship  
20                  or grant under clause (i) may consist of a  
21                  stipend, health insurance benefits, funds  
22                  for travel, and funds for other appropriate  
23                  expenses.

1 (iii) SELECTION.—In selecting a re-  
2 cipient for a fellowship or grant under  
3 clause (i), the Foundation—

4 (I) shall make the selection based  
5 on the technical and commercializa-  
6 tion merits of the proposed project of  
7 the potential recipient; and

8 (II) may consult with a potential  
9 recipient regarding the ability of the  
10 potential recipient to carry out various  
11 projects that would further the pur-  
12 poses of the Foundation described in  
13 paragraph (3).

14 (iv) NATIONAL LABORATORIES.—A  
15 National Laboratory that applies for or ac-  
16 cepts an award under clause (i) shall not  
17 be considered to be engaging in a competi-  
18 tive process.

19 (C) ACCESSING FACILITIES AND EXPER-  
20 TISE.—The Foundation may work with the De-  
21 partment—

22 (i) to leverage the capabilities and fa-  
23 cilities of National Laboratories to com-  
24 mercialize technology; and



1 (ii) to assist with resources, including  
2 by providing information on the assets of  
3 each National Laboratory that may enable  
4 the deployment and commercialization of  
5 technology.

6 (D) TRAINING AND EDUCATION.—The  
7 Foundation may support programs that provide  
8 training to researchers, scientists, other rel-  
9 evant personnel at National Laboratories and  
10 institutions of higher education, and previous or  
11 current recipients of or applicants for Depart-  
12 ment funding to help research, develop, dem-  
13 onstrate, deploy, and commercialize federally  
14 funded technology.

15 (E) MATURATION FUNDING.—The Foun-  
16 dation shall support programs that provide  
17 maturation funding to researchers to advance  
18 the technology of those researchers for the pur-  
19 pose of moving products from a prototype stage  
20 to a commercial stage.

21 (F) STAKEHOLDER ENGAGEMENT.—The  
22 Foundation shall convene, and may consult  
23 with, representatives from the Department, in-  
24 stitutions of higher education, National Labora-  
25 tories, the private sector, and commercialization

1 organizations to develop programs for the pur-  
2 poses of the Foundation described in paragraph  
3 (3) and to advance the activities of the Founda-  
4 tion.

5 (G) INDIVIDUAL AND FEDERAL LABORA-  
6 TORY-ASSOCIATED FOUNDATIONS.—

7 (i) DEFINITION OF COVERED FOUN-  
8 DATION.—In this subparagraph, the term  
9 “covered foundation” means each of the  
10 following:

11 (I) An Individual Laboratory-  
12 Associated Foundation.

13 (II) A Federal Laboratory- Asso-  
14 ciated Foundation established pursu-  
15 ant to subsection (c)(1).

16 (ii) SUPPORT.—The Foundation shall  
17 provide support to and collaborate with  
18 covered foundations.

19 (iii) GUIDELINES AND TEMPLATES.—  
20 For the purpose of providing support  
21 under clause (ii), the Secretary shall estab-  
22 lish suggested guidelines and templates for  
23 covered foundations, including—

1 (I) a standard adaptable organi-  
2 zational design for responsible man-  
3 agement;

4 (II) standard and legally tenable  
5 bylaws and money-handling proce-  
6 dures; and

7 (III) a standard training cur-  
8 riculum to orient and expand the op-  
9 erating expertise of personnel em-  
10 ployed by covered foundations.

11 (iv) AFFILIATIONS.—Nothing in this  
12 subparagraph requires—

13 (I) an existing Individual Labora-  
14 tory-Associated Foundation to modify  
15 current practices or affiliate with the  
16 Foundation; or

17 (II) a covered foundation to be  
18 bound by charter or corporate bylaws  
19 as permanently affiliated with the  
20 Foundation.

21 (H) SUPPLEMENTAL PROGRAMS.—The  
22 Foundation may carry out supplemental pro-  
23 grams—

24 (i) to conduct and support forums,  
25 meetings, conferences, courses, and train-

1 ing workshops consistent with the purposes  
2 of the Foundation described in paragraph  
3 (3);

4 (ii) to support and encourage the un-  
5 derstanding and development of data that  
6 promotes the translation of technologies  
7 from the research stage, through the devel-  
8 opment and maturation stage, and ending  
9 in the market stage;

10 (iii) for writing, editing, printing, pub-  
11 lishing, and vending books and other mate-  
12 rials relating to research carried out under  
13 the Foundation and the Department; and  
14 (iv) to conduct other activities to  
15 carry out and support the purposes of the  
16 Foundation described in paragraph (3).

17 (I) EVALUATIONS.—The Foundation shall  
18 support the development of an evaluation meth-  
19 odology, to be used as part of any program sup-  
20 ported by the Foundation, that shall—

21 (i) consist of qualitative and quan-  
22 titative metrics; and

23 (ii) include periodic third party eval-  
24 uation of those programs and other activi-  
25 ties of the Foundation.

1           (J) COMMUNICATIONS.—The Foundation  
2 shall develop an expertise in communications to  
3 promote the work of grant and fellowship re-  
4 cipients under subparagraph (B), the commer-  
5 cialization successes of the Foundation, oppor-  
6 tunities for partnership with the Foundation,  
7 and other activities.

8           (K) SOLICITATION AND USE OF FUNDS.—  
9 The Foundation may solicit and accept gifts,  
10 grants, and other donations, establish accounts,  
11 and invest and expend funds in support of the  
12 activities and programs of the Foundation.

13           (L) AUTHORITY OF THE FOUNDATION.—  
14 The Foundation shall be the sole entity respon-  
15 sible for carrying out the activities described in  
16 this paragraph.

17 (5) ADMINISTRATION.—

18           (A) EXECUTIVE DIRECTOR.—The Board  
19 shall hire an Executive Director of the Founda-  
20 tion, who shall serve at the pleasure of the  
21 Board. Subject to the compliance with the poli-  
22 cies and bylaws established pursuant to para-  
23 graph (2)(G), the Executive Director shall be  
24 responsible for the daily operations of the

1 Foundation in carrying the activities described  
2 in paragraph (4).

3 (B) COMPENSATION.—The rate of com-  
4 pensation of the Executive Director shall be  
5 fixed by the Board.

6 (C) ADMINISTRATIVE CONTROL.—No  
7 member of the Board, officer or employee of the  
8 Foundation or of any program established by  
9 the Foundation, or participant in a program es-  
10 tablished by the Foundation, shall exercise ad-  
11 ministrative control over any Federal employee.

12 (D) STRATEGIC PLAN.—Not later than 1  
13 year after the date of enactment of this Act, the  
14 Foundation shall submit to the Committee on  
15 Energy and Natural Resources of the Senate  
16 and the Committee on Science, Space, and  
17 Technology of the House of Representatives a  
18 strategic plan that contains—

19 (i) a plan for the Foundation to be-  
20 come financially self-sustaining in fiscal  
21 year 2023 and thereafter (except for the  
22 amounts provided each fiscal year under  
23 paragraph (11)(A)(iii));

24 (ii) a forecast of major crosscutting  
25 energy challenge opportunities, including

1 short- and long-term objectives, identified  
2 by the Board, with input from commu-  
3 nities representing the entities and areas  
4 of subject matter expertise, as applicable,  
5 described in paragraph (2)(B)(iii)(II);

6 (iii) a description of the efforts that  
7 the Foundation will take to be transparent  
8 in the processes of the Foundation, includ-  
9 ing processes relating to—

10 (I) grant awards, including selec-  
11 tion, review, and notification;

12 (II) communication of past, cur-  
13 rent, and future research priorities;  
14 and

15 (III) solicitation of and response  
16 to public input on the opportunities  
17 identified under clause (ii);

18 (iv) a description of the financial  
19 goals and benchmarks of the Foundation  
20 for the following 10 years;

21 (v) a description of the efforts under-  
22 taken by the Foundation to engage histori-  
23 cally underrepresented groups or regions,  
24 including through collaborations with his-  
25 torically Black colleges and universities,

1 Tribal Colleges or Universities, minority-  
2 serving institutions, and minority-owned  
3 and women-owned business, and;

4 (vi) a description of the efforts under-  
5 taken by the Foundation to ensure max-  
6 imum complementarity and minimum re-  
7 dundancy with investments made by the  
8 Department.

9 (E) ANNUAL REPORT.—Not later than 1  
10 year after the date on which the Foundation is  
11 established, and every years thereafter, the  
12 Foundation shall submit to the Committee on  
13 Energy and Natural Resources of the Senate,  
14 the Committee on Science, Space, and Tech-  
15 nology of the House of Representatives, and the  
16 Secretary a report that, for the year covered by  
17 the report—

18 (i) describes the activities of the  
19 Foundation and the progress of the Foun-  
20 dation in furthering the purposes of the  
21 Foundation described in paragraph (3);

22 (ii) provides a specific accounting of  
23 the source and use of all funds made avail-  
24 able to the Foundation to carry out those  
25 activities to ensure transparency in the



1 alignment of Department missions and  
2 policies with national security;

3 (iii) describes how the results of the  
4 activities of the Foundation could be incor-  
5 porated into the procurement processes of  
6 the General Services Administration; and

7 (iv) includes a summary of each eval-  
8 uation conducted using the evaluation  
9 methodology described in paragraph (4)(I).

10 (F) EVALUATION BY COMPTROLLER GEN-  
11 ERAL.—Not later than 5 years after the date on  
12 which the Foundation is established, the Comp-  
13 troller General of the United States shall sub-  
14 mit to the Committee on Energy and Natural  
15 Resources of the Senate and the Committee on  
16 Science, Space, and Technology of the House of  
17 Representatives—

18 (i) an evaluation of—

19 (I) the extent to which the Foun-  
20 dation is achieving the mission of the  
21 Foundation; and

22 (II) the operation of the Founda-  
23 tion; and

24 (ii) any recommendations on how the  
25 Foundation may be improved.

1 (G) AUDITS.—The Foundation shall—

2 (i) provide for annual audits of the fi-  
3 nancial condition of the Foundation; and

4 (ii) make the audits, and all other  
5 records, documents, and papers of the  
6 Foundation, available to the Secretary and  
7 the Comptroller General of the United  
8 States for examination or audit.

9 (H) SEPARATE FUND ACCOUNTS.—The  
10 Board shall ensure that any funds received  
11 under paragraph (11)(A) are held in a separate  
12 account from any other funds received by the  
13 Foundation.

14 (I) INTEGRITY.—

15 (i) IN GENERAL.—To ensure integrity  
16 in the operations of the Foundation, the  
17 Board shall develop and enforce procedures  
18 relating to standards of conduct, financial  
19 disclosure statements, conflicts of interest  
20 (including recusal and waiver rules), au-  
21 dits, and any other matters determined ap-  
22 propriate by the Board.

23 (ii) FINANCIAL CONFLICTS OF INTER-  
24 EST.—To mitigate conflicts of interest and  
25 risks from malign foreign influence, any

1 individual who is an officer, employee, or  
2 member of the Board is prohibited from  
3 any participation in deliberations by the  
4 Foundation of a matter that would directly  
5 or predictably affect any financial interest  
6 of—

7 (I) the individual;

8 (II) a relative (as defined in sec-  
9 tion 109 of the Ethics in Government  
10 Act of 1978 (5 U.S.C. App.)) of that  
11 individual; or

12 (III) a business organization or  
13 other entity in which the individual  
14 has an interest, including an organiza-  
15 tion or other entity with which the in-  
16 dividual is negotiating employment.

17 (J) INTELLECTUAL PROPERTY.—The  
18 Board shall adopt written standards to govern  
19 the ownership and licensing of any intellectual  
20 property rights developed by the Foundation or  
21 derived from the collaborative efforts of the  
22 Foundation.

23 (K) LIABILITY.—

1 (i) IN GENERAL.—The United States  
2 shall not be liable for any debts, defaults,  
3 acts, or omissions of—

4 (I) the Foundation;

5 (II) a Federal entity with respect  
6 to an agreement of that Federal enti-  
7 ty with the Foundation; or

8 (III) an Individual Laboratory-  
9 Associated Foundation with respect to  
10 an agreement of that Federal entity  
11 with the Foundation.

12 (ii) FULL FAITH AND CREDIT.—The  
13 full faith and credit of the United States  
14 shall not extend to any obligations of the  
15 Foundation.

16 (L) NONAPPLICABILITY OF FACA.—The  
17 Federal Advisory Committee Act (5 U.S.C.  
18 App.) shall not apply to the Foundation or an  
19 Individual Laboratory-Associated Foundation.

20 (6) DEPARTMENT COLLABORATION.—

21 (A) NATIONAL LABORATORIES.—The Sec-  
22 retary shall collaborate with the Foundation to  
23 develop a process to ensure collaboration and  
24 coordination between the Department, the  
25 Foundation, and National Laboratories—

1 (i) to streamline contracting processes  
2 between National Laboratories and the  
3 Foundation, including by—

4 (I) streamlining the ability of the  
5 Foundation to transfer equipment and  
6 funds to National Laboratories;

7 (II) standardizing contract mech-  
8 anisms to be used by the Foundation  
9 in engaging with National Labora-  
10 tories; and

11 (III) streamlining the ability of  
12 the Foundation to fund endowed posi-  
13 tions at National Laboratories;

14 (ii) to allow a National Laboratory or  
15 site of a National Laboratory—

16 (I) to accept and perform work  
17 for the Foundation, consistent with  
18 provided resources, notwithstanding  
19 any other provision of law governing  
20 the administration, mission, use, or  
21 operations of the National Laboratory  
22 or site, as applicable; and

23 (II) to perform that work on a  
24 basis equal to other missions at the  
25 National Laboratory; and

1                   (iii) to permit the director of any Na-  
2                   tional Laboratory or site of a National  
3                   Laboratory to enter into a cooperative re-  
4                   search and development agreement or ne-  
5                   gotiate a licensing agreement with the  
6                   Foundation pursuant to section 12 of the  
7                   Stevenson-Wydler Technology Innovation  
8                   Act of 1980 (15 U.S.C. 3710a).

9                   (B) DEPARTMENT LIAISONS.—The Sec-  
10                  retary shall appoint liaisons from across the  
11                  Department to collaborate and coordinate with  
12                  the Foundation, including not less than 1 liai-  
13                  son from the Office of Technology Transitions,  
14                  who shall ensure that the Foundation works in  
15                  conjunction with and does not duplicate existing  
16                  activities and programs carried out by the De-  
17                  partment, including the Technology Commer-  
18                  cialization Fund of the Department.

19                  (C) ADMINISTRATION.—The Secretary  
20                  shall leverage appropriate arrangements, con-  
21                  tracts, and directives to carry out the process  
22                  developed under subparagraph (A).

23                  (7) NATIONAL SECURITY.—Nothing in this sub-  
24                  section exempts the Foundation from any national  
25                  security policy of the Department.

1           (8) SUPPORT SERVICES.—The Secretary may  
2 provide facilities, utilities, and support services to  
3 the Foundation if it is determined by the Secretary  
4 to be advantageous to the research programs of the  
5 Department.

6           (9) PREEMPTION OF AUTHORITY.—This sub-  
7 section shall not preempt any authority or responsi-  
8 bility of the Secretary under any other provision of  
9 law.

10          (10) TRANSFER FUNDS.—The Foundation may  
11 transfer funds to the Department, which shall be  
12 subject to all applicable Federal limitations relating  
13 to federally funded research.

14          (11) AUTHORIZATION OF APPROPRIATIONS.—

15           (A) IN GENERAL.—There is authorized to  
16 be appropriated—

17           (i) not less than \$1,500,000 shall be  
18 for the Secretary for fiscal year 2023 to  
19 establish the Foundation;

20           (ii) not less than \$30,000,000 shall be  
21 for the Foundation for fiscal year 2024 to  
22 carry out the activities of the Foundation;  
23 and

24           (iii) not less than \$3,000,000 shall be  
25 for the Foundation for each of the fiscal

1                   years 2025 through 2027 for administra-  
2                   tive and operational costs.

3                   (B) LIMITATION.—None of the funds au-  
4                   thorized to be appropriated to the Secretary by  
5                   subparagraph (A)(i) of this paragraph shall be  
6                   used for construction.

7                   (C) COST SHARE.—Funds made available  
8                   under subparagraph (A)(ii) shall be required to  
9                   be cost- shared by a partner of the Foundation  
10                  other than the Department or a National Lab-  
11                  oratory.

12                  (c) NATIONAL ENERGY TECHNOLOGY LABORATORY-  
13                  ASSOCIATED FOUNDATION.—

14                  (1) ESTABLISHMENT.—

15                  (A) IN GENERAL.—The National Energy  
16                  Technology Laboratory may establish, or enter  
17                  into an agreement with a nonprofit organization  
18                  to establish, a Federal Laboratory-Associated  
19                  Foundation (referred to in this subsection as a  
20                  “Laboratory Foundation”) to support the mis-  
21                  sion of the National Energy Technology Lab-  
22                  oratory.

23                  (B) NOT AGENCY OR INSTRUMEN-  
24                  TALITY.—A Laboratory Foundation shall not be



1 an agency or instrumentality of the Federal  
2 Government.

3 (C) GOVERNANCE STRUCTURE.—A Lab-  
4 oratory Foundation established under subpara-  
5 graph (A) shall have a separate governance  
6 structure from, and shall be managed independ-  
7 ently of, the National Energy Technology Lab-  
8 oratory.

9 (2) ACTIVITIES.—Activities of a Laboratory  
10 Foundation may include—

11 (A) conducting support studies, competi-  
12 tions, projects, research, and other activities  
13 that further the purpose of the Laboratory  
14 Foundation;

15 (B) carrying out programs to foster col-  
16 laboration and partnership among researchers  
17 from the Federal Government, State govern-  
18 ments, institutions of higher education, feder-  
19 ally funded research and development centers,  
20 and industry and nonprofit organizations relat-  
21 ing to the research, development, and commer-  
22 cialization of federally supported technologies;

23 (C) carrying out programs to leverage  
24 technologies to support new product develop-

1           ment that supports regional economic develop-  
2           ment;

3           (D) administering prize competitions—

4                 (i) to accelerate private sector com-  
5                 petition and investment; and

6                 (ii) that complement the use of prize  
7                 authority by the Department;

8           (E) providing fellowships and grants to re-  
9           search and development personnel at, or affili-  
10          ated with, federally funded centers, in accord-  
11          ance with paragraph (3);

12          (F) carrying out programs—

13                 (i) that allow scientists from foreign  
14                 countries to serve in research capacities in  
15                 the United States or other countries in as-  
16                 sociation with the National Energy Tech-  
17                 nology Laboratory;

18                 (ii) that provide opportunities for em-  
19                 ployees of the National Energy Technology  
20                 Laboratory to serve in research capacities  
21                 in foreign countries;

22                 (iii) to conduct studies, projects, or  
23                 research in collaboration with national and  
24                 international nonprofit and for-profit orga-  
25                 nizations, which may include the provision

1 of stipends, travel, and other support for  
2 personnel;

3 (iv)(I) to hold forums, meetings, con-  
4 ferences, courses, and training workshops  
5 that may include undergraduate, graduate,  
6 post- graduate, and post-doctoral accred-  
7 ited courses; and

8 (II) for the accreditation of those  
9 courses by the Laboratory Foundation at  
10 the State and national level for college de-  
11 grees or continuing education credits;

12 (v) to support and encourage teachers  
13 and students of science at all levels of edu-  
14 cation;

15 (vi) to promote an understanding of  
16 science amongst the general public;

17 (vii) for writing, editing, printing,  
18 publishing, and vending of relevant books  
19 and other materials; and

20 (viii) for the conduct of other activi-  
21 ties to carry out and support the purpose  
22 of the Laboratory Foundation; and

23 (G) receiving, administering, soliciting, ac-  
24 cepting, and using funds, gifts, devises, or be-  
25 quests, either absolutely or in trust of real or

1 personal property or any income therefrom, or  
2 other interest or equity therein for the benefit  
3 of, or in connection with, the mission of the ap-  
4 plicable Federal laboratory, in accordance with  
5 paragraph (4).

6 (3) FELLOWSHIPS AND GRANTS.—

7 (A) SELECTION.—Recipients of fellowships  
8 and grants described in paragraph (2)(E) shall  
9 be selected—

10 (i) by a Laboratory Foundation and  
11 the donors to a Laboratory Foundation;

12 (ii) subject to the agreement of the  
13 head of the agency the mission of which is  
14 supported by a Laboratory Foundation;  
15 and

16 (iii) in the case of a fellowship, based  
17 on the recommendation of the employees of  
18 the National Energy Technology Labora-  
19 tory at which the fellow would serve.

20 (B) EXPENSES.—Fellowships and grants  
21 described in paragraph (2)(E) may include sti-  
22 pends, travel, health insurance, benefits, and  
23 other appropriate expenses.

24 (4) GIFTS.—An amount of funds, a gift, a de-  
25 vise, or a bequest described in paragraph (2)(G)

1        may be accepted by a Laboratory Foundation re-  
2        gardless of whether it is encumbered, restricted, or  
3        subject to a beneficial interest of a private person if  
4        any current or future interest of the funds, gift, de-  
5        vise, or bequest is for the benefit of the research and  
6        development activities of the National Energy Tech-  
7        nology Laboratory.

8            (5) OWNERSHIP BY FEDERAL GOVERNMENT.—  
9        A contribution, gift, or any other transfer made to  
10       or for the use of a Laboratory Foundation shall be  
11       regarded as a contribution, gift, or transfer to or for  
12       the use of the Federal Government.

13           (6) LIABILITY.—The United States shall not be  
14       liable for any debts, defaults, acts, or omissions of  
15       a Laboratory Foundation.

16           (7) TRANSFER OF FUNDS.—Notwithstanding  
17       any other provision of law, a Laboratory Foundation  
18       may transfer funds to the National Energy Tech-  
19       nology Laboratory and the National Energy Tech-  
20       nology Laboratory may accept that transfer of  
21       funds.

22           (8) OTHER LAWS.—This subsection shall not  
23       alter or supersede any other provision of law gov-  
24       erning the authority, scope, establishment, or use of  
25       nonprofit organizations by a Federal agency.

1    **Subtitle J—Energizing Technology**  
2                                    **Transfer**

3    **SEC. 10701. DEFINITIONS.**

4        In this subtitle:

5            (1) **CLEAN ENERGY TECHNOLOGY.**—The term  
6            “clean energy technology” means a technology that  
7            significantly reduces energy use, increases energy ef-  
8            ficiency, reduces greenhouse gas emissions, reduces  
9            emissions of other pollutants, or mitigates other neg-  
10           ative environmental consequences of energy produc-  
11           tion, transmission or use.

12           (2) **DEPARTMENT.**—The term “Department”  
13           means the Department of Energy.

14           (3) **DIRECTOR.**—The term “Director” means  
15           the Director of each National Laboratory and the  
16           Director of each Department of Energy single-pur-  
17           pose research facility.

18           (4) **ECONOMICALLY DISTRESSED AREA.**—The  
19           term “economically distressed area” has the mean-  
20           ing described in section 301(a) of the Public Works  
21           and Economic Development Act of 1965 (42 U.S.C.  
22           3161(a)).

23           (5) **GRANT.**—The term “grant” means a grant  
24           award, cooperative agreement award, or any other fi-

1           nancial assistance arrangement that the Secretary of  
2           Energy determines to be appropriate.

3           (6) INSTITUTION OF HIGHER EDUCATION.—The  
4           term “institution of higher education” has the  
5           meaning given such term in section 101 of the High-  
6           er Education Act of 1965, as amended (20 U.S.C.  
7           1001).

8           (7) NATIONAL LABORATORY.—The term “Na-  
9           tional Laboratory” has the meaning given that term  
10          in section 2 of the Energy Policy Act of 2005 (42  
11          U.S.C. 15801).

12          (8) SECRETARY.—The term “Secretary” means  
13          the Secretary of Energy.

14                   **PART 1—NATIONAL CLEAN ENERGY**  
15                   **TECHNOLOGY TRANSFER PROGRAMS**

16 **SEC. 10713. NATIONAL CLEAN ENERGY INCUBATOR PRO-**  
17                   **GRAM.**

18          (a) CLEAN ENERGY INCUBATOR DEFINED.—In this  
19          section, the term “clean energy incubator”—

20                  (1) means any entity that is designed to accel-  
21                  erate the commercial application of clean energy  
22                  technologies by providing—

23                          (A) physical workspace, labs, and proto-  
24                          typing facilities to support clean energy

1 startups or established clean energy companies;

2 or

3 (B) companies developing such tech-  
4 nologies with support, resources, and services,  
5 including—

6 (i) access to business education and  
7 counseling;

8 (ii) mentorship opportunities; and

9 (iii) other services rendered for the  
10 purpose of aiding the development and  
11 commercial application of a clean energy  
12 technology; and

13 (2) may include a program within or established  
14 by a National Laboratory, an institution of higher  
15 education or a State, territorial, local, or tribal gov-  
16 ernment.

17 (b) PROGRAM ESTABLISHMENT.—Not later than 180  
18 days after the enactment of this Act, the Secretary, acting  
19 through the Chief Commercialization Officer established  
20 in section 1001(a) of the Energy Policy Act of 2005 (42  
21 U.S.C. 16391(a)), shall establish a Clean Energy Incu-  
22 bator Program (herein referred to as the “program”) to  
23 competitively award grants to clean energy incubators.

24 (c) CLEAN ENERGY INCUBATOR SELECTION.—In  
25 awarding grants to clean energy incubators under sub-



1 section (b), the Secretary shall, to the maximum extent  
2 practicable, prioritize funding clean energy incubators  
3 that—

4 (1) partner with entities that carry out activi-  
5 ties relevant to the activities of such incubator and  
6 that operate at the local, State, and regional levels;

7 (2) support the commercial application activi-  
8 ties of startup companies focused on physical hard-  
9 ware, computational, or integrated hardware and  
10 software technologies;

11 (3) are located in geographically diverse regions  
12 of the United States, such as the Great Lakes re-  
13 gion;

14 (4) are located in, or partner with entities lo-  
15 cated in, economically-distressed areas;

16 (5) support the development of entities focused  
17 on expanding clean energy tools and technologies to  
18 rural, Tribal, and low-income communities;

19 (6) support the commercial application of tech-  
20 nologies being developed by clean energy entre-  
21 preneurs from underrepresented backgrounds; and

22 (7) have a plan for sustaining activities of the  
23 incubator after grant funds received under this pro-  
24 gram have been expended.

1 (d) AWARD LIMITS.—The Secretary shall not award  
2 more than \$4,000,000 to one or more incubators in one  
3 given State, per fiscal year.

4 (e) DURATION.—Each grant under subsection (b)  
5 shall be for a period of no longer than 5 years, subject  
6 to the availability of appropriations.

7 (f) USE OF FUNDS.—An entity receiving a grant  
8 under this section may use grant amounts for operating  
9 expenses.

10 (g) RENEWAL.—An award made to a clean energy  
11 incubator under this section may be renewed for a period  
12 of not more than 3 years, subject to merit review.

13 (h) EVALUATION.—In accordance with section 9007  
14 of division Z of the Consolidated Appropriations Act, 2021  
15 (Public Law 116–260), the Secretary shall submit to the  
16 Committee on Science, Space, and Technology of the  
17 House of Representatives and the Committee on Energy  
18 and Natural Resources of the Senate an evaluation of the  
19 program established under this section that includes anal-  
20 yses of the performance of the clean energy incubators.

21 (i) AUTHORIZATION OF APPROPRIATIONS.—There  
22 are authorized to be appropriated to the Secretary to carry  
23 out this section \$15,000,000 for each of fiscal years 2023  
24 through 2027.

1 **SEC. 10714. CLEAN ENERGY TECHNOLOGY UNIVERSITY**  
2 **PRIZE COMPETITION.**

3 (a) DEFINITIONS.—In this section:

4 (1) ELIGIBLE ENTITY.—The term “eligible enti-  
5 ty” means a nonprofit entity, an institution of high-  
6 er education, or an entity working with one or more  
7 institutions of higher education.

8 (2) MINORITY-SERVING INSTITUTION.—The  
9 term “minority-serving institution” means an insti-  
10 tution described in section 371(a) of the Higher  
11 Education Act of 1965 (20 U.S.C. 1067q(a)).

12 (b) IN GENERAL.—The Secretary shall establish a  
13 program, known as the “Clean Energy Technology Uni-  
14 versity Prize”, to award funding for eligible entities to  
15 carry out regional and one national clean energy tech-  
16 nology prize competitions, under section 24 of the Steven-  
17 son-Wydler Technology Innovation Act of 1980 (15 U.S.C.  
18 3719). In carrying out such prize competitions, students  
19 shall compete to develop a business model for furthering  
20 the commercial application of an innovative clean energy  
21 technology.

22 (c) TRAINING FUNDING.—In carrying out this pro-  
23 gram, the Secretary may provide funding to train partici-  
24 pating students in skills needed for the successful commer-  
25 cial application of clean energy technologies, including  
26 through virtual training sessions.

1 (d) PRIORITIZATION.—In awarding grants under this  
2 section, the Secretary shall prioritize awarding grants to  
3 eligible entities that work with students at minority-serv-  
4 ing institutions.

5 (e) COORDINATION.—In carrying out this program,  
6 the Secretary shall coordinate and partner with other  
7 clean energy technology prize competitions. In doing so,  
8 the Secretary may develop and disseminate best practices  
9 for administering prize competitions under this section.

10 (f) REPORT.—In accordance with section 9007 of di-  
11 vision Z of the Consolidated Appropriations Act, 2021  
12 (Public Law 116–260), the Secretary shall report annually  
13 on the progress and implementation of the program estab-  
14 lished under section (b).

15 (g) EVALUATION.—In accordance with section 9007  
16 of division Z of the Consolidated Appropriations Act, 2021  
17 (Public Law 116–260), the Secretary shall submit to the  
18 Committee on Science, Space, and Technology of the  
19 House of Representatives and the Committee on Energy  
20 and Natural Resources of the Senate an evaluation on the  
21 long-term outcomes of the program established under this  
22 section and the progress towards achieving the purposes  
23 of the program in subsection (b).

24 (h) AUTHORIZATION OF APPROPRIATIONS.—There  
25 are authorized to be appropriated to the Secretary to carry

1 out the activities authorized in this section \$1,000,000 for  
2 each of fiscal years 2023 through 2027.

3 **SEC. 10715. CLEAN ENERGY TECHNOLOGY TRANSFER CO-**  
4 **ORDINATION.**

5 (a) IN GENERAL.—The Secretary, acting through the  
6 Chief Commercialization Officer established in section  
7 1001 (a) of the Energy Policy Act of 2005 (42 U.S.C.  
8 16391 (a)), shall support the coordination of relevant  
9 technology transfer programs that advance the commercial  
10 application of clean energy technologies nationally and  
11 across all energy sectors. In particular, the Secretary may  
12 support activities to—

13 (1) facilitate the sharing of information on best  
14 practices for successful operation of clean energy  
15 technology transfer programs;

16 (2) coordinate resources and improve coopera-  
17 tion among clean energy technology transfer pro-  
18 grams;

19 (3) facilitate connections between entrepreneurs  
20 and start-up companies and the variety of programs  
21 related to clean energy technology transfer under the  
22 Department; and

23 (4) facilitate the development of metrics to  
24 measure the impact of clean energy technology  
25 transfer programs on—

1 (A) advancing the development, demonstra-  
2 tion, and commercial application of clean en-  
3 ergy technologies;

4 (B) increasing the competitiveness of  
5 United States in the clean energy sector, in-  
6 cluding in manufacturing; and

7 (C) commercial application of clean energy  
8 technologies being developed by entrepreneurs  
9 from under-represented backgrounds.

10 (b) AUTHORIZATION OF APPROPRIATIONS.—There  
11 are authorized to be appropriated to the Secretary to carry  
12 out the activities in this section \$3,000,000 for each of  
13 fiscal years 2023 through 2027.

14 **PART 2—SUPPORTING TECHNOLOGY DEVELOP-**  
15 **MENT AT THE NATIONAL LABORATORIES**

16 **SEC. 10716. LAB PARTNERING SERVICE PILOT PROGRAM.**

17 Section 9002 of division Z of the Consolidated Appro-  
18 priations Act, 2021 (Public Law 116–260) is amended by  
19 adding at the end the following:

20 “(h) AUTHORIZATION OF APPROPRIATIONS.—There  
21 are authorized to be appropriated to the Secretary  
22 \$2,000,000 for each of fiscal years 2023 through 2025  
23 to carry out subsections (a), (b), and (c), and \$1,700,000  
24 for each of fiscal years 2023 through 2025 for National

1 Laboratory employees to provide services under subsection  
2 (d).”.

3 **SEC. 10717. LAB-EMBEDDED ENTREPRENEURSHIP PRO-**  
4 **GRAM.**

5 (a) IN GENERAL.—The Secretary shall competitively  
6 award grants to National Laboratories for the purpose of  
7 establishing or supporting Lab-Embedded Entrepreneur-  
8 ship Programs.

9 (b) PURPOSES.—The purposes of such programs are  
10 to provide entrepreneurial fellows with access to National  
11 Laboratory research facilities, National Laboratory exper-  
12 tise, and mentorship to perform research and development  
13 and gain expertise that may be required or beneficial for  
14 the commercial application of research ideas.

15 (c) ENTREPRENEURIAL FELLOWS.—An entrepre-  
16 neurial fellow participating in a program described in sub-  
17 section (a) shall be provided with—

18 (1) opportunities for entrepreneurial training,  
19 professional development, and exposure to leaders  
20 from academia, industry, government, and finance  
21 who may serve as advisors to or partners of the fel-  
22 low;

23 (2) financial and technical support for research,  
24 development, and commercial application activities;

1           (3) fellowship awards to cover costs of living,  
2           health insurance, and travel stipends for the dura-  
3           tion of the fellowship; and

4           (4) any other resources determined appropriate  
5           by the Secretary.

6           (d) PROGRAM ACTIVITIES.—Each National Labora-  
7           tory that receives funding under this section shall support  
8           entrepreneurial fellows by providing—

9           (1) access to facilities and expertise within the  
10          National Laboratory;

11          (2) engagement with external stakeholders; and

12          (3) market and customer development opportu-  
13          nities.

14          (e) ADMINISTRATION.—National Laboratories that  
15          receive grants under this section shall prioritize the sup-  
16          port and success of the entrepreneurial fellow with regards  
17          to professional development and development of a relevant  
18          technology.

19          (f) PARTNERSHIPS.—In carrying out a Lab-Embed-  
20          ded Entrepreneurship Program, a National Laboratory  
21          may partner with an external entity, including—

22          (1) a nonprofit organization;

23          (2) an institution of higher education;

24          (3) a federally-owned corporation; or



1           (4) a consortium of 2 or more entities described  
2           in paragraphs (1) through (3).

3           (g) METRICS.—The Secretary shall support the de-  
4           velopment of short-term and long-term metrics to assess  
5           the effectiveness of programs receiving a grant under sub-  
6           section (a) in achieving the purposes of the program in  
7           subsection (a).

8           (h) EVALUATION.—In accordance with section 9007  
9           of division Z of the Consolidated Appropriations Act, 2021  
10          (Public Law 116–260), the Secretary shall submit to the  
11          Committee on Science, Space, and Technology of the  
12          House of Representatives and the Committee on Energy  
13          and Natural Resources of the Senate an evaluation of the  
14          effectiveness of the programs under subsection (a) based  
15          on the metrics developed pursuant to subsection (g).

16          (i) COORDINATION.—The Secretary shall oversee the  
17          planning and coordination of grants under subsection (a)  
18          and shall identify and disseminate best practices for  
19          achieving the purposes of subsection (a) to National Lab-  
20          oratories that receive grants under this section.

21          (j) INTERAGENCY COLLABORATION.—The Secretary  
22          shall collaborate with other executive branch agencies, in-  
23          cluding the Department of Defense and other agencies  
24          with Federal laboratories, regarding opportunities to part-

1 ner with National Laboratories receiving a grant under  
2 subsection (a).

3 (k) AUTHORIZATION OF APPROPRIATIONS.—There  
4 are authorized to be appropriated to the Secretary to carry  
5 out the activities authorized in this section \$25,000,000  
6 for each of fiscal years 2023 through 2027.

7 **SEC. 10718. SMALL BUSINESS VOUCHER PROGRAM.**

8 Section 1003 of the Energy Policy Act of 2005 (42  
9 U.S.C. 16393) is amended—

10 (1) in subsection (a)—

11 (A) in the matter preceding paragraph (1),  
12 by striking “, and may require the Director of  
13 a single-purpose research facility,” and insert-  
14 ing “(as defined in section 2) and the Director  
15 of each single-purpose research facility”;

16 (B) in paragraph (1)—

17 (i) by striking “increase” and insert-  
18 ing “encourage”; and

19 (ii) by striking “collaborative re-  
20 search,” and inserting “research, develop-  
21 ment, demonstration, and commercial ap-  
22 plication activities, including product devel-  
23 opment,”;

1 (C) in paragraph (2), by striking “procure-  
2 ment and collaborative research” and inserting  
3 “the activities described in paragraph (1)”;

4 (D) in paragraph (3)—

5 (i) by inserting “facilities,” before  
6 “training”; and

7 (ii) by striking “procurement and col-  
8 laborative research activities” and insert-  
9 ing “the activities described in paragraph  
10 (1)”; and

11 (E) in paragraph (5), by striking “for the  
12 program under subsection (b)” and inserting  
13 “and metrics for the programs under sub-  
14 sections (b) and (c)”;

15 (2) by redesignating subsections (c) and (d) as  
16 subsections (d) and (e), respectively;

17 (3) by inserting after subsection (b) the fol-  
18 lowing:

19 “(c) SMALL BUSINESS VOUCHER PROGRAM.—

20 “(1) DEFINITIONS.—In this subsection:

21 “(A) DIRECTOR.—The term ‘Director’  
22 means—

23 “(i) the Director of each National  
24 Laboratory; and

1                   “(ii) the Director of each single-pur-  
2                   pose research facility.

3                   “(B) NATIONAL LABORATORY.—The term  
4                   ‘National Laboratory’ has the meaning given  
5                   the term in section 2.

6                   “(C) PROGRAM.—The term ‘program’  
7                   means the program established under para-  
8                   graph (2).

9                   “(D) SMALL BUSINESS CONCERN.—The  
10                  term ‘small business concern’ has the meaning  
11                  given such term in section 3 of the Small Busi-  
12                  ness Act (15 U.S.C. 632).

13                  “(2) ESTABLISHMENT.—The Secretary, acting  
14                  through the Chief Commercialization Officer ap-  
15                  pointed under section 1001(a), and in consultation  
16                  with the Directors, shall establish a program to pro-  
17                  vide small business concerns with vouchers under  
18                  paragraph (3)—

19                         “(A) to achieve the goal described in sub-  
20                         section (a)(1); and

21                         “(B) to improve the products, services, and  
22                         capabilities of small business concerns in the  
23                         mission space of the Department.

24                         “(3) VOUCHERS.—Under the program, the Di-  
25                         rectors are authorized to provide to small business

1 concerns vouchers to be used at National Labora-  
2 tories and single-purpose research facilities for—

3 “(A) research, development, demonstra-  
4 tion, technology transfer, skills training and  
5 workforce development, or commercial applica-  
6 tion activities; or

7 “(B) any other activities that the applica-  
8 ble Director determines appropriate.

9 “(4) EXPEDITED APPROVAL.—The Secretary,  
10 working with the Directors, shall establish a stream-  
11 lined approval process for financial assistance agree-  
12 ments signed between—

13 “(A) small business concerns selected to  
14 receive a voucher under the program; and

15 “(B) the National Laboratories and single-  
16 purpose research facilities.

17 “(5) COST-SHARING REQUIREMENT.—In car-  
18 rying out the program, the Secretary shall require  
19 cost-sharing in accordance with section 988.

20 “(6) REPORT.—In accordance with section  
21 9007 of division Z of the Consolidated Appropria-  
22 tions Act, 2021 (Public Law 116–260), the Sec-  
23 retary shall report annually on the progress and im-  
24 plementation of the small business voucher program  
25 established under this section, including the number

1 and locations of small businesses that received  
2 grants under this program.”; and

3 (4) in subsection (e) (as so redesignated), by  
4 striking “for activities under this section” and in-  
5 serting “for activities under subsection (b)” and in-  
6 serting before the period at the end “and for activi-  
7 ties under subsection (c) \$25,000,000 for each of  
8 fiscal years 2023 through 2027”.

9 **SEC. 10719. ENTREPRENEURIAL LEAVE PROGRAM.**

10 (a) **IN GENERAL.**—The Secretary shall delegate to  
11 Directors the authority to carry out an entrepreneurial  
12 leave program (referred to in this section as the “pro-  
13 gram”) to allow National Laboratory employees to take  
14 a full leave of absence from their position, with the option  
15 to return to that or a comparable position up to 3 years  
16 later, or a partial leave of absence, to advance the commer-  
17 cial application of energy and related technologies relevant  
18 to the mission of the Department.

19 (b) **TERMINATION AUTHORITY.**—Directors shall re-  
20 tain the authority to terminate National Laboratory em-  
21 ployees that participate in the program if such employees  
22 are found to violate terms prescribed by the National Lab-  
23 oratory at which such employee is employed.

24 (c) **LICENSING.**—To reduce barriers to participation  
25 in the program, the Secretary shall delegate to the Direc-

1 tors the requirement to establish streamlined mechanisms  
2 for facilitating the licensing of technology that is the focus  
3 of National Laboratory employees who participate in the  
4 program.

5 (d) REPORT.—In accordance with section 9007 of di-  
6 vision Z of the Consolidated Appropriations Act, 2021  
7 (Public Law 116–260), the Secretary shall report annually  
8 on the utilization of this authority at National Labora-  
9 tories, including the number of employees who participate  
10 in this program at each National Laboratory and the num-  
11 ber of employees who take a permanent leave from their  
12 positions at National Laboratories as a result of partici-  
13 pating in this program.

14 (e) FEDERAL ETHICS.—Nothing in this section shall  
15 affect existing Federal ethics rules applicable to Federal  
16 personnel.

17 **SEC. 10720. NATIONAL LABORATORY NON-FEDERAL EM-**  
18 **PLOYEE OUTSIDE EMPLOYMENT AUTHORITY.**

19 (a) IN GENERAL.—The Secretary shall delegate to  
20 Directors of National Laboratories the authority to allow  
21 their non-Federal employees—

22 (1) to engage in outside employment, including  
23 start-up companies based on licensing technologies  
24 developed at National Laboratories and consulting in

1 their areas of expertise, and receive compensation  
2 from such entities; and

3 (2) to engage in outside activities related to  
4 their areas of expertise at the National Laboratory  
5 and may allow employees, in their employment ca-  
6 pacity at such outside employment, to access the  
7 National Laboratories under the same contracting  
8 mechanisms as non-Laboratory employees and enti-  
9 ties, in accordance with appropriate conflict of inter-  
10 est protocols.

11 (b) REQUIREMENTS.—If a Director elects to use the  
12 authority granted by subsection (a) of this section, the Di-  
13 rector, or their designee, shall—

14 (1) require employees to disclose to and obtain  
15 approval from the Director or their designee prior to  
16 engaging in any outside employment;

17 (2) develop and require appropriate conflict of  
18 interest protocols for employees that engage in out-  
19 side employment;

20 (3) maintain the authority to terminate employ-  
21 ees engaging in outside employment if they are  
22 found to violate terms, including conflict of interest  
23 protocols, mandated by the Director; and



1           (4) ensure that any such programs or activities  
2           are in conformance with the Department's research  
3           security policies, including DOE Order 486.1.

4           (c) ADDITIONAL RESTRICTIONS.—Employees engag-  
5           ing in outside employment may not—

6           (1) allow such activities to interfere with or im-  
7           pede their duties at the National Laboratory;

8           (2) engage in activities related to outside em-  
9           ployment using National Laboratory government  
10          equipment, property, or resources, unless such ac-  
11          tivities are performed under National Laboratory  
12          contracting mechanisms, such as Cooperative Re-  
13          search and Development Agreements or Strategic  
14          Partnership Projects, whereby all conflicts of inter-  
15          est requirements apply; or

16          (3) use their position at a National Laboratory  
17          to provide an unfair competitive advantage to an  
18          outside employer or start-up activity.

19          (d) FEDERAL ETHICS.—Nothing in this section shall  
20          affect existing Federal ethics rules applicable to Federal  
21          personnel.

1                   **PART 3—DEPARTMENT OF ENERGY**  
2                   **MODERNIZATION**

3 **SEC. 10722. OFFICE OF TECHNOLOGY TRANSITIONS.**

4           Section 1001(a) of the Energy Policy Act of 2005  
5 (42 U.S.C. 16391) is amended by adding at the end the  
6 following:

7                   “(6) **HIRING AND MANAGEMENT.**—To carry out  
8 the program authorized in this section, the Under  
9 Secretary for Science may appoint personnel using  
10 the authorities in section 10726 of the Research and  
11 Development, Competition, and Innovation Act.

12                   “(7) **AUTHORIZATION OF APPROPRIATIONS.**—  
13 There are authorized to be appropriated to the Sec-  
14 retary to carry out the activities authorized in this  
15 section \$20,000,000 for each of fiscal years 2023  
16 through 2027.”.

17 **SEC. 10723. MANAGEMENT OF DEPARTMENT OF ENERGY**  
18                   **DEMONSTRATION PROJECTS.**

19           Section 41201 of the Infrastructure Investment and  
20 Jobs Act (42 U.S.C. 18861) is amended—

21                   (1) in subsection (b), by inserting “including  
22 the Office of Technology Transitions, the Loan Pro-  
23 gram Office, and all applied program offices,” after  
24 “Department,”;

25                   (2) in subsection (d), by inserting “, including  
26 by using the authorities in section 10726 of the Re-

1 search and Development, Competition, and Innova-  
2 tion Act,” after “personnel”;

3 (3) by redesignating subsections (e), (f), and  
4 (g) as subsections (g), (h), and (i), respectively;

5 (4) by adding after subsection (d) the following:

6 “(e) **ADDITIONAL AUTHORITY.**—The Secretary may  
7 solicit, select, and manage covered projects directly  
8 through the program.

9 “(f) **PROJECT TERMINATION.**—Should an ongoing  
10 covered project receive an unfavorable review under sub-  
11 section (e)(5), the Secretary or their designee may cease  
12 funding the covered project and reallocate the remaining  
13 funds to new or existing covered projects carried out by  
14 that program office.”; and

15 (5) in subsection (h)(1) (as so redesignated), by  
16 striking “The Secretary” and inserting “In accord-  
17 ance with section 9007 of division Z of the Consoli-  
18 dated Appropriations Act, 2021 (Public Law 116–  
19 260), the Secretary”.

20 **SEC. 10724. STREAMLINING PRIZE COMPETITIONS.**

21 (a) **REPORTING.**—Section 1008 of the Energy Policy  
22 Act of 2005 (42 U.S.C. 16396) is amended by adding at  
23 the end the following:

24 “(h) **REPORT.**—In accordance with section 9007 of  
25 division Z of the Consolidated Appropriations Act, 2021

1 (Public Law 116–260), the Secretary shall report annually  
2 on a description of any prize competitions carried out  
3 using the authority under this section, the total amount  
4 of prizes awarded along with any private sector contribu-  
5 tions, the methods used for solicitation and evaluation,  
6 and a description of how each prize competition advanced  
7 the mission of the Department.”.

8 (b) **TECHNICAL AMENDMENT.**—Section 1008 of the  
9 Energy Policy Act of 2005 (42 U.S.C. 16396) is amended  
10 by redesignating the second subsection (e) (relating to au-  
11 thorization of appropriations) as subsection (f).

12 **SEC. 10725. COST-SHARE WAIVER EXTENSION.**

13 (a) **IN GENERAL.**—Section 988 of the Energy Policy  
14 Act of 2005 (42 U.S.C. 16352) is amended in subsection  
15 (b)(4)(B) by striking “this paragraph” and inserting “the  
16 Research and Development, Competition, and Innovation  
17 Act”.

18 (b) **REPORT.**—Section 108(b) of the Department of  
19 Energy Research and Innovation Act is amended in sub-  
20 section (b) by striking “this Act” each place it appears  
21 and inserting “the Research and Development, Competi-  
22 tion, and Innovation Act”.

1 **SEC. 10726. SPECIAL HIRING AUTHORITY FOR SCIENTIFIC,**  
2 **ENGINEERING, AND PROJECT MANAGEMENT**  
3 **PERSONNEL.**

4 (a) IN GENERAL.—The Under Secretary for Science  
5 shall have the authority to—

6 (1) make appointments of not more than 60  
7 scientific, engineering, and professional personnel,  
8 without regard to civil service laws, to assist the De-  
9 partment in meeting specific project or research  
10 needs;

11 (2) fix the basic pay of any employee appointed  
12 under this section at a rate to be determined by the  
13 Under Secretary at rates not in excess of Level II  
14 of the Executive Schedule (EX-II) under section  
15 5311 of title 5, United States Code without regard  
16 to the civil service laws; and

17 (3) pay any employee appointed under this sec-  
18 tion payments in addition to basic pay, except that  
19 the total amount of additional payments paid to an  
20 employee under this subsection for any 12-month pe-  
21 riod shall not exceed the lesser of the following  
22 amounts:

23 (A) \$25,000.

24 (B) The amount equal to 25 percent of the  
25 annual rate of basic pay of that employee.

1 (C) The amount of the limitation that is  
2 applicable for a calendar year under section  
3 5307(a)(1) of title 5, United States Code.

4 (b) TERM.—

5 (1) IN GENERAL.—The term of any employee  
6 appointed under this section shall not exceed 3 years  
7 unless otherwise authorized in law.

8 (2) TERMINATION.—The Under Secretary for  
9 Science shall have the authority to terminate any  
10 employee appointed under this section at any time  
11 based on performance or changing project or re-  
12 search needs of the Department.

13 **SEC. 10727. TECHNOLOGY TRANSFER REPORTS AND EVAL-**  
14 **UATION.**

15 Section 9007 of division Z of the Consolidated Appro-  
16 priations Act, 2021 (Public Law 116–260) is amended as  
17 follows:

18 “(a) ANNUAL REPORT.—As part of the updated tech-  
19 nology transfer execution plan required each year under  
20 section 1001(h)(2) of the Energy Policy Act of 2005 (42  
21 U.S.C. 16391(h)(2)), the Secretary of Energy (in this sec-  
22 tion referred to as the ‘Secretary’) shall submit to the  
23 Committee on Science, Space, and Technology of the  
24 House of Representatives and the Committee on Energy  
25 and Natural Resources of the Senate a report on the

1 progress and implementation of programs established  
2 under sections 9001, 9002, 9003, 9004, and 9005 of this  
3 Act and under sections 10714, 10718, 10719, 10720, and  
4 10723 of the Research and Development, Competition,  
5 and Innovation Act.

6 “(b) EVALUATION.—Not later than 3 years after the  
7 enactment of this Act and every 3 years thereafter the  
8 Secretary shall submit to the Committee on Science,  
9 Space, and Technology of the House of Representatives  
10 and the Committee on Energy and Natural Resources of  
11 the Senate an evaluation on the extent to which programs  
12 established under sections 9001, 9002, 9003, 9004, and  
13 9005 of this Act and sections 10713, 10714, 10715, and  
14 10717 of the Research and Development, Competition,  
15 and Innovation Act are achieving success based on rel-  
16 evant short-term and long-term metrics.”.

## 17 **Subtitle K—Micro Act**

### 18 **SEC. 10731. MICROELECTRONICS RESEARCH FOR ENERGY**

#### 19 **INNOVATION.**

20 (a) DEFINITIONS.—In this section:

21 (1) CENTER.—The term “Center” means a  
22 Microelectronics Science Research Center established  
23 pursuant to subsection (d).

24 (2) DEPARTMENT.—The term “Department”  
25 means the Department of Energy.

1           (3) DIRECTOR.—The term “Director” means  
2 the Director of the Office of Science.

3           (4) HISTORICALLY BLACK COLLEGE OR UNI-  
4 VERSITY.—The term “historically Black college or  
5 university” has the meaning given the term “part B  
6 institution” in section 322 of the Higher Education  
7 Act of 1965 (20 U.S.C. 1061).

8           (5) INSTITUTION OF HIGHER EDUCATION.—The  
9 term “institution of higher education” has the  
10 meaning given the term in section 101(a) of the  
11 Higher Education Act of 1965 (20 U.S.C. 1001(a)).

12           (6) MICROELECTRONICS.—The term “micro-  
13 electronics” means—

14                   (A) a semiconductor and related materials;

15                   (B) processing chemistries;

16                   (C) design technologies;

17                   (D) fabrication technologies;

18                   (E) lithography technologies;

19                   (F) packaging technologies;

20                   (G) a sensor;

21                   (H) a device;

22                   (I) an integrated circuit;

23                   (J) a processor;

24                   (K) computing architecture;

25                   (L) modeling and simulation;



1 (M) a software tool; and

2 (N) any other related technology.

3 (7) MINORITY-SERVING INSTITUTION.—The  
4 term “minority-serving institution” means—

5 (A) a Hispanic-serving institution (as de-  
6 fined in section 502(a) of the Higher Education  
7 Act of 1965 (20 U.S.C. 1101a(a)));

8 (B) an Alaska Native-serving institution  
9 (as defined in section 317(b) of the Higher  
10 Education Act of 1965 (20 U.S.C. 1059d(b)));

11 (C) a Native Hawaiian-serving institution  
12 (as defined in that section);

13 (D) a Predominantly Black Institution (as  
14 defined in section 371(c) of the Higher Edu-  
15 cation Act of 1965 (20 U.S.C. 1067q(c)));

16 (E) an Asian American and Native Amer-  
17 ican Pacific Islander-serving institution (as de-  
18 fined in that section); and

19 (F) a Native American-serving nontribal  
20 institution (as defined in that section).

21 (8) NATIONAL LABORATORY.—The term “Na-  
22 tional Laboratory” has the meaning given the term  
23 in section 2 of the Energy Policy Act of 2005 (42  
24 U.S.C. 15801).

1           (9) PROGRAM.—The term “program” means  
2 the program established under subsection (c)(1).

3           (10) SECRETARY.—The term “Secretary”  
4 means the Secretary of Energy.

5           (11) SKILLED TECHNICAL WORKFORCE.—The  
6 term “skilled technical workforce” has the meaning  
7 given the term in section 4(b)(3) of the Innovations  
8 in Mentoring, Training, and Apprenticeships Act (42  
9 U.S.C. 1862p note; Public Law 115–402).

10           (12) TRIBAL COLLEGE OR UNIVERSITY.—The  
11 term “Tribal College or University” has the meaning  
12 given the term in section 316 of the Higher Edu-  
13 cation Act of 1965 (20 U.S.C. 1059c).

14           (13) WORK-BASED LEARNING.—The term  
15 “work-based learning” has the meaning given the  
16 term in section 3 of the Carl D. Perkins Career and  
17 Technical Education Act of 2006 (20 U.S.C. 2302).

18 (b) FINDINGS.—Congress finds that—

19           (1) the coming end of Moore’s Law presents  
20 major technological challenges and opportunities for  
21 the United States and has important implications  
22 for national security, economic competitiveness, and  
23 scientific discovery;

24           (2) future progress and innovation in microelec-  
25 tronics, and the maintenance of a robust domestic

1 microelectronics supply chain, will require an ap-  
2 proach that advances relevant materials science,  
3 electronic and photonic device technologies, proc-  
4 essing and packaging technologies, manufacturing  
5 technologies, circuit, chip, and system architecture,  
6 and software system and algorithm development in  
7 a codesign fashion;

8 (3) the National Laboratories possess unique  
9 technical expertise and user facilities that are essen-  
10 tial to—

11 (A) overcoming foundational research chal-  
12 lenges relevant to the topics described in para-  
13 graph (2); and

14 (B) translating and transferring research  
15 outcomes to industry; and

16 (4) the expertise and user facilities of the Na-  
17 tional Laboratories described in paragraph (3) will  
18 enable the Department to drive advances in micro-  
19 electronics that are essential to meeting future needs  
20 in areas critical to the missions of the Department  
21 and the future competitiveness of the domestic  
22 microelectronics industry, including high-perform-  
23 ance computing, emerging data-centric computing  
24 approaches and energy-efficient computing, optical

1 sensors, sources, and wireless networks, and power  
2 electronics and electricity delivery systems.

3 (c) MICROELECTRONICS RESEARCH PROGRAM.—

4 (1) IN GENERAL.—The Secretary shall carry  
5 out a crosscutting program of research, development,  
6 and demonstration of microelectronics relevant to  
7 the missions of the Department to enable advances  
8 and breakthroughs that will—

9 (A) accelerate underlying research and de-  
10 velopment for design, development, and  
11 manufacturability of next-generation microelec-  
12 tronics; and

13 (B) ensure the global competitiveness of  
14 the United States in the field of microelec-  
15 tronics.

16 (2) RESEARCH PROJECTS.—

17 (A) IN GENERAL.—In carrying out the  
18 program, the Secretary shall provide financial  
19 assistance to eligible entities described in sub-  
20 paragraph (B) to carry out research projects  
21 in—

22 (i) foundational science areas, includ-  
23 ing—

1 (I) materials sciences, chemical  
2 sciences, and plasma science synthesis  
3 and fabrication;

4 (II) novel microelectronics de-  
5 vices, including emerging memory and  
6 storage technologies;

7 (III) diverse computing architec-  
8 tures and paradigms, including analog  
9 computing and edge computing;

10 (IV) data-driven modeling and  
11 simulation;

12 (V) integrated sensing, power  
13 harvesting, and communications;

14 (VI) component integration and  
15 subsystems;

16 (VII) photonic integration and  
17 packaging; and

18 (VIII) development of codesign  
19 frameworks for all stages of microelec-  
20 tronics design, development, fabrica-  
21 tion, and application;

22 (ii) cybersecurity by design to result  
23 in trusted and resilient microelectronics;

24 (iii) methods for leveraging advanced  
25 simulation and artificial intelligence to en-

1           hance codesign and discovery in microelec-  
2           tronics;

3                   (iv) in consultation with the National  
4           Institute of Standards and Technology,  
5           fabrication and processing science and me-  
6           trology associated with microelectronics  
7           manufacturing, including lithography, pat-  
8           terning, surface deposition, etching, and  
9           cleaning;

10                   (v) approaches for optimizing system-  
11           level energy efficiency of advanced com-  
12           puting systems, the electrical grid, power  
13           electronics, and other energy infrastruc-  
14           ture;

15                   (vi) approaches for enhancing the du-  
16           rability and lifetime of radiation-hardened  
17           electronics;

18                   (vii) enhancement of microelectronics  
19           security, including the development of inte-  
20           grated devices, packages, and thermal  
21           management for severe environments and  
22           national security;

23                   (viii) in coordination with other rel-  
24           evant initiatives of the Department, meth-  
25           ods to improve the lifetime, maintenance,

1 recycling, reuse, and sustainability of  
2 microelectronics components and systems,  
3 including technologies and strategies that  
4 reduce the use of energy, water, critical  
5 materials, and other commodities that the  
6 Secretary determines are vulnerable to dis-  
7 ruption; and

8 (ix) methods and techniques for do-  
9 mestic processing of materials for micro-  
10 electronics and components of microelec-  
11 tronics.

12 (B) ELIGIBLE ENTITIES.—An eligible enti-  
13 ty referred to in subparagraph (A) is—

14 (i) an institution of higher education,  
15 including a historically Black college or  
16 university, a Tribal College or University,  
17 and a minority-serving institution;

18 (ii) a nonprofit research organization;

19 (iii) a State research agency;

20 (iv) a National Laboratory;

21 (v) a private commercial entity;

22 (vi) a partnership or consortium of 2  
23 or more entities described in clauses (i)  
24 through (v); and

1 (vii) any other entity that the Sec-  
2 retary determines appropriate.

3 (C) NOTIFICATION.—Not later than 30  
4 days after the Secretary provides financial as-  
5 sistance to an eligible entity under subpara-  
6 graph (A), the Secretary shall submit to the  
7 Committee on Energy and Natural Resources of  
8 the Senate and the Committee on Science,  
9 Space, and Technology of the House of Rep-  
10 resentatives a notification of the financial as-  
11 sistance provided, including—

12 (i) the criteria used by the Secretary  
13 to select the eligible entity receiving the fi-  
14 nancial assistance;

15 (ii) the manner in which the criteria  
16 described in clause (i) comport with the  
17 purposes of the program described in para-  
18 graph (1); and

19 (iii) a description of the research  
20 project that the eligible entity will carry  
21 out using the financial assistance.

22 (3) TECHNOLOGY TRANSFER.—In carrying out  
23 the program, the Secretary, in coordination with the  
24 Director of the Office of Technology Transitions and  
25 in consultation with the private sector, shall—



1 (A) support translational research and  
2 transfer of microelectronics technologies; and

3 (B) identify emerging research and devel-  
4 opment needs of industry and government for  
5 the benefit of United States economic competi-  
6 tiveness.

7 (4) WORKFORCE DEVELOPMENT.—In carrying  
8 out the program, the Secretary shall support—

9 (A) workforce development through exist-  
10 ing authorities and mechanisms available to the  
11 Department, including internships, fellowships,  
12 individual investigator grants, and other activi-  
13 ties the Secretary determines appropriate; and

14 (B) in consultation with the National  
15 Science Foundation, as appropriate, education  
16 and outreach activities—

17 (i) to disseminate information and  
18 promote understanding of microelectronics  
19 and related fields among students at ele-  
20 mentary school, secondary school, high  
21 school, undergraduate, and graduate levels;  
22 and

23 (ii) that may include educational pro-  
24 gramming with an emphasis on experien-  
25 tial and project-based learning.

1           (5) OUTREACH.—The Secretary shall conduct  
2 outreach to recruit applicants to the program and  
3 engage participants from all regions of the United  
4 States, especially individuals from underserved com-  
5 munities and groups historically underrepresented in  
6 science, technology, engineering, and mathematics.

7           (6) COORDINATION.—In carrying out the pro-  
8 gram, the Secretary shall—

9                   (A) coordinate across all relevant programs  
10 and offices of the Department; and

11                   (B) coordinate the research carried out  
12 under the program relating to microelectronics  
13 with activities carried out by other Federal  
14 agencies and programs relating to microelec-  
15 tronics research, development, manufacturing,  
16 and supply chain security, including the pro-  
17 grams authorized under subsections (c) through  
18 (f) of section 9906 of the William M. (Mac)  
19 Thornberry National Defense Authorization Act  
20 for Fiscal Year 2021 (15 U.S.C. 4656).

21           (7) REPORT.—Not later than 180 days after  
22 the date of enactment of this Act, the Secretary  
23 shall submit to the Committee on Energy and Nat-  
24 ural Resources of the Senate and the Committee on  
25 Science, Space, and Technology of the House of

1       Representatives a report describing the goals, prior-  
2       ities, and anticipated outcomes of the program.

3               (8) FUNDING.—There are authorized to be ap-  
4       propriated to the Secretary to carry out this sub-  
5       section—

6               (A) \$75,000,000 for fiscal year 2023;

7               (B) \$100,000,000 for fiscal year 2024;

8               (C) \$100,000,000 for fiscal year 2025;

9               (D) \$100,000,000 for fiscal year 2026;

10              and

11              (E) \$100,000,000 for fiscal year 2027.

12       (d) MICROELECTRONICS SCIENCE RESEARCH CEN-  
13       TERS.—

14              (1) IN GENERAL.—In carrying out the program,  
15       subject to the availability of appropriations, the Di-  
16       rector shall establish not more than 4 Microelec-  
17       tronics Science Research Centers, each comprising 1  
18       or more eligible entities—

19              (A) to conduct mission-driven research to  
20       address foundational challenges in the design,  
21       development, characterization, prototyping,  
22       demonstration, and fabrication of microelec-  
23       tronics; and

24              (B) to facilitate the translation of research  
25       results to industry.

1           (2) ELIGIBLE ENTITIES.—An eligible entity re-  
2           ferred to in paragraph (1) is—

3                   (A) a National Laboratory;

4                   (B) an institution of higher education, in-  
5           cluding a historically Black college or univer-  
6           sity, a Tribal College or University, and a mi-  
7           nority-serving institution;

8                   (C) a private commercial entity;

9                   (D) a research center;

10                  (E) a partnership or consortium of 2 or  
11           more entities described in subparagraphs (A)  
12           through (D); and

13                  (F) any other entity that the Secretary de-  
14           termines appropriate.

15           (3) ACTIVITIES.—The activities of a Center  
16           shall include research, development, and demonstra-  
17           tion activities for—

18                   (A) accelerating the development of new  
19           microelectronics science and technology, includ-  
20           ing materials, devices, circuits, systems, archi-  
21           tectures, fabrication tools, processes,  
22           diagnostics, modeling, synthesis, and, in con-  
23           sultation with the National Institute of Stand-  
24           ards and Technology, metrology;

1           (B) advancing the sustainability and en-  
2 energy efficiency of new microelectronics devices,  
3 packages, and systems;

4           (C) application-driven codesign and proto-  
5 typing of novel devices to facilitate laboratory-  
6 to-fabrication transition;

7           (D) advancing knowledge and experimental  
8 capabilities in surface and materials science,  
9 plasma science, and computational and theo-  
10 retical methods, including artificial intelligence,  
11 multiscale codesign, and advanced supercom-  
12 puting capabilities to invent and manufacture  
13 revolutionary microelectronic devices;

14           (E) creating technology testbeds for proto-  
15 typing platforms for validation and verification  
16 of new capabilities and sharing of ideas, intel-  
17 lectual property, and the unique facilities of the  
18 Department;

19           (F) supporting development of cybersecu-  
20 rity capabilities for computing architectures  
21 that measurably improve safety and security  
22 and are adaptable for existing and future appli-  
23 cations; and

24           (G) supporting long-term and short-term  
25 workforce development in microelectronics.

1           (4) REQUEST FOR PROPOSALS; MERIT RE-  
2           VIEW.—

3           (A) IN GENERAL.—The Director shall, at  
4           such time, in such manner, and containing such  
5           information as the Director determines to be  
6           appropriate, issue a request for proposals from  
7           eligible entities described in paragraph (2) seek-  
8           ing to be designated as a Center.

9           (B) COMPETITIVE MERIT REVIEW.—The  
10          Director shall select eligible entities under sub-  
11          paragraph (A) through a competitive, merit-  
12          based process.

13          (5) OPERATION.—

14          (A) DURATION.—

15           (i) IN GENERAL.—Each Center shall  
16           operate for a period of not more than 5  
17           years, unless renewed for an additional 5-  
18           year period in accordance with clause (ii).

19           (ii) RENEWAL.—

20           (I) INITIAL RENEWAL.—In the  
21           case of a Center that has operated for  
22           not more than 5 years, the Director  
23           may renew support for the Center on  
24           a merit-reviewed basis for a period of  
25           not more than 5 years.

1 (II) 10-YEAR OPERATION.—In  
2 the case of a Center that has operated  
3 for not less than 5 years but not more  
4 than 10 years, the Director may  
5 renew support for the Center on a  
6 competitive, merit-reviewed basis for a  
7 period of not more than 5 years.

8 (III) 15-YEAR OPERATION.—In  
9 the case of a Center that has operated  
10 for not less than 10 years but not  
11 more than 15 years, the Director may  
12 renew support for the Center on a  
13 merit-reviewed basis for a period of  
14 not more than 5 years.

15 (B) TERMINATION.—Consistent with the  
16 existing authorities of the Department, the Di-  
17 rector may terminate an underperforming Cen-  
18 ter during the performance period.

19 (6) TECHNOLOGY TRANSFER.—The Director, in  
20 coordination with the Director of the Office of Tech-  
21 nology Transitions, shall seek to enter into partner-  
22 ships with industry groups to facilitate the trans-  
23 lation and transfer of research results produced by  
24 the Centers.

25 (7) COORDINATION.—The Secretary shall—

1 (A) establish a coordinating network to co-  
2 ordinate cross-cutting research and foster com-  
3 munication and collaboration among the Cen-  
4 ters; and

5 (B) ensure coordination, and avoid unnec-  
6 essary duplication, of the activities of each Cen-  
7 ter with the activities of—

8 (i) other research entities of the De-  
9 partment, including—

10 (I) the Nanoscale Science Re-  
11 search Centers;

12 (II) the National Quantum Infor-  
13 mation Science Research Centers;

14 (III) the Energy Frontier Re-  
15 search Centers;

16 (IV) the Energy Innovation  
17 Hubs;

18 (V) the National Laboratories;

19 and

20 (VI) other offices of the Depart-  
21 ment;

22 (ii) the National Semiconductor Tech-  
23 nology Center established under section  
24 9906(c)(1) of the William M. (Mac)  
25 Thornberry National Defense Authoriza-



1                   tion Act for Fiscal Year 2021 (15 U.S.C.  
2                   4656(c)(1));  
3                   (iii) institutions of higher education;  
4                   (iv) industry; and  
5                   (v) relevant research activities carried  
6                   out by other Federal agencies.

7                   (8) WORKFORCE DEVELOPMENT.—Each Center  
8                   shall support workforce development through—

9                   (A) incorporation of undergraduate stu-  
10                  dents, postdoctoral fellows, graduate students,  
11                  and early career researchers, as well as elemen-  
12                  tary school, secondary school, and high school  
13                  students, through opportunities such as dual-  
14                  enrollment programs and work-based learning  
15                  programs, as applicable;

16                  (B) hands-on research and equipment  
17                  training programs;

18                  (C) technical training and certificate pro-  
19                  grams for the skilled technical workforce;

20                  (D) facilitation of engagement among aca-  
21                  demic, industry, and laboratory researchers;  
22                  and

23                  (E) public outreach activities, including to  
24                  students at elementary school, secondary school,  
25                  high school, undergraduate, and graduate lev-

1           els, which may include educational program-  
2           ming with an emphasis on experiential and  
3           project-based learning.

4           (9) OUTREACH.—The Director shall support  
5           the workforce development of Centers under para-  
6           graph (8) by conducting outreach to recruit appli-  
7           cants and engage participants from all regions of the  
8           United States, especially individuals from under-  
9           served communities and groups historically under-  
10          represented in science, technology, engineering, and  
11          mathematics.

12          (10) INTELLECTUAL PROPERTY.—The Sec-  
13          retary shall ensure that the intellectual property and  
14          value proposition created by the Centers are retained  
15          within the United States.

16          (11) NOTIFICATION.—

17                 (A) DEFINITION OF COVERED DETERMINA-  
18                 TION.—In this paragraph, the term “covered  
19                 determination” means a determination of the  
20                 Secretary—

21                         (i) to establish a Center under para-  
22                         graph (1);

23                         (ii) to renew support for a Center  
24                         under paragraph (5)(A)(ii); or

1 (iii) to terminate a Center under para-  
2 graph (5)(B).

3 (B) NOTIFICATION.—Not later than 30  
4 days after the Secretary makes a covered deter-  
5 mination, the Secretary shall submit to the  
6 Committee on Energy and Natural Resources of  
7 the Senate and the Committee on Science,  
8 Space, and Technology of the House of Rep-  
9 resentatives a notification of the covered deter-  
10 mination, including—

11 (i) the criteria used by the Secretary  
12 to make the covered determination; and

13 (ii) the manner in which the criteria  
14 described in clause (i) comport with the  
15 purposes of the program described in para-  
16 graph (1).

17 (12) FUNDING.—Subject to the availability of  
18 appropriations, the Secretary shall use not more  
19 than \$25,000,000 to fund each Center for each of  
20 fiscal years 2023 through 2027.

1 **Subtitle L—National Nuclear Uni-**  
2 **versity Research Infrastructure**  
3 **Reinvestment**

4 **SEC. 10741. SHORT TITLE.**

5 This subtitle may be cited as the “National Nuclear  
6 University Research Infrastructure Reinvestment Act of  
7 2021”.

8 **SEC. 10742. PURPOSES.**

9 The purposes of this subtitle are—

10 (1) to upgrade the nuclear research capabilities  
11 of universities in the United States to meet the re-  
12 search requirements of advanced nuclear energy sys-  
13 tems;

14 (2) to ensure the continued operation of univer-  
15 sity research reactors;

16 (3) to coordinate available resources to enable  
17 the establishment, including the start and efficient  
18 completion of construction, of new nuclear science  
19 and engineering facilities; and

20 (4) to support—

21 (A) workforce development critical to  
22 maintaining United States leadership in nuclear  
23 science and engineering and related disciplines;  
24 and

1 (B) the establishment or enhancement of  
2 nuclear science and engineering capabilities and  
3 other, related capabilities at historically Black  
4 colleges and universities, Tribal colleges or uni-  
5 versities, minority-serving institutions, EPSCoR  
6 universities, junior or community colleges, and  
7 associate-degree-granting colleges.

8 **SEC. 10743. UNIVERSITY INFRASTRUCTURE COLLABORA-**  
9 **TION.**

10 Section 954(a) of the Energy Policy Act of 2005 (42  
11 U.S.C. 16274(a)) is amended—

12 (1) in paragraph (2) by amending subpara-  
13 graph (D) to read as follows:

14 “(D) promote collaborations, partnerships,  
15 and knowledge sharing between institutions of  
16 higher education, National Laboratories, other  
17 Federal agencies, industry, and associated labor  
18 unions; and”.

19 (2) by amending paragraph (4) to read as fol-  
20 low:

21 “(4) **STRENGTHENING UNIVERSITY RESEARCH**  
22 **AND TRAINING REACTORS AND ASSOCIATED INFRA-**  
23 **STRUCTURE.—**

1           “(A) IN GENERAL.—In carrying out the  
2 program under this subsection, the Secretary  
3 may support—

4           “(i) converting research reactors from  
5 high-enrichment fuels to low-enrichment  
6 fuels and upgrading operational instrumen-  
7 tation;

8           “(ii) revitalizing and upgrading exist-  
9 ing nuclear science and engineering infra-  
10 structure that support the development of  
11 advanced nuclear technologies and applica-  
12 tions;

13           “(iii) regional or subregional univer-  
14 sity-led consortia to—

15           “(I) broaden access to university  
16 research reactors;

17           “(II) enhance existing university-  
18 based nuclear science and engineering  
19 infrastructure; and

20           “(III) provide project manage-  
21 ment, technical support, quality engi-  
22 neering and inspections, manufac-  
23 turing, and nuclear material support;

24           “(iv) student training programs, in  
25 collaboration with the United States nu-

1 clear industry, in relicensing and upgrad-  
2 ing reactors, including through the provi-  
3 sion of technical assistance; and

4 “(v) reactor improvements that em-  
5 phasize research, training, and education,  
6 including through the Innovations in Nu-  
7 clear Infrastructure and Education Pro-  
8 gram or any similar program.

9 “(B) Of any amounts appropriated to  
10 carry out the program under this subsection,  
11 there is authorized to be appropriated to the  
12 Secretary to carry out clauses (ii) and (iii) of  
13 subparagraph (A) \$55,000,000 for each of fis-  
14 cal years 2023 through 2027.”.

15 **SEC. 10744. ADVANCED NUCLEAR RESEARCH INFRASTRUC-**  
16 **TURE ENHANCEMENT SUBPROGRAM.**

17 Section 954(a) of the Energy Policy Act of 2005 (42  
18 U.S.C. 16274(a)), as amended by section 3, is further  
19 amended—

20 (1) by redesignating paragraphs (5) through  
21 (8) as paragraphs (6) through (9), respectively;

22 (2) by inserting after paragraph (4) the fol-  
23 lowing:

24 “(5) **ADVANCED NUCLEAR RESEARCH INFRA-**  
25 **STRUCTURE ENHANCEMENT.**—

1                   “(A) IN GENERAL.—The Secretary shall  
2                   carry out a subprogram to be known as the Ad-  
3                   vanced Nuclear Research Infrastructure En-  
4                   hancement Subprogram in order to—

5                   “(i) demonstrate various advanced nu-  
6                   clear reactor and nuclear microreactor con-  
7                   cepts;

8                   “(ii) establish medical isotope produc-  
9                   tion reactors or other specialized applica-  
10                  tions; and

11                  “(iii) advance other research infra-  
12                  structure that, in the determination of the  
13                  Secretary, is consistent with the mission of  
14                  the Department.

15                  “(B) NEW NUCLEAR SCIENCE AND ENGI-  
16                  NEERING FACILITIES.—In carrying out the sub-  
17                  program, the Secretary shall establish—

18                  “(i) not more than 4 new research re-  
19                  actors; and

20                  “(ii) new nuclear science and engi-  
21                  neering facilities, as required to address re-  
22                  search demand and identified infrastruc-  
23                  ture gaps.



1                   “(C) LOCATIONS.—New research reactors  
2                   and facilities established under subparagraph  
3                   (B) shall be established in a manner that—

4                   “ (i) supports the regional or sub-  
5                   regional consortia described in paragraph  
6                   (4)(C); and

7                   “ (ii) encourages the participation of—

8                   “ (I) historically Black colleges  
9                   and universities;

10                   “ (II) Tribal colleges or univer-  
11                   sities;

12                   “ (III) minority-serving institu-  
13                   tions;

14                   “ (IV) EPSCoR universities; and

15                   “ (V) junior or community col-  
16                   leges.

17                   “(D) FUEL REQUIREMENTS.—New re-  
18                   search reactors established under subparagraph  
19                   (B) shall not use high-enriched uranium, as de-  
20                   fined in section 2001 of division Z of the Con-  
21                   solidated Appropriations Act of 2021.

22                   “(E) AUTHORIZATION OF APPROPRIA-  
23                   TIONS.—Of any amounts appropriated to carry  
24                   out the program under this section, there are  
25                   authorized to be appropriated to the Secretary

1 to carry out the subprogram under this para-  
2 graph—

3 “(i) \$45,000,000 for fiscal year 2023;

4 “(ii) \$60,000,000 for fiscal year 2024;

5 “(iii) \$65,000,000 for fiscal year  
6 2025;

7 “(iv) \$80,000,000 for fiscal year  
8 2026; and

9 “(v) \$140,000,000 for fiscal year  
10 2027.”; and

11 (3) by amending paragraph (9), as redesignated  
12 by paragraph (1) of this section, to read as follows:

13 “(9) DEFINITIONS.—In this subsection:

14 “(A) JUNIOR FACULTY.—The term ‘junior  
15 faculty’ means a faculty member who was  
16 awarded a doctorate less than 10 years before  
17 receipt of an award from the grant program de-  
18 scribed in paragraph (2)(B).

19 “(B) JUNIOR OR COMMUNITY COLLEGE.—  
20 The term ‘junior or community college’  
21 means—

22 “(i) a public institution of high edu-  
23 cation, including additional locations, at  
24 which the highest awarded degree, or the

1           predominantly awarded degree, is an asso-  
2           ciate degree; or

3           “(ii) any Tribal college or university  
4           (as defined in section 316 of the Higher  
5           Education Act of 1965 (20 U.S.C.  
6           1059c)).

7           “(C) EPSCOR UNIVERSITY.—The term  
8           ‘EPSCoR university’ means an institution of  
9           higher education located in a State eligible to  
10          participate in the program defined in section  
11          502 of the America COMPETES Reauthoriza-  
12          tion Act of 2010 (42 U.S.C. 1862p note).

13          “(D) HISTORICALLY BLACK COLLEGE OR  
14          UNIVERSITY.—The term ‘historically Black col-  
15          lege or university’ has the meaning given the  
16          term ‘part B institution’ in section 322 of the  
17          Higher Education Act of 1965 (20 U.S.C.  
18          1061).

19          “(E) MINORITY-SERVING INSTITUTION.—  
20          The term ‘minority-serving institution’ means a  
21          Hispanic-serving institution, an Alaska Native-  
22          serving institution, a Native Hawaiian-serving  
23          institution, a Predominantly Black Institution,  
24          an Asian American and Native American Pa-  
25          cific Islander-serving institution, or a Native

1 American-serving nontribal institution as de-  
2 scribed in section 371 of the Higher Education  
3 Act of 1965 (20 U.S.C. 1067q(a)).

4 “(F) TRIBAL COLLEGE OR UNIVERSITY.—  
5 The term ‘Tribal College or University’ has the  
6 meaning given such term in section 316 of the  
7 Higher Education Act of 1965 (20 U.S.C.  
8 1059c).”.

9 **SEC. 10745. SCIENCE EDUCATION AND HUMAN RESOURCES**  
10 **SCHOLARSHIPS, FELLOWSHIPS, AND RE-**  
11 **SEARCH AND DEVELOPMENT PROJECTS.**

12 (a) IN GENERAL.—The purpose of this section is to  
13 support a diverse workforce for the complex landscape as-  
14 sociated with effective and equitable development of ad-  
15 vanced nuclear energy technologies, including interdiscipli-  
16 nary research to enable positive impacts and avoid poten-  
17 tial negative impacts across the lifespan of nuclear energy  
18 technologies.

19 (b) NONTECHNICAL NUCLEAR RESEARCH.—Section  
20 313 of the Omnibus Appropriations Act, 2009 (Public  
21 Law 111–8; 42 U.S.C. 16274a) is amended—

22 (1) in subsection (b)(2), after “engineering”, by  
23 inserting “, which may include nontechnical nuclear  
24 research.”;

1           (2) in subsection (c), by inserting after para-  
2 graph (2) the following:

3           “(3) NONTECHNICAL NUCLEAR RESEARCH.—

4           The term ‘nontechnical nuclear research’ means re-  
5 search with specializations such as social sciences or  
6 law that can support an increase in community en-  
7 gagement, participation, and confidence in nuclear  
8 energy systems, including the navigation of the li-  
9 censing required for advanced reactor deployment,  
10 aligned with the objectives in section 951(a)(2) of  
11 the Energy Policy Act of 2005 (42 U.S.C.  
12 16271(a)(2)).”; and

13           (3) in subsection (d)(1), by striking  
14 “\$30,000,000” and inserting “\$45,000,000”.

15 **Subtitle M—Steel Upgrading Part-**  
16 **nerships and Emissions Reduc-**  
17 **tion**

18 **SEC. 10751. LOW-EMISSIONS STEEL MANUFACTURING RE-**  
19 **SEARCH PROGRAM.**

20           (a) PROGRAM.—Subtitle D of title IV of the Energy  
21 Independence and Security Act of 2007 (42 U.S.C. 17111  
22 et seq.) is amended by inserting after section 454 the fol-  
23 lowing:

1 **“SEC. 454A. LOW-EMISSIONS STEEL MANUFACTURING RE-**  
2 **SEARCH PROGRAM.**

3 “(a) PURPOSE.—The purpose of this section is to en-  
4 courage the research and development of innovative tech-  
5 nologies aimed at—

6 “(1) increasing the technological and economic  
7 competitiveness of industry and manufacturing in  
8 the United States; and

9 “(2) achieving significant net nonwater green-  
10 house emissions reductions in the production proc-  
11 esses for iron, steel, and steel mill products.

12 “(b) DEFINITIONS.—In this section:

13 “(1) COMMERCIALLY AVAILABLE  
14 STEELMAKING.—The term ‘commercially available  
15 steelmaking’ means the current production method  
16 of iron, steel, and steel mill products.

17 “(2) CRITICAL MATERIAL.—The term ‘critical  
18 material’ has the meaning given such term in section  
19 7002 of division Z of the Consolidated Appropria-  
20 tions Act, 2021 (Public Law 116–260).

21 “(3) CRITICAL MINERAL.—The term ‘critical  
22 mineral’ has the meaning given such term in section  
23 7002 of division Z of the Consolidated Appropria-  
24 tions Act, 2021 (Public Law 116–260).

25 “(4) ELIGIBLE ENTITY.—The term ‘eligible en-  
26 tity’ means—

1 “(A) an institution of higher education;

2 “(B) an appropriate State or Federal enti-  
3 ty, including a federally funded research and  
4 development center of the Department;

5 “(C) a nonprofit research institution;

6 “(D) a private entity;

7 “(E) any other relevant entity the Sec-  
8 retary determines appropriate; and

9 “(F) a partnership or consortium of two or  
10 more entities described in subparagraphs (A)  
11 through (E).

12 “(5) INSTITUTION OF HIGHER EDUCATION.—  
13 The term ‘institution of higher education’ has the  
14 meaning given the term in section 101 of the Higher  
15 Education Act of 1965 (20 U.S.C. 1001).

16 “(6) LOW-EMISSIONS STEEL MANUFAC-  
17 TURING.—The term ‘low-emissions steel manufac-  
18 turing’ means advanced or commercially available  
19 steelmaking with the reduction, to the maximum ex-  
20 tent practicable, of net nonwater greenhouse gas  
21 emissions to the atmosphere from the production of  
22 iron, steel, and steel mill products.

23 “(c) IN GENERAL.—Not later than 180 days after  
24 the date of enactment of the Research and Development,  
25 Competition, and Innovation Act, the Secretary shall es-

1 tablish a program of research, development, demonstra-  
2 tion, and commercial application of advanced tools, tech-  
3 nologies, and methods for low-emissions steel manufac-  
4 turing.

5 “(d) REQUIREMENTS.—In carrying out the program  
6 under subsection (c), the Secretary shall—

7 “(1) coordinate this program with the programs  
8 and activities authorized in title VI of division Z of  
9 the Consolidated Appropriations Act, 2021;

10 “(2) coordinate across all relevant program of-  
11 fices of the Department, including the Office of  
12 Science, Office of Energy Efficiency and Renewable  
13 Energy, the Office of Fossil Energy, and the Office  
14 of Nuclear Energy;

15 “(3) leverage, to the extent practicable, the re-  
16 search infrastructure of the Department, including  
17 scientific computing user facilities, x-ray light  
18 sources, neutron scattering facilities, and nanoscale  
19 science research centers; and

20 “(4) conduct research, development, and dem-  
21 onstration of low-emissions steel manufacturing  
22 technologies that have the potential to increase do-  
23 mestic production and employment in advanced and  
24 commercially available steelmaking.

25 “(e) STRATEGIC PLAN.—



1           “(1) IN GENERAL.—Not later than 180 days  
2 after the date of enactment of the Research and De-  
3 velopment, Competition, and Innovation Act, the  
4 Secretary shall develop a 5-year strategic plan iden-  
5 tifying research, development, demonstration, and  
6 commercial application goals for the program estab-  
7 lished in subsection (c). The Secretary shall submit  
8 this plan to the Committee on Science, Space, and  
9 Technology of the House of Representatives and the  
10 Committee on Energy and Natural Resources of the  
11 Senate.

12           “(2) CONTENTS.—The strategic plan submitted  
13 under paragraph (1) shall—

14           “(A) identify programs at the Department  
15 related to low-emissions steel manufacturing  
16 that support the research, development, dem-  
17 onstration, and commercial application activities  
18 described in this section, and the demonstration  
19 projects under subsection (h);

20           “(B) establish technological and pro-  
21 grammatic goals to achieve the requirements of  
22 subsection (d); and

23           “(C) include timelines for the accomplish-  
24 ment of goals developed under the plan.

1           “(3) UPDATES TO PLAN.—Not less than once  
2           every two years, the Secretary shall submit to the  
3           Committee on Science, Space, and Technology of the  
4           House of Representatives and the Committee on En-  
5           ergy and Natural Resources of the Senate an up-  
6           dated version of the plan under paragraph (1).

7           “(f) FOCUS AREAS.—In carrying out the program es-  
8           tablished in subsection (e), the Secretary shall focus on—

9           “(1) medium- and high-temperature heat gen-  
10          eration technologies used for low-emissions steel  
11          manufacturing, which may include—

12                 “(A) alternative fuels, including hydrogen  
13                 and biomass;

14                 “(B) alternative reducing agents, including  
15                 hydrogen;

16                 “(C) renewable heat generation technology,  
17                 including solar and geothermal;

18                 “(D) electrification of heating processes,  
19                 including through electrolysis; and

20                 “(E) other heat generation sources;

21          “(2) carbon capture technologies for advanced  
22          and commercially available steelmaking processes,  
23          which may include—

24                 “(A) combustion and chemical looping  
25                 technologies;

1                   “(B) use of slag to reduce carbon dioxide  
2                   emissions;

3                   “(C) pre-combustion technologies; and

4                   “(D) post-combustion technologies;

5                   “(3) smart manufacturing technologies and  
6                   principles, digital manufacturing technologies, and  
7                   advanced data analytics to develop advanced tech-  
8                   nologies and practices in information, automation,  
9                   monitoring, computation, sensing, modeling, and  
10                  networking to—

11                  “(A) model and simulate manufacturing  
12                  production lines;

13                  “(B) monitor and communicate production  
14                  line status; and

15                  “(C) model, simulate, and optimize the en-  
16                  ergy efficiency of manufacturing processes;

17                  “(4) technologies and practices that minimize  
18                  energy and natural resource consumption, which  
19                  may include—

20                  “(A) designing products that enable reuse,  
21                  refurbishment, remanufacturing, and recycling;

22                  “(B) minimizing waste from advanced and  
23                  commercially available steelmaking processes,  
24                  including through the reuse of waste as re-

1 sources in other industrial processes for mutual  
2 benefit;

3 “(C) increasing resource efficiency; and

4 “(D) increasing the energy efficiency of  
5 advanced and commercially available  
6 steelmaking processes;

7 “(5) alternative materials and technologies that  
8 produce fewer emissions during production and re-  
9 sult in fewer emissions during use, which may in-  
10 clude—

11 “(A) innovative raw materials;

12 “(B) high-performance lightweight mate-  
13 rials;

14 “(C) substitutions for critical materials  
15 and critical minerals; and

16 “(D) other technologies that achieve sig-  
17 nificant carbon emission reductions in low-emis-  
18 sions steel manufacturing, as determined by the  
19 Secretary; and

20 “(6) high-performance computing to develop ad-  
21 vanced materials and manufacturing processes con-  
22 tributing to the focus areas described in paragraphs  
23 (1) through (5), including—

1           “(A) modeling, simulation, and optimiza-  
2           tion of the design of energy efficient and sus-  
3           tainable products; and

4           “(B) the use of digital prototyping and ad-  
5           ditive manufacturing to enhance product de-  
6           sign.

7           “(g) TESTING AND VALIDATION.—The Secretary, in  
8           consultation with the Director of the National Institute  
9           of Standards and Technology, shall support the develop-  
10          ment of standardized testing and technical validation of  
11          advanced and commercially available steelmaking and low-  
12          emissions steel manufacturing through collaboration with  
13          one or more National Laboratories, and one or more eligi-  
14          ble entities.

15          “(h) DEMONSTRATION.—

16                 “(1) ESTABLISHMENT.—Not later than 180  
17                 days after the date of enactment of the Research  
18                 and Development, Competition, and Innovation Act,  
19                 the Secretary, in carrying out the program estab-  
20                 lished in subsection (c), and in collaboration with in-  
21                 dustry partners, institutions of higher education,  
22                 and the National Laboratories, shall support an ini-  
23                 tiative for the demonstration of low-emissions steel  
24                 manufacturing, as identified by the Secretary, that  
25                 uses either—

1                   “(A) a single technology; or

2                   “(B) a combination of multiple tech-  
3 nologies.

4                   “(2) SELECTION REQUIREMENTS.—Under the  
5 initiative established under paragraph (1), the Sec-  
6 retary shall select eligible entities to carry out dem-  
7 onstration projects and to the maximum extent prac-  
8 ticable—

9                   “(A) encourage regional diversity among  
10 eligible entities, including participation by rural  
11 States;

12                   “(B) encourage technological diversity  
13 among eligible entities; and

14                   “(C) ensure that specific projects se-  
15 lected—

16                   “(i) expand on the existing technology  
17 demonstration programs of the Depart-  
18 ment; and

19                   “(ii) prioritize projects that leverage  
20 matching funds from non-Federal sources.

21                   “(3) REPORTS.—The Secretary shall submit to  
22 the Committee on Science, Space, and Technology of  
23 the House of Representatives and the Committee on  
24 Energy and Natural Resources of the Senate—

1           “(A) not less frequently than once every  
2 two years for the duration of the demonstration  
3 initiative under this subsection, a report de-  
4 scribing the performance of the initiative; and

5           “(B) if the initiative established under this  
6 subsection is terminated, an assessment of the  
7 success of, and education provided by, the  
8 measures carried out by recipients of financial  
9 assistance under the initiative.

10       “(i) ADDITIONAL COORDINATION.—

11           “(1) MANUFACTURING U.S.A.—In carrying out  
12 this section the Secretary shall consider—

13           “(A) leveraging the resources of relevant  
14 existing Manufacturing USA Institutes de-  
15 scribed in section 34(d) of the National Insti-  
16 tute of Standards and Technology Act (15  
17 U.S.C. 278s(d));

18           “(B) integrating program activities into a  
19 relevant existing Manufacturing USA Institute;  
20 or

21           “(C) establishing a new institute focused  
22 on low-emissions steel manufacturing.

23           “(2) OTHER FEDERAL AGENCIES.—In carrying  
24 out this section, the Secretary shall coordinate with  
25 other Federal agencies that are carrying out re-

1 search and development initiatives to increase indus-  
2 trial competitiveness and achieve significant net  
3 nonwater greenhouse emissions reductions through  
4 low-emissions steel manufacturing, including the De-  
5 partment of Defense, Department of Transportation,  
6 and the National Institute of Standards and Tech-  
7 nology.”.

8 (b) CLERICAL AMENDMENT.—Section 1(b) of the  
9 Energy Independence and Security Act of 2007 (42  
10 U.S.C. 17001 note) is amended in the table of contents  
11 by inserting after the item relating to section 454 the fol-  
12 lowing:

“Sec. 454A. Low-Emissions Steel Manufacturing Research Program.”.

13 **Subtitle N—Applied Laboratories**  
14 **Infrastructure Restoration and**  
15 **Modernization**

16 **SEC. 10761. APPLIED LABORATORIES INFRASTRUCTURE**  
17 **RESTORATION AND MODERNIZATION.**

18 (a) DEFINITION OF NATIONAL LABORATORY.—In  
19 this section, the term “National Laboratory” means—

- 20 (1) the National Renewable Energy Laboratory;  
21 (2) the National Energy Technology Labora-  
22 tory;  
23 (3) the Idaho National Laboratory;  
24 (4) the Savannah River National Laboratory;  
25 (5) the Sandia National Laboratories;



1 (6) the Los Alamos National Laboratory; and

2 (7) the Lawrence Livermore National Labora-  
3 tory.

4 (b) RESTORATION AND MODERNIZATION  
5 PROJECTS.—

6 (1) IN GENERAL.—The Secretary shall fund  
7 projects described in paragraph (2) as needed to ad-  
8 dress the deferred maintenance, critical infrastruc-  
9 ture needs, and modernization of National Labora-  
10 tories.

11 (2) PROJECTS DESCRIBED.—The projects re-  
12 ferred to in paragraph (1) are, as determined by the  
13 Secretary—

14 (A) priority deferred maintenance projects  
15 at National Laboratories, including facilities  
16 sustainment for, upgrade of, and construction  
17 of research laboratories, administrative and  
18 support buildings, utilities, roads, power plants,  
19 and any other critical infrastructure; and

20 (B) lab modernization projects at National  
21 Laboratories, including projects relating to core  
22 infrastructure needed—

23 (i) to support existing and emerging  
24 science missions with new and specialized  
25 requirements for world-leading scientific

1 user facilities and computing capabilities;  
2 and

3 (ii) to maintain safe, efficient, reliable,  
4 and environmentally responsible oper-  
5 ations, including pilot projects to dem-  
6 onstrate net-zero emissions with resilient  
7 operations.

8 (3) APPROACH.—In carrying out paragraph (1),  
9 the Secretary shall use all available approaches and  
10 mechanisms, as the Secretary determines to be ap-  
11 propriate, including—

- 12 (A) capital line items;
- 13 (B) minor construction projects;
- 14 (C) energy savings performance contracts;
- 15 (D) utility energy service contracts;
- 16 (E) alternative financing; and
- 17 (F) expense funding.

18 (c) SUBMISSION TO CONGRESS.—For each fiscal year  
19 through fiscal year 2027, at the same time as the annual  
20 budget submission of the President, the Secretary shall  
21 submit to the Committee on Appropriations and the Com-  
22 mittee on Energy and Natural Resources of the Senate  
23 and the Committee on Appropriations and the Committee  
24 on Science, Space, and Technology of the House of Rep-  
25 resentatives a list of projects for which the Secretary will

1 provide funding under this section, including a description  
2 of each project and the funding profile for the project.

3 (d) AUTHORIZATION OF APPROPRIATIONS.—There is  
4 authorized to be appropriated to the Secretary to carry  
5 out the activities described in this section \$800,000,000  
6 for each of fiscal years 2023 through 2027, of which, in  
7 each fiscal year—

8 (1) \$640,000,000 is authorized to be appro-  
9 priated for projects at National Laboratories de-  
10 scribed in paragraphs (1) through (4) of subsection  
11 (a); and

12 (2) \$160,000,000 is authorized to be appro-  
13 priated for projects at National Laboratories de-  
14 scribed in paragraphs (5) through (7) of that sub-  
15 section.

16 **Subtitle O—Department of Energy**  
17 **Research, Development, and**  
18 **Demonstration Activities**

19 **SEC. 10771. DEPARTMENT OF ENERGY RESEARCH, DEVEL-**  
20 **OPMENT, AND DEMONSTRATION ACTIVITIES.**

21 For the purpose of carrying out research, develop-  
22 ment, and demonstration activities and addressing energy-  
23 related supply chain activities in the key technology focus  
24 areas (as described in section 10387), there are authorized  
25 to be appropriated the following amounts:

1           (1) OFFICE OF ENERGY EFFICIENCY AND RE-  
2           NEWABLE ENERGY.—In addition to amounts other-  
3           wise authorized to be appropriated or made avail-  
4           able, there are authorized to be appropriated to the  
5           Secretary of Energy (referred to in this section as  
6           the “Secretary”), acting through the Office of En-  
7           ergy Efficiency and Renewable Energy, for the pe-  
8           riod of fiscal years 2023 through 2026—

9                   (A) \$1,200,000,000 to carry out building  
10                  technologies research, development, and dem-  
11                  onstration activities;

12                  (B) \$1,200,000,000 to carry out sustain-  
13                  able transportation research, development, and  
14                  demonstration activities;

15                  (C) \$1,000,000,000 to carry out advanced  
16                  manufacturing research, development, and dem-  
17                  onstration activities, excluding activities carried  
18                  out pursuant to subparagraph (D);

19                  (D) \$1,000,000,000 to carry out section  
20                  454 of the Energy Independence and Security  
21                  Act of 2007 (42 U.S.C. 171113);

22                  (E) \$600,000,000 to carry out advanced  
23                  materials research, development, and dem-  
24                  onstration activities, including relating to

1           upcycling, recycling, and biobased materials;  
2           and

3                   (F) \$800,000,000 to carry out renewable  
4           power research, development, and demonstra-  
5           tion activities.

6           (2) OFFICE OF ELECTRICITY.—In addition to  
7           amounts otherwise authorized to be appropriated or  
8           made available, there is authorized to be appro-  
9           priated to the Secretary, acting through the Office  
10          of Electricity, for the period of fiscal years 2023  
11          through 2026, \$1,000,000,000 to carry out electric  
12          grid modernization and security research, develop-  
13          ment, and demonstration activities.

14          (3) OFFICE OF CYBERSECURITY, ENERGY SECUR-  
15          RITY, AND EMERGENCY RESPONSE.—In addition to  
16          amounts otherwise authorized to be appropriated or  
17          made available, there is authorized to be appro-  
18          priated to the Secretary, acting through the Office  
19          of Cybersecurity, Energy Security, and Emergency  
20          Response, for the period of fiscal years 2023  
21          through 2026, \$800,000,000 to carry out cybersecu-  
22          rity and energy system physical security research,  
23          development, and demonstration activities.

24          (4) OFFICE OF NUCLEAR ENERGY.—In addition  
25          to amounts otherwise authorized to be appropriated

1 or made available, there is authorized to be appro-  
2 priated to the Secretary, acting through the Office  
3 of Nuclear Energy, for the period of fiscal years  
4 2023 through 2026, \$400,000,000 to carry out ad-  
5 vanced materials research, development, and dem-  
6 onstration activities.

7 (5) OFFICE OF ENVIRONMENTAL MANAGE-  
8 MENT.—In addition to amounts otherwise authorized  
9 to be appropriated or made available, there is au-  
10 thorized to be appropriated to the Secretary, acting  
11 through the Office of Environmental Management,  
12 for the period of fiscal years 2023 through 2026,  
13 \$200,000,000 to carry out research, development,  
14 and demonstration activities, including relating to  
15 artificial intelligence and information technology.

16 (6) OFFICE OF FOSSIL ENERGY AND CARBON  
17 MANAGEMENT.—In addition to amounts otherwise  
18 authorized to be appropriated or made available,  
19 there are authorized to be appropriated to the Sec-  
20 retary, acting through the Office of Fossil Energy  
21 and Carbon Management, for the period of fiscal  
22 years 2023 through 2026—

23 (A) \$600,000,000 to carry out clean indus-  
24 trial technologies research, development, and  
25 demonstration activities pursuant to section

1           454 of the Energy Independence and Security  
2           Act of 2007 (42 U.S.C. 17113);

3                   (B) \$200,000,000 to carry out alternative  
4           fuels research, development, and demonstration  
5           activities; and

6                   (C) \$1,000,000,000 to carry out carbon re-  
7           moval research, development, and demonstra-  
8           tion activities.

9           (7) ADVANCED RESEARCH PROJECTS AGENCY—  
10          ENERGY.—In addition to amounts otherwise author-  
11          ized to be appropriated or made available, there is  
12          authorized to be appropriated to the Secretary, act-  
13          ing through the Director of the Advanced Research  
14          Projects Agency—Energy established under section  
15          5012 of the America COMPETES Act (42 U.S.C.  
16          16538), for the period of fiscal years 2023 through  
17          2026, \$1,200,852,898 to carry out activities of the  
18          Advanced Research Projects Agency—Energy.

## 19       **Subtitle P—Fission for the Future**

### 20       **SEC. 10781. ADVANCED NUCLEAR TECHNOLOGIES FEDERAL** 21                   **RESEARCH, DEVELOPMENT, AND DEM-** 22                   **ONSTRATION PROGRAM.**

23           (a) DEFINITIONS.—In this section:

24                   (1) ADVANCED NUCLEAR REACTOR.—The term  
25           “advanced nuclear reactor” has the meaning given

1 the term in section 951(b) of the Energy Policy Act  
2 of 2005 (42 U.S.C. 16271(b)).

3 (2) ELIGIBLE ENTITY.—The term “eligible enti-  
4 ty” means each of—

5 (A) a State;

6 (B) an Indian Tribe (as defined in section  
7 4 of the Indian Self-Determination and Edu-  
8 cation Assistance Act (25 U.S.C. 5304));

9 (C) a Tribal organization (as defined in  
10 section 4 of the Indian Self-Determination and  
11 Education Assistance Act (25 U.S.C. 5304));

12 (D) a unit of local government;

13 (E) an electric utility (as defined in section  
14 3 of the Federal Power Act (16 U.S.C. 796));

15 (F) a National Laboratory (as defined in  
16 section 2 of the Energy Policy Act of 2005 (42  
17 U.S.C. 15801));

18 (G) an institution of higher education (as  
19 defined in section 101(a) of the Higher Edu-  
20 cation Act of 1965 (20 U.S.C. 1001(a)); and

21 (H) a private entity specializing in—

22 (i) advanced nuclear technology devel-  
23 opment;

24 (ii) nuclear supply chains; or



1 (iii) with respect to nuclear tech-  
2 nologies and nonelectric applications of nu-  
3 clear technologies, construction, project fi-  
4 nancing, contract structuring and risk allo-  
5 cation, or regulatory and licensing proc-  
6 esses.

7 (3) PROGRAM.—The term “program” means  
8 the program established under subsection (b)(1).

9 (4) SECRETARY.—The term “Secretary” means  
10 the Secretary of Energy.

11 (b) ESTABLISHMENT OF PROGRAM.—

12 (1) IN GENERAL.—The Secretary shall establish  
13 a program to provide Federal financial assistance to  
14 eligible entities to support the research, develop-  
15 ment, and demonstration of advanced nuclear reac-  
16 tors.

17 (2) COMPETITIVE PROCEDURES.—To the max-  
18 imum extent practicable, the Secretary shall carry  
19 out the program using a competitive, merit-based re-  
20 view process that is consistent with section 989 of  
21 the Energy Policy Act of 2005 (42 U.S.C. 16353).

22 (c) APPLICATIONS.—An eligible entity desiring Fed-  
23 eral financial assistance under the program shall submit  
24 to the Secretary an application at such time, in such man-

1 ner, and containing such information as the Secretary may  
2 require.

3 (d) PRIORITY.—In selecting eligible entities to receive  
4 Federal financial assistance under the program, the Sec-  
5 retary shall give priority to eligible entities that—

6 (1) plan to carry out projects at or near the site  
7 of 1 or more fossil fuel electric generation facilities  
8 that are retired or scheduled to retire, including  
9 multi-unit facilities that are partially shut down—

10 (A) to support the productive reuse of fos-  
11 sil fuel electric generation facilities that are re-  
12 tired or scheduled to retire; and

13 (B) to sustain and revitalize communities  
14 impacted by the closure of fossil fuel electric  
15 generation facilities;

16 (2) plan to support nonelectric applications, in-  
17 cluding supplying heat for—

18 (A) energy storage;

19 (B) hydrogen or other liquid and gaseous  
20 fuel or chemical production;

21 (C) industrial processes;

22 (D) desalination technologies and proc-  
23 esses;

24 (E) isotope production;

25 (F) district heating; and

1                   (G) other applications, as the Secretary de-  
2                   termines to be appropriate; and

3                   (3) have implemented or demonstrated the abil-  
4                   ity to successfully implement workforce training or  
5                   retraining programs to train workers to perform ac-  
6                   tivities relating to the research, development, and  
7                   demonstration of advanced nuclear reactors.

8                   (e) COST SHARE.—Section 988 of the Energy Policy  
9                   Act of 2005 (42 U.S.C. 16352) shall apply to Federal fi-  
10                   nancial assistance provided under the program.

11                   (f) AUTHORIZATION OF APPROPRIATIONS.—In addi-  
12                   tion to amounts otherwise available, there are authorized  
13                   to be appropriated to the Secretary to carry out the pro-  
14                   gram—

- 15                   (1) \$75,000,000 for fiscal year 2023;  
16                   (2) \$100,000,000 for fiscal year 2024;  
17                   (3) \$150,000,000 for fiscal year 2025;  
18                   (4) \$225,000,000 for fiscal year 2026; and  
19                   (5) \$250,000,000 for fiscal year 2027.

1 **TITLE VII—NATIONAL AERO-**  
2 **NAUTICS AND SPACE ADMIN-**  
3 **ISTRATION AUTHORIZATION**  
4 **ACT**

5 **SEC. 10801. SHORT TITLE.**

6 This title may be cited as the “National Aeronautics  
7 and Space Administration Authorization Act of 2022”.

8 **SEC. 10802. DEFINITIONS.**

9 In this title:

10 (1) **ADMINISTRATION.**—The term “Administra-  
11 tion” means the National Aeronautics and Space  
12 Administration.

13 (2) **ADMINISTRATOR.**—The term “Adminis-  
14 trator” means the Administrator of the National  
15 Aeronautics and Space Administration.

16 (3) **APPROPRIATE COMMITTEES OF CON-**  
17 **GRESS.**—Except as otherwise expressly provided, the  
18 term “appropriate committees of Congress”  
19 means—

20 (A) the Committee on Commerce, Science,  
21 and Transportation of the Senate; and

22 (B) the Committee on Science, Space, and  
23 Technology of the House of Representatives.

24 (4) **CISLUNAR SPACE.**—The term “eislunar  
25 space” means the region of space beyond low-Earth

1 orbit out to and including the region around the sur-  
2 face of the Moon.

3 (5) DEEP SPACE.—The term “deep space”  
4 means the region of space beyond low-Earth orbit,  
5 including cislunar space.

6 (6) DEVELOPMENT COST.—The term “develop-  
7 ment cost” has the meaning given the term in sec-  
8 tion 30104 of title 51, United States Code.

9 (7) GOVERNMENT ASTRONAUT.—The term  
10 “government astronaut” has the meaning given the  
11 term in section 50902 of title 51, United States  
12 Code.

13 (8) ISS.—The term “ISS” means the Inter-  
14 national Space Station.

15 (9) LOW-ENRICHED URANIUM.—The term “low-  
16 enriched uranium” means uranium having an assay  
17 greater than the assay for natural uranium but less  
18 than 20 percent of the uranium-235 isotope.

19 (10) NASA.—The term “NASA” means the  
20 National Aeronautics and Space Administration.

21 (11) ORION.—The term “Orion” means the  
22 multipurpose crew vehicle described in section 303 of  
23 the National Aeronautics and Space Administration  
24 Authorization Act of 2010 (42 U.S.C. 18323).

1           (12) OSTP.—The term “OSTP” means the Of-  
2           fice of Science and Technology Policy.

3           (13) SPACE FLIGHT PARTICIPANT.—The term  
4           “space flight participant” has the meaning given the  
5           term in section 50902 of title 51, United States  
6           Code.

7           (14) SPACE LAUNCH SYSTEM.—The term  
8           “Space Launch System” means the Space Launch  
9           System authorized under section 302 of the National  
10          Aeronautics and Space Administration Act of 2010  
11          (42 U.S.C. 18322).

12          (15) UNMANNED AIRCRAFT; UNMANNED AIR-  
13          CRAFT SYSTEM.—The terms “unmanned aircraft”  
14          and “unmanned aircraft system” have the meanings  
15          given those terms in section 44801 of title 49,  
16          United States Code.

## 17                                   **Subtitle A—Exploration**

### 18   **SEC. 10811. MOON TO MARS.**

19          (a) SENSE OF CONGRESS.—It is the sense of Con-  
20          gress that—

21                  (1) advances in space technology and space ex-  
22          ploration capabilities—

23                                  (A) ensure the long-term technological pre-  
24          eminence, economic competitiveness, STEM

1 workforce development, and national security of  
2 the United States; and

3 (B) offer profound inspirational value for  
4 future generations;

5 (2) the Artemis missions—

6 (A) will make further progress on advanc-  
7 ing the human exploration roadmap to achieve  
8 human presence beyond low-Earth orbit to the  
9 surface of Mars, as required under section 432  
10 of the National Aeronautics and Space Admin-  
11 istration Transition Authorization Act of 2017  
12 (Public Law 115–10; 51 U.S.C. 20302 note);

13 (B) should fulfill the goal of landing  
14 United States astronauts, including the first  
15 woman and the next man, on the Moon; and

16 (C) should seek collaboration with commer-  
17 cial and international partners to establish sus-  
18 tainable lunar exploration, and should fund any  
19 sustainable lunar activities not directly required  
20 for the advancement of a human mission to  
21 Mars separately;

22 (3) in carrying out the Artemis missions, the  
23 Administrator should ensure that the entire Artemis  
24 program is inclusive and representative of all people

1 of the United States, including women and minori-  
2 ties;

3 (4) safe and successful execution of the road-  
4 map to achieve human presence on Mars, including  
5 the Artemis missions, requires—

6 (A) a clear strategic vision for achieving  
7 lunar and Mars exploration that is shared by  
8 NASA, international partners, nongovernmental  
9 partners, Congress, and the people of the  
10 United States;

11 (B) a well-developed and executable  
12 timeline, budget, and mission architecture, to  
13 inform decisions, including decisions relating to  
14 workforce and infrastructure needs and the de-  
15 velopment of technical and nontechnical skills;

16 (C) consistent NASA oversight of all rel-  
17 evant exploration activities, enabled by NASA  
18 leadership with authority, responsibility, and ac-  
19 countability for decisions and well-developed ca-  
20 pabilities for systems engineering and integra-  
21 tion;

22 (D) clearly defined roles for NASA, inter-  
23 national partners, and nongovernmental part-  
24 ners, including criteria for determining whether



1           NASA should make, manage, or buy key capa-  
2           bilities; and

3                   (E) mechanisms to ensure NASA insight  
4           into the activities of its international and non-  
5           governmental partners, as required to identify  
6           and mitigate risks to mission safety and suc-  
7           cess.

8           (b) MOON TO MARS OFFICE AND PROGRAM.—

9                   (1) MOON TO MARS OFFICE.—Not later than  
10          120 days after the date of the enactment of this Act,  
11          the Administrator shall establish within the Explo-  
12          ration Systems Development Mission Directorate a  
13          Moon to Mars Program Office (referred to in this  
14          section as the “Office”) to lead and manage the  
15          Moon to Mars program established under paragraph  
16          (2), including Artemis missions and activities.

17                  (2) MOON TO MARS PROGRAM.—

18                   (A) ESTABLISHMENT.—Not later than 120  
19          days after the date of the enactment of this  
20          Act, the Administrator shall establish a Moon  
21          to Mars Program (referred to in this section as  
22          the “Program”) in accordance with sections  
23          20302(b) and 70504 of title 51, United States  
24          Code, which shall include Artemis missions and

1 activities, to achieve the goal of human explo-  
2 ration of Mars.

3 (B) ELEMENTS.—The Program shall in-  
4 clude the following elements:

5 (i) The Space Launch System under  
6 section 20302 of title 51, United States  
7 Code.

8 (ii) The Orion crew vehicle under such  
9 section.

10 (iii) Exploration Ground Systems.

11 (iv) An outpost in orbit around the  
12 Moon under section 70504 of such title.

13 (v) Human-rated landing systems.

14 (vi) Spacesuits.

15 (vii) Any other element needed to  
16 meet the requirements for the Program.

17 (C) DIRECTION.—The Administrator shall  
18 ensure that—

19 (i) each Artemis mission demonstrates  
20 or advances a technology or operational  
21 concept that will enable human missions to  
22 Mars;

23 (ii) the Program incorporates each  
24 such mission into the human exploration  
25 roadmap under section 432 of the National



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1 be used to transport humans to  
2 Mars;

3 (bb) has the capability for  
4 periodic human habitation; and

5 (cc) functions as a point of  
6 departure, return, or staging for  
7 missions to multiple locations on  
8 the lunar surface or other des-  
9 tinations.

10 (3) DIRECTOR.—

11 (A) IN GENERAL.—The Administrator  
12 shall appoint a Director for the Program, who  
13 shall lead the Office and report to the Associate  
14 Administrator of the Exploration Systems De-  
15 velopment Mission Directorate.

16 (B) ACCOUNTABILITY.—The Director shall  
17 have accountability for risk management and  
18 shall have authority, as consistent with NASA  
19 Space Flight Program and Project Management  
20 requirements—

21 (i) to implement—

22 (I) Program-level requirements;

23 and

1 (II) an architecture and program  
2 plan developed to meet such require-  
3 ments;

4 (ii) to manage resources, personnel,  
5 and contracts necessary to implement the  
6 Program, as appropriate;

7 (iii) to manage cost, risk, schedule,  
8 and performance factors;

9 (iv) to direct and oversee a Program-  
10 wide systems engineering and integration  
11 and integrated risk management function;  
12 and

13 (v) to carry out other authorities, in  
14 accordance with Administration policies  
15 and procedures.

16 (C) RESPONSIBILITIES.—The Director  
17 shall be responsible for—

18 (i) developing and managing—

19 (I) an integrated master plan, in-  
20 tegrated master schedule, and inte-  
21 grated risk management procedures  
22 for the Program;

23 (II) a Program-wide systems en-  
24 gineering and integration function as  
25 described in subsection (c);

1 (III) plans for technology and ca-  
2 pabilities development;

3 (IV) logistics support, science  
4 data management, communications,  
5 and other plans that are relevant to  
6 the functions of the Office; and

7 (V) performance measures to as-  
8 sess the progress of the Program;

9 (ii) advising the Associate Adminis-  
10 trator of the Exploration Systems Develop-  
11 ment Mission Directorate on the develop-  
12 ment of—

13 (I) Program-level requirements,  
14 including for a human Mars orbital  
15 mission and a human mission to the  
16 surface of Mars; and

17 (II) an architecture based on the  
18 requirements described in subclause  
19 (I); and

20 (iii) informing the Associate Adminis-  
21 trator of the Administration on coordina-  
22 tion among NASA centers, as required to  
23 most efficiently achieve the goals of the  
24 Program.

1 (c) SYSTEMS ENGINEERING AND INTEGRATION.—

2 The Director of the Office shall—

3 (1) establish within the Office a Program-wide  
4 systems engineering and integration function; and

5 (2) appoint a manager for such function to  
6 manage systems engineering and integration activi-  
7 ties across the Program, including with respect to  
8 the Program elements described in subsection (b)(2).

9 (d) IMPLEMENTATION.—In the implementation of the  
10 Program, the Administrator shall ensure that—

11 (1) for the purposes of reducing risk and com-  
12 plexity and making the maximum use of taxpayer in-  
13 vestments to date, in conducting Artemis activities,  
14 the Administration does not take any action in re-  
15 gard to the design of the Exploration Upper Stage-  
16 enhanced Space Launch System that would preclude  
17 it from carrying an integrated human-rated lunar  
18 landing system for crewed lunar landing missions;

19 (2) the Program maintains a robust series of  
20 ground-based and in-flight testing activities, includ-  
21 ing, with respect to each crewed system design, not  
22 less than 1 uncrewed flight test, followed by a  
23 crewed flight test, as appropriate, prior to use of the  
24 design on a human-rated lunar landing system or  
25 Mars mission; and

1           (3) human lunar landing missions under the  
2           Program, including surface and in-space activities,  
3           are carried out solely by government astronauts.

4           (e) STUDY.—Not later than 180 days after the date  
5           of the enactment of this Act, the Administrator shall sub-  
6           mit to the appropriate committees of Congress a report  
7           detailing—

8           (1) progress towards the establishment of—

9                   (A) the Office, the Program, and the Pro-  
10                  gram architecture; and

11                   (B) the integrated master plan, integrated  
12                  master schedule, and integrated risk manage-  
13                  ment procedures for the Program;

14           (2) performance measures and milestones for  
15           the Program and any interim assessment with re-  
16           spect to such performance measures, as practicable;

17           (3) initial criteria for determining whether  
18           NASA should make, manage, or buy key capabilities  
19           within the Program or engage with international  
20           partners to access such capabilities;

21           (4) strategies to ensure consistent insight into  
22           the activities of NASA partners, including non-  
23           governmental partners, as required to identify and  
24           mitigate mission risks;



1           (5) progress towards the establishment of a sys-  
2           tems engineering and integration function; and

3           (6) an annual budget profile for resources re-  
4           quired to implement the Program during the 5-year  
5           period beginning on the date of the enactment of  
6           this Act.

7 **SEC. 10812. SPACE LAUNCH SYSTEM CONFIGURATIONS.**

8           (a) **EXPLORATION GROUND SYSTEMS INFRASTRUC-**  
9 **TURE.**—The Administrator shall ensure that—

10           (1) the necessary elements of a ground system  
11           infrastructure are in place to enable the preparation  
12           and use of the Space Launch System, specifically  
13           the Block 1 (at least 70 mt), Block 1B (at least 105  
14           mt), and Block 2 (at least 130 mt) variants of the  
15           Space Launch System; and

16           (2) not fewer than 2 bays of the vehicle assem-  
17           bly building of such ground system infrastructure  
18           are outfitted and dedicated to support Space Launch  
19           System stacking and preparations.

20           (b) **FLIGHT RATE AND SAFETY.**—After the first  
21           crewed lunar landing of the Administration’s Moon to  
22           Mars activities, the Administrator shall, to the extent  
23           practicable, seek to carry out a flight rate of 2 integrated  
24           Space Launch System and Orion crew vehicle missions an-  
25           nually until the lunar activities needed to enable a human

1 mission to Mars are completed so as to maintain the crit-  
2 ical human spaceflight production and operations skills  
3 necessary for the safety of human spaceflight activities in  
4 deep space.

5 (c) MOBILE LAUNCH PLATFORM.—

6 (1) IN GENERAL.—The Administrator is au-  
7 thorized to maintain 2 operational mobile launch  
8 platforms to enable the launch of multiple configura-  
9 tions of the Space Launch System.

10 (2) SECOND MOBILE LAUNCH PLATFORM.—

11 (A) IN GENERAL.—In implementing para-  
12 graph (1), the Administrator shall take all nec-  
13 essary steps to develop and complete a second  
14 mobile launch platform, to be in place by 2026,  
15 to support the first launch of the Block 1B var-  
16 iant of the Space Launch System.

17 (B) REQUIREMENT.—Such second mobile  
18 launch platform shall be sized and constructed  
19 to accommodate the Block 2 variant of the  
20 Space Launch System.

21 (d) REPORTS.—The Administrator shall submit to  
22 Congress—

23 (1) not later than 45 days after the date of the  
24 enactment of this Act, a report on the steps the Ad-  
25 ministrator and industry partners are taking—

1 (A) to address the cost, schedule, and per-  
2 formance challenges in the development of the  
3 Mobile Launch–2 platform; and

4 (B) to ensure that such platform is ready  
5 for operational use on a schedule that aligns  
6 with the current plans for an Artemis IV  
7 launch, which is currently anticipated in 2027;  
8 and

9 (2) not later than 90 days after such date of  
10 enactment, a report that contains a list of the key  
11 milestones required for completing each of the Space  
12 Launch System variants, and an estimated date on  
13 which such milestones will be completed.

14 (e) EXPLORATION UPPER STAGE.—

15 (1) IN GENERAL.—To meet the capability re-  
16 quirements under section 302(c)(2) of the National  
17 Aeronautics and Space Administration Authorization  
18 Act of 2010 (42 U.S.C. 18322(c)(2)), the Adminis-  
19 trator shall continue development of the Exploration  
20 Upper Stage for the Space Launch System on a  
21 schedule consistent with the Artemis IV lunar mis-  
22 sion.

23 (2) BRIEFING.—Not later than 90 days after  
24 the date of the enactment of this Act, the Adminis-  
25 trator shall brief the appropriate committees of Con-

1           gress on the development and scheduled availability  
2           of the Exploration Upper Stage for the Artemis IV  
3           lunar mission.

4           (f) MAIN PROPULSION TEST ARTICLE.—To meet the  
5 requirements under section 302(c)(3) of the National Aer-  
6 onautics and Space Administration Authorization Act of  
7 2010 (42 U.S.C. 18322(c)(3)), the Administrator may ini-  
8 tiate development of a main propulsion test article for the  
9 integrated Exploration Upper Stage element of the Space  
10 Launch System, consistent with cost and schedule con-  
11 straints, particularly for long-lead propulsion hardware  
12 needed for flight.

13 **SEC. 10813. ROCKET ENGINE TEST INFRASTRUCTURE.**

14           (a) IN GENERAL.—The Administrator shall, to the  
15 extent practicable, continue to carry out a program to  
16 modernize rocket propulsion test infrastructure at NASA  
17 facilities—

18                   (1) to increase capabilities;

19                   (2) to enhance safety;

20                   (3) to support propulsion development and test-  
21 ing; and

22                   (4) to foster the improvement of Government  
23 and commercial space transportation and explo-  
24 ration.

1 (b) PROJECTS.—Projects funded under the program  
2 described in subsection (a) may include—

3 (1) infrastructure and other facilities and sys-  
4 tems relating to rocket propulsion test stands and  
5 rocket propulsion testing;

6 (2) enhancements to test facility capacity and  
7 flexibility; and

8 (3) such other projects as the Administrator  
9 considers appropriate to meet the goals described in  
10 that subsection.

11 (c) REQUIREMENTS.—In carrying out the program  
12 under subsection (a), the Administrator shall—

13 (1) to the extent practicable and appropriate,  
14 prioritize investments in projects that enhance test  
15 and flight certification capabilities, including for  
16 large thrust-level atmospheric and altitude engines  
17 and engine systems, and multi-engine integrated test  
18 capabilities;

19 (2) continue to make underutilized test facilities  
20 available for commercial use on a reimbursable  
21 basis; and

22 (3) ensure that no project carried out under  
23 this program adversely impacts, delays, or defers  
24 testing or other activities associated with facilities  
25 used for Government programs, including—

1 (A) the Space Launch System and the Ex-  
2 ploration Upper Stage of the Space Launch  
3 System;

4 (B) in-space propulsion to support explo-  
5 ration missions; or

6 (C) nuclear propulsion testing.

7 (d) RULE OF CONSTRUCTION.—Nothing in this sec-  
8 tion shall preclude a NASA program, including the Space  
9 Launch System and the Exploration Upper Stage of the  
10 Space Launch System, from using the modernized test in-  
11 frastructure developed under this section.

12 (e) WORKING CAPITAL FUND STUDY.—

13 (1) IN GENERAL.—Not later than 1 year after  
14 the date of the enactment of this division, the Ad-  
15 ministrators shall submit to the appropriate commit-  
16 tees of Congress a report on the use of the authority  
17 under section 30102 of title 51, United States Code,  
18 to promote increased use of NASA rocket propulsion  
19 test infrastructure for research, development, test-  
20 ing, and evaluation activities by other Federal agen-  
21 cies, firms, associations, corporations, and edu-  
22 cational institutions.

23 (2) MATTERS TO BE INCLUDED.—The report  
24 required by paragraph (1) shall include the fol-  
25 lowing:

1           (A) An assessment of prior use, if any, of  
2           the authority under section 30102 of title 51,  
3           United States Code, to improve testing infra-  
4           structure.

5           (B) An analysis of any barrier to imple-  
6           mentation of such authority for the purpose of  
7           promoting increased use of NASA rocket pro-  
8           pulsion test infrastructure.

9   **SEC. 10814. PEARL RIVER MAINTENANCE.**

10       (a) **IN GENERAL.**—The Administrator shall coordi-  
11       nate with the Chief of the Army Corps of Engineers on  
12       a comprehensive plan to ensure the continued navigability  
13       of the Pearl River and Little Lake channels sufficient to  
14       support NASA barge operations surrounding Stennis  
15       Space Center and the Michoud Assembly Facility.

16       (b) **REPORT TO CONGRESS.**—Not later than 180 days  
17       after the date of the enactment of this division, the Ad-  
18       ministrator shall submit to the appropriate committees of  
19       Congress a report on efforts under subsection (a).

20       (c) **APPROPRIATE COMMITTEES OF CONGRESS DE-**  
21       **FINED.**—In this section, the term “appropriate commit-  
22       tees of Congress” means—

23           (1) the Committee on Commerce, Science, and  
24       Transportation, the Committee on Environment and

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1 Public Works, and the Committee on Appropriations  
2 of the Senate; and

3 (2) the Committee on Science, Space, and  
4 Technology, the Committee on Transportation and  
5 Infrastructure, and the Committee on Appropria-  
6 tions of the House of Representatives.

7 **SEC. 10815. EXTENSION AND MODIFICATION RELATING TO**  
8 **INTERNATIONAL SPACE STATION.**

9 (a) POLICY.—Section 501(a) of the National Aero-  
10 nautics and Space Administration Authorization Act of  
11 2010 (42 U.S.C. 18351(a)) is amended by striking  
12 “2024” and inserting “September 30, 2030”.

13 (b) MAINTENANCE OF UNITED STATES SEGMENT  
14 AND ASSURANCE OF CONTINUED OPERATIONS.—Section  
15 503(a) of the National Aeronautics and Space Administra-  
16 tion Authorization Act of 2010 (42 U.S.C. 18353(a)) is  
17 amended by striking “September 30, 2024” and inserting  
18 “September 30, 2030”.

19 (c) RESEARCH CAPACITY ALLOCATION AND INTE-  
20 GRATION OF RESEARCH PAYLOADS.—Section 504(d) of  
21 the National Aeronautics and Space Administration Au-  
22 thorization Act of 2010 (42 U.S.C. 18354(d)) is amend-  
23 ed—

24 (1) in paragraph (1), in the first sentence—



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1 (A) by striking “As soon as practicable”  
2 and all that follows through “2011,” and in-  
3 serting “The”; and

4 (B) by striking “September 30, 2024” and  
5 inserting “September 30, 2030”; and

6 (2) in paragraph (2), in the third sentence, by  
7 striking “September 30, 2024” and inserting “Sep-  
8 tember 30, 2030”.

9 (d) MAINTENANCE OF USE.—

10 (1) IN GENERAL.—Section 70907 of title 51,  
11 United States Code, is amended—

12 (A) in the section heading, by striking  
13 “**2024**” and inserting “**2030**”;

14 (B) in subsection (a), by striking “Sep-  
15 tember 30, 2024” and inserting “September 30,  
16 2030”; and

17 (C) in subsection (b)(3), by striking “Sep-  
18 tember 30, 2024” and inserting “September 30,  
19 2030”.

20 (2) CONFORMING AMENDMENT.—The table of  
21 sections for chapter 709 of title 51, United States  
22 Code, is amended by striking the item relating to  
23 section 70907 and inserting the following:

“70907. Maintaining use through at least 2030.”.

24 (e) TRANSITION PLAN REPORTS.—Section  
25 50111(c)(2) of title 51, United States Code is amended—

1 (1) in the matter preceding subparagraph (A),  
2 by striking “2023” and inserting “2028”; and

3 (2) in subparagraph (J), by striking “2028”  
4 and inserting “2030”.

5 (f) ASSESSMENTS AND REPORT.—The Administrator  
6 shall—

7 (1) conduct a comprehensive assessment of the  
8 viability of the ISS to operate safely and support full  
9 and productive use through 2030, including all nec-  
10 essary analyses to certify ISS operations through  
11 2030;

12 (2) not later than 180 days after the date of  
13 the enactment of this Act, submit to the Aerospace  
14 Safety Advisory Panel an assessment of—

15 (A) the root cause of cracks and air leaks  
16 in the Russian Service Module Transfer Tunnel;

17 (B) the certification of all United States  
18 systems and modules to operate through 2030;

19 (C)(i) an inventory of spares or replace-  
20 ments for elements, systems, and equipment,  
21 including systems certified under subparagraph  
22 (B), that are currently produced, in inventory,  
23 or on order;

24 (ii) a description of the state of the readi-  
25 ness of such spares and replacements; and

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1 (iii) a schedule for delivery of such spares  
2 and replacements to the ISS, including the  
3 planned transportation means for such delivery  
4 and the estimated cost and schedule for pro-  
5 curement of such spares and replacements and  
6 their delivery to the ISS; and

7 (D) any other relevant data, information,  
8 or analysis relevant to the safe and productive  
9 use of the ISS through 2030; and

10 (3) not later than 240 days after the date of  
11 the enactment of this Act, submit to the appropriate  
12 committees of Congress—

13 (A) a report on the results of the assess-  
14 ment conducted under paragraph (1); and

15 (B) a plan to address any recommenda-  
16 tions of the Aerospace Safety Advisory Panel,  
17 consistent with section 31101(c)(2) of title 51,  
18 United States Code, with respect to such as-  
19 sessment.

20 **SEC. 10816. PRIORITIES FOR INTERNATIONAL SPACE STA-**  
21 **TION.**

22 (a) IN GENERAL.—The Administrator shall assess  
23 International Space Station research activities and shall  
24 ensure that crew time and resources allocated to the Ad-

1 ministration for use on the International Space Station

2 prioritize—

3           (1) the research of the Human Research Pro-  
4           gram, including research on and development of  
5           countermeasures relevant to reducing human health  
6           and performance risks, behavioral and psychological  
7           risks, and other astronaut safety risks related to  
8           long-duration human spaceflight;

9           (2) risk reduction activities relevant to explo-  
10          ration technologies, including for the Environmental  
11          Control and Life Support System, extravehicular ac-  
12          tivity and space suits, environmental monitoring,  
13          safety, emergency response, and deep space commu-  
14          nications;

15          (3) the advancement of United States leader-  
16          ship in basic and applied space life and physical  
17          science research, consistent with the priorities of the  
18          most recent space life and physical sciences decadal  
19          survey of the National Academies of Sciences, Engi-  
20          neering, and Medicine; and

21          (4) other research and development activities  
22          identified by the Administrator as essential to Moon  
23          to Mars activities.

24          (b) REPORTS.—

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1           (1) ASSESSMENT AND PRIORITIZATION.—Not  
2 later than 180 days after the date of the enactment  
3 of this Act, the Administrator shall submit to the  
4 appropriate committees of Congress a report on—

5                   (A) the assessment; and

6                   (B) the steps taken to achieve the  
7 prioritization required by subsection (a).

8           (2) SPACE FLIGHT PARTICIPANTS.—Not later  
9 than 120 days after the date of the enactment of  
10 this Act, the Administrator shall submit to the ap-  
11 propriate committees of Congress a report on meas-  
12 ures taken, with respect to space flight participants  
13 aboard the ISS, to ensure government astronaut  
14 safety, to avoid interference in ISS operations and  
15 research priorities, and to prevent undue demands  
16 on crew time and resources.

17           (3) ANNUAL PROGRESS REPORTS.—Concurrent  
18 with the annual budget submission of the President  
19 to Congress under section 1105(a) of title 31,  
20 United States Code, the Administrator shall provide  
21 to the appropriate committees of Congress an an-  
22 nual accounting of the use of Administration crew  
23 time and ISS resources, including the allocation of  
24 such resources toward the priorities described in  
25 subsection (a).

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1 **SEC. 10817. TECHNICAL AMENDMENTS RELATING TO**  
2 **ARTEMIS MISSIONS.**

3 (a) Section 421 of the National Aeronautics and  
4 Space Administration Authorization Act of 2017 (Public  
5 Law 115–10; 51 U.S.C. 20301 note) is amended—

6 (1) in subsection (c)(3)—

7 (A) by striking “EM–1” and inserting  
8 “Artemis I”;

9 (B) by striking “EM–2” and inserting  
10 “Artemis II”; and

11 (C) by striking “EM–3” and inserting  
12 “Artemis III”; and

13 (2) in subsection (f)(3), by striking “EM–3”  
14 and inserting “Artemis III”.

15 (b) Section 432(b) of the National Aeronautics and  
16 Space Administration Authorization Act of 2017 (Public  
17 Law 115–10; 51 U.S.C. 20302 note) is amended—

18 (1) in paragraph (3)(D)—

19 (A) by striking “EM–1” and inserting  
20 “Artemis I”; and

21 (B) by striking “EM–2” and inserting  
22 “Artemis II”; and

23 (2) in paragraph (4)(C), by striking “EM–3”  
24 and inserting “Artemis III”.

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1                                   **Subtitle B—Science**

2   **SEC. 10821. SCIENCE PRIORITIES.**

3           (a) SENSE OF CONGRESS ON SCIENCE PORTFOLIO.—

4   It is the sense of Congress that—

5                   (1) a balanced and adequately funded set of ac-  
6           tivities, consisting of research and analysis grant  
7           programs, technology development, suborbital re-  
8           search activities, and small, medium, and large space  
9           missions, contributes to a robust and productive  
10          science program and serves as a catalyst for innova-  
11          tion and discovery; and

12                   (2) the Research and Analysis programs funded  
13          by the Science Mission Directorate are critically im-  
14          portant for—

15                           (A) preparing the next generation of space  
16                           and Earth scientists;

17                           (B) pursuing peer-reviewed cutting-edge  
18                           research;

19                           (C) maximizing scientific return from the  
20                           Administration’s space and Earth science mis-  
21                           sions; and

22                           (D) developing innovative techniques and  
23                           future mission concepts.

24          (b) GOAL.—The Administrator shall pursue the goal  
25          of establishing annual funding for Research and Analysis

1 in the Science Mission Directorate that reaches a level of  
2 not less than 10 percent of the total annual funding of  
3 relevant divisions of the Science Mission Directorate by  
4 fiscal year 2025.

5 **SEC. 10822. SEARCH FOR LIFE.**

6 (a) SENSE OF CONGRESS.—It is the sense of Con-  
7 gress that—

8 (1) the report entitled “An Astrobiology Strat-  
9 egy for the Search for Life in the Universe” pub-  
10 lished by the National Academies of Sciences, Engi-  
11 neering, and Medicine outlines key scientific ques-  
12 tions and methods on the search for the origin, evo-  
13 lution, distribution, and future of life in the uni-  
14 verse; and

15 (2) the interaction of lifeforms with their envi-  
16 ronment, a central focus of astrobiology research, is  
17 a topic of broad significance to life sciences research  
18 in space and on Earth.

19 (b) PROGRAM CONTINUATION.—

20 (1) IN GENERAL.—The Administrator shall con-  
21 tinue to implement a collaborative, multidisciplinary  
22 science and technology development program to  
23 search for evidence of the existence or historical ex-  
24 istence of life beyond Earth in support of—



1 (A) the scientific priorities of the most re-  
2 cent decadal surveys on planetary science and  
3 astrobiology and astronomy and astrophysics of  
4 the National Academies of Sciences, Engineer-  
5 ing, and Medicine; and

6 (B) the objective described in section  
7 20102(d)(10) of title 51, United States Code.

8 (2) ELEMENT.—The program under paragraph  
9 (1) shall include activities relating to astronomy, bi-  
10 ology, geology, and planetary science.

11 (3) COORDINATION WITH LIFE SCIENCES PRO-  
12 GRAM.—In carrying out the program under para-  
13 graph (1), the Administrator shall coordinate efforts  
14 with the life sciences program of the Administration.

15 (4) INSTRUMENTATION AND SENSOR TECH-  
16 NOLOGY.—In carrying out the program under para-  
17 graph (1), the Administrator may invest in the de-  
18 velopment of new instrumentation and sensor tech-  
19 nology.

20 (5) TECHNOSIGNATURES.—In carrying out the  
21 program under paragraph (1), the Administrator  
22 may support, as appropriate, merit-reviewed, com-  
23 petitively selected research on technosignatures.

1 **SEC. 10823. NEXT GENERATION OF ASTROPHYSICS GREAT**  
2 **OBSERVATORIES.**

3 (a) SENSE OF CONGRESS.—It is the sense of Con-  
4 gress that—

5 (1) NASA’s Great Observatories, a suite of  
6 space-based telescopes launched over the course of 2  
7 decades and comprised of the Hubble Space Tele-  
8 scope, Compton Gamma-Ray Observatory, Chandra  
9 X-Ray Observatory, and Spitzer Space Telescope,  
10 have enabled major scientific advances across a  
11 broad range of astrophysics disciplines, including  
12 with respect to the origins of planets, the formation  
13 and evolution of stars and galaxies, fundamental  
14 physics, and the structure of the universe;

15 (2) the decadal survey of the National Acad-  
16 emies of Science, Engineering, and Medicine entitled  
17 “Pathways to Discovery in Astronomy and Astro-  
18 physics for the 2020s” recommends a vision to un-  
19 derstand the relationships between stars and the  
20 bodies that orbit them by “looking” at the universe  
21 through a range of observations, including radio, op-  
22 tical, gamma rays, neutrinos, and gravitational  
23 waves, in order to understand the origin and evo-  
24 lution of galaxies;

25 (3) the United States and NASA are uniquely  
26 poised—

1 (A) to lead the world in the implementa-  
2 tion of the next generation of Great Observ-  
3 atories, as recommended in such decadal sur-  
4 vey, including implementation of an observatory  
5 to search for biosignatures of exoplanets in the  
6 habitable zone;

7 (B) to address the most compelling sci-  
8 entific questions of the next decade; and

9 (C) to transform not only our under-  
10 standing of the universe and the processes and  
11 physical paradigms that govern the universe,  
12 but also the place of humanity in the universe;

13 (4) the Administrator should pursue an ambi-  
14 tious astrophysics program that meets the scientific  
15 vision of the astronomical community and the trans-  
16 formative capacity of technological innovation; and

17 (5) in implementing astrophysics research, in  
18 order to avoid the major growth in the cost of astro-  
19 physics flagship-class missions that has the potential  
20 to impact the overall portfolio balance of the Science  
21 Mission Directorate, the Administrator should seek  
22 to implement lessons learned from previous astro-  
23 physics missions, including by—

24 (A) establishing sufficient cost and sched-  
25 ule reserves;

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1 (B) demonstrating in advance of prelimi-  
2 nary design review, as practicable and appro-  
3 priate, the maturity of necessary technologies  
4 through prototype demonstrations in a relevant  
5 environment;

6 (C) providing for regular updates to the  
7 cost, schedule, and risk of a project; and

8 (D) considering, as feasible, the impacts of  
9 cost and schedule changes across the Science  
10 Mission Directorate.

11 (b) NANCY GRACE ROMAN TELESCOPE.—

12 (1) IN GENERAL.—The Administrator shall con-  
13 tinue development of the Nancy Grace Roman Space  
14 Telescope (commonly known as the “Roman tele-  
15 scope” and formerly known as the “Wide Field In-  
16 frared Survey Telescope”) in the configuration es-  
17 tablished through critical design review, to meet the  
18 objectives prioritized in the 2010 decadal survey of  
19 astronomy and astrophysics of the National Acad-  
20 emies of Sciences, Engineering, and Medicine.

21 (2) COST AND SCHEDULE.—Section 30104 of  
22 title 51, United States Code shall apply to the devel-  
23 opment of the Roman telescope under paragraph  
24 (1).

1           (3) QUARTERLY REPORTS.—Not less frequently  
2           than quarterly, the Administrator shall submit to  
3           the appropriate committees of Congress a report on  
4           the progress of the development of the Roman tele-  
5           scope and the budget profile and schedule relative to  
6           the baseline plan for such development.

7 **SEC. 10824. EARTH SCIENCE MISSIONS AND PROGRAMS.**

8           (a) SENSE OF CONGRESS.—It is the sense of Con-  
9           gress that—

10           (1) the Earth science and applications program  
11           of the Administration provides increasingly valuable  
12           data for natural resource management, agriculture,  
13           forestry, food security, air quality monitoring, and  
14           many other application areas; and

15           (2) a robust and balanced Earth science and  
16           applications program contributes significantly to—

17                   (A) the scientific discovery and economic  
18                   growth of the United States; and

19                   (B) supporting the health and safety of the  
20                   people of the United States and the citizens of  
21                   the world.

22           (b) REAFFIRMATION.—Congress reaffirms the goal  
23           for the Administration’s Earth science and applications  
24           program set forth in section 60501 of title 51, United  
25           States Code, which states: “The goal for the Administra-

1 tion’s Earth Science program shall be to pursue a program  
2 of Earth observations, research, and applications activities  
3 to better understand the Earth, how it supports life, and  
4 how human activities affect its ability to do so in the fu-  
5 ture. In pursuit of this goal, the Administration’s Earth  
6 Science program shall ensure that securing practical bene-  
7 fits for society will be an important measure of its success  
8 in addition to securing new knowledge about the Earth  
9 system and climate change. In further pursuit of this goal,  
10 the Administration shall, together with the National Oce-  
11 anic and Atmospheric Administration and other relevant  
12 agencies, provide United States leadership in developing  
13 and carrying out a cooperative international Earth obser-  
14 vations-based research program.”.

15 (c) EARTH SCIENCE MISSIONS AND PROGRAMS.—

16 With respect to the missions and programs of the Earth  
17 Science Division, the Administrator shall, to the maximum  
18 extent practicable, follow the recommendations and guid-  
19 ance provided by the scientific community through the  
20 decadal survey for Earth science and applications from  
21 space of the National Academies of Sciences, Engineering,  
22 and Medicine, including—

- 23 (1) the science priorities described in such sur-  
24 vey;

1           (2) the execution of the series of existing or  
2           previously planned observations (commonly known as  
3           the “program of record”); and

4           (3) the development of a range of missions of  
5           all classes, including opportunities for principal in-  
6           vestigator-led, competitively selected missions.

7           (d) EARTH SYSTEM OBSERVATORY.—The Adminis-  
8           trator shall pursue an Earth System Observatory, which  
9           shall consist of an array of new and complementary Earth-  
10          observing scientific satellites, instruments, and missions—

11          (1) to address the recommendations of the 2018  
12          Earth science and applications decadal survey of the  
13          National Academies of Sciences, Engineering, and  
14          Medicine entitled “Thriving on our Changing Plan-  
15          et”, including by conducting priority observations  
16          in—

17                  (A) aerosols;

18                  (B) cloud convection and precipitation;

19                  (C) mass change;

20                  (D) surface biology and geology;

21                  (E) surface deformation and change; and

22                  (F) other observation areas designated as  
23          high-priority by such decadal survey; and

1           (2) to achieve the goal of the Earth Science  
2           Program set forth in section 60501 of title 51,  
3           United States Code.

4           (e) SURVEY OF USE OF EARTH OBSERVATION DATA  
5 BY STATES, TRIBES, AND TERRITORIES.—

6           (1) SURVEY.—The Administrator shall arrange  
7           for the conduct of a survey of the use of NASA  
8           Earth observation data by States, Tribal organiza-  
9           tions, and territories.

10           (2) SUBMISSION.—Not later than 18 months  
11           after the date of the enactment of this Act, the Ad-  
12           ministrator shall submit to the appropriate commit-  
13           tees of Congress the results of the survey conducted  
14           under paragraph (1).

15           (f) CLIMATE ARCHITECTURE PLAN.—The Adminis-  
16           trator shall—

17           (1) maintain a comprehensive, strategic Climate  
18           Architecture Plan for Earth Observations and Appli-  
19           cations from Space that describes an integrated and  
20           balanced program of Earth science and applications  
21           observations to advance science, policy, and applica-  
22           tions and societal benefits; and

23           (2) update such plan every 5 years so as to  
24           align with the release of the decadal surveys in  
25           Earth science and applications from space and the



1 mid-decade assessments of the National Academies  
2 of Sciences, Engineering, and Medicine.

3 **SEC. 10825. PLANETARY DEFENSE COORDINATION OFFICE.**

4 (a) FINDINGS.—Congress makes the following find-  
5 ings:

6 (1) Near-Earth objects remain a threat to the  
7 United States.

8 (2) Section 321(d)(1) of the National Aero-  
9 nautics and Space Administration Authorization Act  
10 of 2005 (Public Law 109–155; 119 Stat. 2922; 51  
11 U.S.C. 71101 note prec.), established a requirement  
12 that the Administrator plan, develop, and implement  
13 a Near-Earth Object Survey program to detect,  
14 track, catalogue, and characterize the physical char-  
15 acteristics of near-Earth objects equal to, or greater  
16 than, 140 meters in diameter in order to assess the  
17 threat of such near-Earth objects to the Earth, with  
18 the goal of 90 percent completion of the catalogue  
19 of such near-Earth objects by December 30, 2020.

20 (3) The goal described in paragraph (2) has not  
21 be met.

22 (4) The report of the National Academies of  
23 Sciences, Engineering, and Medicine entitled “Find-  
24 ing Hazardous Asteroids Using Infrared and Visible

1 Wavelength Telescopes”, issued in 2019, states  
2 that—

3 (A) NASA should develop and launch a  
4 dedicated space-based infrared survey telescope  
5 to meet the requirements of section 321(d)(1)  
6 of the National Aeronautics and Space Admin-  
7 istration Authorization Act of 2005 (Public  
8 Law 109–155; 119 Stat. 2922; 51 U.S.C.  
9 71101 note prec.); and

10 (B) the early detection of potentially haz-  
11 ardous near-Earth objects enabled by a space-  
12 based infrared survey telescope is important to  
13 enable deflection of a dangerous asteroid.

14 (b) MAINTENANCE OF PLANETARY DEFENSE CO-  
15 ORDINATION OFFICE.—The Administrator shall maintain  
16 an office within the Planetary Science Division of the  
17 Science Mission Directorate, to be known as the “Plan-  
18 etary Defense Coordination Office”—

19 (1) to plan, develop, and implement a program  
20 to survey threats posed by near-Earth objects equal  
21 to or greater than 140 meters in diameter, as re-  
22 quired by section 321(d)(1) of the National Aero-  
23 nautics and Space Administration Authorization Act  
24 of 2005 (Public Law 109–155; 119 Stat. 2922; 51  
25 U.S.C. 71101 note prec.);

1           (2) identify, track, and characterize potentially  
2 hazardous near-Earth objects, issue warnings of the  
3 effects of potential impacts of such objects, and in-  
4 vestigate strategies and technologies for mitigating  
5 the potential impacts of such objects; and

6           (3) assist in coordinating government planning  
7 for response to a potential impact of a near-Earth  
8 object.

9       (c) DEDICATED SURVEY MISSION.—

10           (1) SENSE OF CONGRESS.—It is the sense of  
11 Congress that—

12           (A) the Near-Earth Object Surveyor mis-  
13 sion, as designed, is anticipated to make signifi-  
14 cant progress toward carrying out congressional  
15 policy and direction, as set forth in section  
16 321(d)(1) of the National Aeronautics and  
17 Space Administration Authorization Act of  
18 2005 (Public Law 109–155; 119 Stat. 2922; 51  
19 U.S.C. 71101 note prec.), to detect 90 percent  
20 of near-Earth objects equal to, or greater than,  
21 140 meters in diameter; and

22           (B) the Administrator should prioritize the  
23 public safety role of the Near-Earth Object  
24 Surveyor mission and should not delay the de-

1           velopment and launch of the mission due to cost  
2           growth on other planetary science missions.

3           (2) CONTINUATION OF MISSION.—

4                   (A) IN GENERAL.—The Administrator  
5           shall continue the development of a dedicated  
6           space-based infrared survey telescope mission,  
7           known as the “Near-Earth Object Surveyor”,  
8           on a schedule to achieve a launch-readiness  
9           date not later than March 30, 2026, or the ear-  
10          liest practicable date, for the purpose of accom-  
11          plishing the objectives set forth in section  
12          321(d)(1) of the National Aeronautics and  
13          Space Administration Authorization Act of  
14          2005 (Public Law 109–155; 119 Stat. 2922; 51  
15          U.S.C. 71101 note prec.).

16                   (B) CONSIDERATION OF RECOMMENDA-  
17          TIONS.—The design of the mission described in  
18          subparagraph (A) shall take into account the  
19          recommendations of the 2019 report of the Na-  
20          tional Academies of Sciences, Engineering, and  
21          Medicine entitled “Finding Hazardous Aster-  
22          oids Using Infrared and Visible Wavelength  
23          Telescopes”, the planetary science decadal sur-  
24          vey, and the 2018 United States National

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1           Near-Earth Object Preparedness Strategy and  
2           Action Plan.

3           (d) ANNUAL REPORT.—Section 321(f) of the Na-  
4 tional Aeronautics and Space Administration Authoriza-  
5 tion Act of 2005 (Public Law 109–155; 119 Stat. 2922;  
6 51 U.S.C. 71101 note prec.) is amended to read as fol-  
7 lows:

8           “(f) ANNUAL REPORT.—Not later than 180 days  
9 after the date of the enactment of the National Aero-  
10 nautics and Space Administration Authorization Act of  
11 2022 and annually thereafter through 90-percent comple-  
12 tion of the catalogue required by subsection (d)(1), the  
13 Administrator shall submit to the Committee on Com-  
14 merce, Science, and Transportation of the Senate and the  
15 Committee on Science, Space, and Technology of the  
16 House of Representatives a report that includes the fol-  
17 lowing:

18           “(1) A summary of all activities carried out by  
19 the Planetary Defense Coordination Office estab-  
20 lished under section 10825 of the National Aero-  
21 nautics and Space Administration Authorization Act  
22 of 2022 since the date of enactment of that Act.

23           “(2) A description of the progress with respect  
24 to the design, development, and launch of the space-  
25 based infrared survey telescope required by section

1 10825(c) of the National Aeronautics and Space Ad-  
2 ministration Authorization Act of 2022.

3 “(3) An assessment of the progress toward  
4 meeting the requirements under subsection (d)(1).

5 “(4) A description of the status of efforts to co-  
6 ordinate and cooperate with other countries to detect  
7 hazardous asteroids and comets, plan a mitigation  
8 strategy, and implement that strategy in the event  
9 of the discovery of an object on a likely collision  
10 course with Earth.

11 “(5) A summary of expenditures for all activi-  
12 ties carried out by the Planetary Defense Coordina-  
13 tion Office since the date of enactment of the Na-  
14 tional Aeronautics and Space Administration Au-  
15 thorization Act of 2022”.

16 (e) NEAR-EARTH OBJECT DEFINED.—In this section,  
17 the term “near-Earth object” has the meaning given the  
18 term in section 321(c) of the National Aeronautics and  
19 Space Administration Authorization Act of 2005 (Public  
20 Law 109–155; 119 Stat. 2922; 51 U.S.C. 71101 note  
21 prec.).

## 22 **Subtitle C—Aeronautics**

### 23 **SEC. 10831. EXPERIMENTAL AIRCRAFT PROJECTS.**

24 (a) SENSE OF CONGRESS.—It is the sense of Con-  
25 gress that—

1           (1) developing high-risk, precompetitive aero-  
2           space technologies for which there is not yet a profit  
3           rationale is a fundamental role of the Administra-  
4           tion;

5           (2) large-scale flight test experimentation and  
6           validation are necessary for—

7                   (A) transitioning new technologies and ma-  
8                   terials, including associated manufacturing  
9                   processes, for aviation and aeronautics use; and

10                   (B) capturing the full extent of benefits  
11                   from investments made by the Aeronautics Re-  
12                   search Mission Directorate; and

13           (3) a level of funding that adequately supports  
14           large-scale flight test experimentation and valida-  
15           tion, including related infrastructure, should be en-  
16           sured over a sustained period of time to restore the  
17           capacity of the Administration—

18                   (A) to see legacy priority programs  
19                   through to completion; and

20                   (B) to achieve national economic and secu-  
21                   rity objectives.

22           (b) STATEMENT OF POLICY.—It is the policy of the  
23           United States—

24                   (1) to maintain world leadership in—

1 (A) civilian aeronautical science and tech-  
2 nology; and

3 (B) aerospace industrialization; and

4 (2) to maintain as a fundamental objective of  
5 the aeronautics research of the Administration the  
6 steady progression and expansion of flight research  
7 and capabilities, including the science and tech-  
8 nology of critical underlying disciplines and com-  
9 petencies, such as—

10 (A) computational-based analytical and  
11 predictive tools and methodologies;

12 (B) aerothermodynamics;

13 (C) propulsion;

14 (D) advanced materials and manufacturing  
15 processes;

16 (E) high-temperature structures and mate-  
17 rials; and

18 (F) guidance, navigation, and flight con-  
19 trols.

20 (c) EXPERIMENTAL AIRCRAFT FLIGHT DEMONSTRA-  
21 TIONS.—

22 (1) IN GENERAL.—In meeting the objectives de-  
23 scribed in subsection (b), the Administrator shall  
24 carry out experimental aircraft demonstrations, in-  
25 cluding—



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1 (A) a subsonic demonstrator to dem-  
2 onstrate the performance and feasibility of ad-  
3 vanced, ultra-efficient, and low emissions sub-  
4 sonic flight demonstrator configurations;

5 (B) a low boom flight demonstrator to vali-  
6 date design tools and technologies that can be  
7 applied to low sonic boom commercial super-  
8 sonic aircraft and support the development of a  
9 noise-based standard for supersonic overland  
10 flight; and

11 (C) a flight research demonstrator to test  
12 the performance and feasibility of advanced,  
13 ultra-efficient and net-zero emissions aircraft  
14 concepts and configurations.

15 (2) ELEMENTS.—For each demonstration  
16 under paragraph (1), the Administrator shall—

17 (A) include the development of experi-  
18 mental aircraft and all necessary supporting  
19 flight test assets;

20 (B) pursue a robust technology maturation  
21 and flight test validation effort;

22 (C) improve necessary facilities, flight test-  
23 ing capabilities, and computational tools to sup-  
24 port the demonstration;

1 (D) award any primary contracts for de-  
2 sign, procurement, and manufacturing to  
3 United States persons, consistent with inter-  
4 national obligations and commitments; and

5 (E) coordinate research and flight test  
6 demonstration activities with other Federal  
7 agencies and the United States aviation com-  
8 munity, as the Administrator considers appro-  
9 priate.

10 (3) UNITED STATES PERSON DEFINED.—In this  
11 subsection, the term “United States person”  
12 means—

13 (A) a United States citizen or an alien law-  
14 fully admitted for permanent residence to the  
15 United States; or

16 (B) an entity organized under the laws of  
17 the United States or of any jurisdiction within  
18 the United States, including a foreign branch of  
19 such an entity.

20 (d) COLLABORATION WITH INDUSTRY AND ACA-  
21 DEMIA.—The Administration shall seek means to expand  
22 collaboration with industry and academia on basic re-  
23 search and technology development related to experi-  
24 mental aircraft, and on the experimental aircraft dem-  
25 onstrations required by subsection (c).

1 (e) ADVANCED MATERIALS AND MANUFACTURING  
2 TECHNOLOGY PROGRAM.—

3 (1) IN GENERAL.—The Administrator may es-  
4 tablish an advanced materials and manufacturing  
5 technology program—

6 (A) to develop—

7 (i) new materials, including composite  
8 and high-temperature materials, from base  
9 material formulation through full-scale  
10 structural validation and manufacture;

11 (ii) advanced materials and manufac-  
12 turing processes, including additive manu-  
13 facturing, to reduce the cost of manufac-  
14 turing scale-up and certification for use in  
15 aeronautics; and

16 (iii) noninvasive or nondestructive  
17 techniques for testing or evaluating avia-  
18 tion and aeronautics structures, including  
19 for materials and manufacturing processes;

20 (B) to reduce the time it takes to design,  
21 industrialize, and certify advanced materials  
22 and manufacturing processes;

23 (C) to provide education and training op-  
24 portunities for the aerospace workforce; and

1 (D) to address global cost and human cap-  
2 ital competitiveness for United States aero-  
3 nautical industries and technological leadership  
4 in advanced materials and manufacturing tech-  
5 nology.

6 (2) ELEMENTS.—In carrying out a program  
7 under paragraph (1), the Administrator may—

8 (A) build on work that was carried out by  
9 the Advanced Composites Project of the Admin-  
10 istration;

11 (B) partner with the private and academic  
12 sectors, such as members of the Advanced Com-  
13 posites Consortium of the Administration, the  
14 Joint Advanced Materials and Structures Cen-  
15 ter of Excellence of the Federal Aviation Ad-  
16 ministration, the Manufacturing USA institutes  
17 of the Department of Commerce, and national  
18 laboratories, as the Administrator considers ap-  
19 propriate;

20 (C) provide a structure for managing intel-  
21 lectual property generated by the program  
22 based on or consistent with the structure estab-  
23 lished for the Advanced Composites Consortium  
24 of the Administration;

1 (D) ensure adequate Federal cost share for  
2 applicable research; and

3 (E) coordinate with advanced manufac-  
4 turing and composites initiatives in other mis-  
5 sion directorates of the Administration, as the  
6 Administrator considers appropriate.

7 (f) RESEARCH PARTNERSHIPS.—In carrying out the  
8 demonstrations under subsection (c) and a program under  
9 subsection (e), the Administrator may engage in coopera-  
10 tive research programs with—

11 (1) academia; and

12 (2) commercial aviation and aerospace manu-  
13 facturers.

14 **SEC. 10832. UNMANNED AIRCRAFT SYSTEMS.**

15 (a) UNMANNED AIRCRAFT SYSTEMS OPERATION  
16 PROGRAM.—The Administrator shall—

17 (1) research and test capabilities and concepts,  
18 including unmanned aircraft systems communica-  
19 tions, for integrating unmanned aircraft systems  
20 into the national airspace system;

21 (2) leverage the partnership NASA has with in-  
22 dustry focused on the advancement of technologies  
23 for future air traffic management systems for un-  
24 manned aircraft systems; and

1           (3) continue to leverage the research and test-  
2           ing portfolio of NASA to inform the integration of  
3           unmanned aircraft systems into the national air-  
4           space system, consistent with public safety and na-  
5           tional security objectives.

6           (b) SENSE OF CONGRESS ON COORDINATION WITH  
7           FEDERAL AVIATION ADMINISTRATION.—It is the sense of  
8           Congress that—

9           (1) NASA should continue—

10           (A) to coordinate with the Federal Avia-  
11           tion Administration on research on air traffic  
12           management systems for unmanned aircraft  
13           systems; and

14           (B) to assist the Federal Aviation Admin-  
15           istration in the integration of air traffic man-  
16           agement systems for unmanned aircraft sys-  
17           tems into the national airspace system; and

18           (2) the test ranges (as defined in section 44801  
19           of title 49, United States Code) should continue to  
20           be leveraged for research on—

21           (A) air traffic management systems for un-  
22           manned aircraft systems; and

23           (B) the integration of such systems into  
24           the national airspace system.

1 **SEC. 10833. CLEANER, QUIETER AIRPLANES.**

2 (a) INITIATIVE REQUIRED.—Section 40112 of title  
3 51, United States Code, is amended—

4 (1) by redesignating subsections (b) through (f)  
5 as subsections (c) through (g), respectively; and

6 (2) by inserting after subsection (a) the fol-  
7 lowing:

8 “(b) RESEARCH AND DEVELOPMENT INITIATIVE ON  
9 REDUCTION OF GREENHOUSE GAS AND NOISE EMIS-  
10 SIONS FROM AIRCRAFT.—

11 “(1) IN GENERAL.—The Administrator shall es-  
12 tablish an initiative to research, develop, and dem-  
13 onstrate new technologies and concepts—

14 “(A) to reduce greenhouse gas emissions  
15 from aviation, including carbon dioxide, nitro-  
16 gen oxides, other greenhouse gases, water  
17 vapor, black carbon and sulfate aerosols, and  
18 increased cloudiness due to contrail formation;

19 “(B) to reduce aviation noise emissions;  
20 and

21 “(C) to enable associated aircraft perform-  
22 ance characteristics.

23 “(2) GOALS.—The goals of the initiative re-  
24 quired by paragraph (1) shall be—

25 “(A) to ensure United States leadership in  
26 research and technology innovation leading to

1 substantial reductions in aviation noise and  
2 greenhouse gas emissions;

3 “(B) to enhance and expand basic re-  
4 search, and the translation of basic research  
5 into applications, that may lead to trans-  
6 formational advances in reducing aviation noise  
7 and greenhouse gas emissions;

8 “(C) to accelerate research and develop-  
9 ment that contributes to maturing new tech-  
10 nologies for reducing aircraft noise and green-  
11 house gas emissions; and

12 “(D) to obtain and disseminate associated  
13 testing and performance data that facilitates  
14 the incorporation of new technologies into com-  
15 mercial aircraft development as soon as prac-  
16 ticable.

17 “(3) OBJECTIVES.—The objectives of the initia-  
18 tive established under paragraph (1) and the goals  
19 described in paragraph (2) shall include—

20 “(A) as soon as practicable, a reduction of  
21 greenhouse gas emissions from new aircraft by  
22 at least 50 percent, as compared to the highest-  
23 performing aircraft technologies in service as of  
24 December 31, 2021;



1           “(B) noise levels from aircraft throughout  
2 all phases of flight that do not exceed ambient  
3 noise levels in the absence of flight operations  
4 in the vicinity of the flight route;

5           “(C) net-zero greenhouse gas emissions  
6 from aircraft by 2050; and

7           “(D) demonstration of new technologies  
8 developed pursuant to such initiative on—

9                   “(i) regional aircraft intended to enter  
10 into service by 2030; and

11                   “(ii) single-aisle aircraft designed to  
12 accommodate more than 125 passengers  
13 intended to enter into service by 2040.”.

14       (b) TECHNOLOGY FOCUS AREAS.—In carrying out  
15 the research and development initiative established under  
16 section 40112(b) of title 51, United States Code, the Ad-  
17 ministrator shall advance research, development, and dem-  
18 onstration projects on promising technologies such as—

19           (1) advanced subsonic propulsion technology,  
20 design, and integration;

21           (2) electric and hybrid-electric propulsion, in-  
22 cluding battery electric and hydrogen fuel cell elec-  
23 tric systems;

24           (3) airframe concepts and configurations;

1           (4) analysis of technology options, including  
2           cost-benefit analysis of greenhouse gas and noise  
3           emissions reduction technologies;

4           (5) analytical tools for system-level and system-  
5           of-systems-level modeling and integration;

6           (6) airspace operations improvements;

7           (7) noise emissions reduction; and

8           (8) any other effort, as determined by the Ad-  
9           ministration, that contributes to a sustainable future  
10          for aviation.

11          (c) IMPLEMENTATION.—In implementing the initia-  
12          tive established under section 40112(b) of title 51, United  
13          States Code, the Administrator shall, to the extent prac-  
14          ticable—

15               (1) ensure that testing and performance data  
16               integrates the results of community acceptance sur-  
17               veys conducted by the Federal Aviation Administra-  
18               tion and other relevant studies, including studies on  
19               the impacts of new noise effects from novel propul-  
20               sion systems and from airspace operations changes;

21               (2) provide testing and performance data on the  
22               technologies described in subsection (b) of this sec-  
23               tion to the Administrator of the Federal Aviation  
24               Administration to facilitate the work of the Federal  
25               Aviation Administration in identifying new require-

1       ments for policy, infrastructure, and administrative  
2       capacity necessary to enable the safe integration of  
3       such technologies on aircraft;

4           (3) pursue partnerships with organizations, cur-  
5       rent commercial production aircraft providers, aca-  
6       demic institutions, small businesses, and new en-  
7       trants, including partnerships to advance research  
8       and development activities related to both regional  
9       aircraft and aircraft designed to accommodate more  
10      than 125 passengers;

11          (4) include universities, academic institutions,  
12      and other research organizations in the partnerships  
13      described in paragraph (3);

14          (5) expand basic research;

15          (6) ensure equity in research sponsorship of,  
16      and partnership opportunities with, underrep-  
17      resented students, faculty, and minority-serving-in-  
18      stitutions;

19          (7) continue to coordinate with the Secretary of  
20      Energy on battery technology research;

21          (8) make available the research and develop-  
22      ment carried out under the initiative established  
23      under subsection (b) of section 40112 of title 51,  
24      United States Code, to help enable an industry-wide  
25      shift toward aircraft concepts that reduce green-

1 house gas emissions and aircraft noise to achieve the  
2 goals and objectives under paragraphs (2) and (3) of  
3 that subsection; and

4 (9) continue to support research, development,  
5 and demonstration of aircraft concepts, including  
6 systems architecture, materials and components, in-  
7 tegration of systems and airframe structures, human  
8 factors, airspace planning and operations, and the  
9 integration of related advanced technologies and con-  
10 cepts, with the goal of carrying out test flights with  
11 integrated subsystems by 2025.

12 (d) ANNUAL REPORT.—Not later than 1 year after  
13 the date of the enactment of this Act, and annually there-  
14 after, the Administrator shall submit to the appropriate  
15 committees of Congress a report on the progress of the  
16 efforts carried out under the initiative established under  
17 subsection (b) of section 40112 of title 51, United States  
18 Code, including—

19 (1) the status of progress on such initiative;

20 (2) an updated, anticipated timeframe for read-  
21 iness of technologies and aircraft to be adopted by  
22 industry with the emissions reduction levels directed  
23 under that subsection; and

24 (3) an identification of fundamental aeronautics  
25 research activities contributing to achieving the goals

1 and objectives of such initiative, as described in  
2 paragraphs (2) and (3) of that subsection, and a de-  
3 scription of any obstacles to achieving such goals  
4 and objectives.

## 5 **Subtitle D—Space Technology**

### 6 **SEC. 10841. SPACE NUCLEAR CAPABILITIES.**

#### 7 (a) NUCLEAR PROPULSION.—

8 (1) USE IN ROBOTIC AND HUMAN EXPLORATION  
9 ACTIVITIES.—The Administrator, in collaboration  
10 with other relevant Federal agencies and with indus-  
11 try, shall take all necessary steps to carry out re-  
12 search and development, ground-based testing and  
13 in-space testing, and other associated activities to  
14 enable the use of space nuclear propulsion in Admin-  
15 istration robotic and human exploration activities,  
16 including in cargo missions to Mars in the late  
17 2020's and crewed missions to Mars in the 2030's.

#### 18 (2) SPACE NUCLEAR PROPULSION PROGRAM.—

19 (A) IN GENERAL.—The Administrator  
20 shall establish a space nuclear propulsion pro-  
21 gram to carry out the activities described in  
22 paragraph (1).

23 (B) ELEMENTS.—The program established  
24 under subparagraph (A) shall include the fol-  
25 lowing:

1 (i) Research and development in both  
2 nuclear electric and nuclear thermal pro-  
3 pulsion technology maturation efforts, to  
4 the extent practicable, and the development  
5 of consistent figures of merit across both  
6 nuclear electric and nuclear thermal sys-  
7 tems, as recommended by the National  
8 Academies of Sciences, Engineering, and  
9 Medicine in the report entitled “Space Nu-  
10 clear Propulsion for Human Mars Explo-  
11 ration”, so as to inform a down-selection of  
12 a nuclear electric or nuclear thermal pro-  
13 pulsion system by 2026, or as early as  
14 practicable.

15 (ii) Ground-based testing, to the ex-  
16 tent practicable, including not less than 1  
17 ground-based test of a full-scale, integrated  
18 nuclear propulsion system before any in-  
19 space test or demonstration of such sys-  
20 tem.

21 (iii) In-space demonstration of a nu-  
22 clear propulsion system in the late 2020’s,  
23 which may be carried out as a cargo mis-  
24 sion to Mars.

25 (3) PLAN.—

1           (A) IN GENERAL.—Not later than 180  
2 days after the date of the enactment of this  
3 Act, the Administrator shall submit to the ap-  
4 propriate committees of Congress a plan to  
5 achieve an in-space flight test of a nuclear pro-  
6 pulsion system that could support the first  
7 crewed mission to Mars in the 2030's.

8           (B) ELEMENTS.—The plan required by  
9 subparagraph (A) shall include the following:

10           (i) A timeline to mature enabling  
11 technologies and an outline of major mile-  
12 stones for integration of such technologies  
13 into the larger nuclear propulsion system.

14           (ii) A cost estimate for maturing such  
15 technologies.

16           (iii) A description of facility require-  
17 ments for the program under paragraph  
18 (2) associated with such technologies.

19           (iv) A description of the manner in  
20 which the Administrator will use the ef-  
21 forts described in paragraph (2)(B) to de-  
22 termine whether the in-space flight test  
23 should demonstrate a nuclear electric pro-  
24 pulsion system or a nuclear thermal pro-  
25 pulsion system.

1                   (C) An identification of any policy or regu-  
2                   latory challenges or barriers to conducting such  
3                   in-space test or any precursor ground-based  
4                   testing, and a description of options for ad-  
5                   dressing such challenges or barriers.

6                   (b) NUCLEAR SURFACE POWER PROGRAM.—

7                   (1) ESTABLISHMENT.—The Administrator shall  
8                   establish a program for research, testing, and devel-  
9                   opment of a space nuclear surface power reactor de-  
10                  sign.

11                  (2) PLAN.—

12                  (A) IN GENERAL.—The Administrator  
13                  shall—

14                         (i) develop a plan and timeline for the  
15                         program established under paragraph (1),  
16                         taking into consideration mission needs;  
17                         and

18                         (ii) include in such plan opportunities  
19                         for participation by United States commer-  
20                         cial entities.

21                  (B) SUBMISSION.—Not later than 1 year  
22                  after the date of the enactment of this Act, the  
23                  Administrator shall submit to the appropriate  
24                  committees of Congress the plan developed  
25                  under subparagraph (A).



1 (c) ASSESSMENT OF IN-SPACE PROPULSION TESTING  
2 FACILITIES.—

3 (1) IN GENERAL.—The Administrator shall  
4 carry out a needs assessment for facilities and tech-  
5 nical capabilities required to support ground-based  
6 testing of a full-scale, full-power integrated nuclear  
7 propulsion system.

8 (2) ELEMENT.—The assessment required by  
9 paragraph (1) shall consider the potential develop-  
10 ment of facilities that will support long-term re-  
11 search and development of space nuclear propulsion  
12 systems.

13 (3) REPORT.—Not later than 270 days after  
14 the date of the enactment of this Act, the Adminis-  
15 trator shall submit to the appropriate committees of  
16 Congress a report on the results of the assessment  
17 carried out under paragraph (1).

18 **SEC. 10842. PRIORITIZATION OF LOW-ENRICHED URANIUM**  
19 **TECHNOLOGY.**

20 (a) IN GENERAL.—The Administrator shall prioritize  
21 the use of low-enriched uranium, including high-assay low-  
22 enriched uranium, for space nuclear research and develop-  
23 ment, including ground and in-space testing and other re-  
24 lated demonstration activities carried out under this title.

1 (b) INTERAGENCY COLLABORATION.—The Adminis-  
2 trator shall, to the extent practicable, collaborate and co-  
3 ordinate with the Secretary of Defense, the Secretary of  
4 Energy, and the heads of other relevant Federal agencies  
5 on technology development, knowledge exchange, lessons  
6 learned regarding nuclear power and propulsion tech-  
7 nologies, common fuels, flight demonstrations, and oper-  
8 ational systems production for space applications.

9 (c) REPORT ON NUCLEAR TECHNOLOGY  
10 PRIORITIZATION.—Not later than 120 days after the date  
11 of the enactment of this Act, the Administrator shall sub-  
12 mit to the appropriate committees of Congress a report  
13 that details the actions taken and planned, including a  
14 timeline for such actions, to implement subsection (a).

## 15 **Subtitle E—STEM Engagement**

### 16 **SEC. 10851. OFFICE OF STEM ENGAGEMENT.**

17 (a) SENSE OF CONGRESS.—It is the sense of Con-  
18 gress that NASA’s inspiring mission, specialized facilities,  
19 skilled engineering and scientific workforce, and research  
20 activities present unique opportunities for inspiring public  
21 engagement in STEM and increasing the number of stu-  
22 dents pursuing STEM degrees and careers.

23 (b) ESTABLISHMENT.—The Administrator shall es-  
24 tablish an Office of STEM Engagement (referred to in  
25 this section as the “Office”) for the purpose of advancing

1 progress toward the STEM education goals of the United  
2 States by enhancing STEM literacy, increasing diversity,  
3 equity, and inclusion in STEM, and preparing the STEM  
4 workforce for the future.

5 (c) RESPONSIBILITIES.—The Office established shall  
6 be responsible for coordinating efforts and activities  
7 among organizations across the Administration, including  
8 NASA headquarters, mission directorates, and NASA cen-  
9 ters, designed—

10 (1) to create unique opportunities for students  
11 and the public to learn from and contribute to the  
12 work of NASA in exploration and discovery;

13 (2) to contribute to the growth of a diverse  
14 STEM workforce; and

15 (3) to strengthen public understanding of  
16 science by enabling connections to the mission and  
17 work of NASA.

18 (d) PORTFOLIO.—The Office shall coordinate and ad-  
19 minister—

20 (1) the National Space Grant College and Fel-  
21 lowship Program under chapter 403 of title 51  
22 United States Code;

23 (2) the Established Program to Stimulate Com-  
24 petitive Research under section 40903 of title 51  
25 United States Code;

1 (3) the Minority University Research and Edu-  
2 cation Project;

3 (4) the NextGen STEM Project; and

4 (5) any other program or activity the Adminis-  
5 trator considers appropriate.

6 (e) TECHNICAL AMENDMENTS.—Section 40903 of  
7 title 51, United States Code, is amended—

8 (1) in the section heading, by striking “**Exper-**  
9 **imental**” and inserting “**Established**”; and

10 (2) in subsection (a), by striking “Experi-  
11 mental” and inserting “Established”.

## 12 **Subtitle F—Miscellaneous**

### 13 **SEC. 10861. PROGRAM, WORKFORCE, AND INDUSTRIAL** 14 **BASE REVIEWS.**

15 (a) REPORT ON INDUSTRIAL BASE FOR CIVIL SPACE  
16 MISSIONS AND OPERATIONS.—

17 (1) IN GENERAL.—Not later than 1 year after  
18 the date of the enactment of this Act, and from time  
19 to time thereafter, the Administrator shall submit to  
20 the appropriate committees of Congress a report on  
21 the United States industrial base for NASA civil  
22 space missions and operations.

23 (2) ELEMENTS.—The report required by para-  
24 graph (1) shall include the following:

1 (A) A comprehensive description of the  
2 current status of the United States industrial  
3 base for NASA civil space missions and oper-  
4 ations.

5 (B) A description and assessment of the  
6 weaknesses in the supply chain, skills, manufac-  
7 turing capacity, raw materials, key components,  
8 and other areas of the United States industrial  
9 base for NASA civil space missions and oper-  
10 ations that could adversely impact such mis-  
11 sions and operations if unavailable.

12 (C) A description and assessment of var-  
13 ious mechanisms to address and mitigate the  
14 weaknesses described pursuant to subparagraph  
15 (B).

16 (D) A comprehensive list of the collabo-  
17 rative efforts, including future and proposed  
18 collaborative efforts, between NASA and the  
19 Manufacturing USA institutes of the Depart-  
20 ment of Commerce.

21 (E) An assessment of—

22 (i) the defense and aerospace manu-  
23 facturing supply chains relevant to NASA  
24 in each region of the United States; and



1           ministration missions across all mission di-  
2           rectorates.

3                   (ii) Prioritized recommendations on  
4           actions needed to align the Administra-  
5           tion's workforce with research objectives  
6           and strategic goals and on the improve-  
7           ments and additions to modeling capabili-  
8           ties and test facilities needed to meet the  
9           Administration's strategic goals and objec-  
10          tives.

11                   (C) REPORT.—Not later than 18 months  
12          after the date of the enactment of this Act, the  
13          Administrator shall submit to the appropriate  
14          committees of Congress report on the results of  
15          the review conducted under subparagraph (A).

16                   (2) IMPLEMENTATION PLAN.—Not later than  
17          120 days after the date on which the review under  
18          paragraph (1) is completed, the Administrator shall  
19          submit to the appropriate committees of Congress a  
20          plan for implementing the recommendations con-  
21          tained the review.

22                   (3) REPORT ON NASA INFRASTRUCTURE, WORK-  
23          FORCE SKILLS AND CAPABILITIES.—

24                   (A) POLICY AND PROCEDURE.—

1 (i) IN GENERAL.—The Administrator  
2 shall develop an Administration policy and  
3 procedure for assessment, not less fre-  
4 quently than every 5 years, of the strategic  
5 capabilities of the Administration, includ-  
6 ing infrastructure and facilities, and work-  
7 force skills and capabilities.

8 (ii) ELEMENTS.—The policy and pro-  
9 cedure developed under clause (i) shall in-  
10 clude acquiring data and support for Ad-  
11 ministration decisions and recommenda-  
12 tions on strategic capabilities, including on  
13 infrastructure and facilities, and workforce  
14 skills and capabilities needed to support  
15 the goals and objectives of the Administra-  
16 tion through 2040.

17 (B) REPORT.—Not later than 1 year after  
18 the date of the enactment of this Act, the Ad-  
19 ministrator shall submit the policy and proce-  
20 dure developed under subparagraph (A) to the  
21 appropriate committees of Congress.

22 (4) INDEPENDENT PROGRAM ANALYSIS AND  
23 EVALUATION OFFICE.—

24 (A) ESTABLISHMENT.—The Administrator  
25 shall establish within NASA an Independent



1 Program Analysis and Evaluation Office (re-  
2 ferred to in this paragraph as the “Office”) for  
3 purposes of independently assessing program  
4 performance, making programmatic, technical  
5 risk mitigation and institutional recommenda-  
6 tions, performing cost estimates and analyses,  
7 and conducting strategic planning activities,  
8 among other functions.

9 (B) INDEPENDENCE.—The Office shall re-  
10 main independent of any program, and shall  
11 have no programmatic responsibilities, so as to  
12 maintain its independent assessment integrity.

13 (C) ACTIVITIES AUTHORIZED.—In con-  
14 ducting the functions of the Office, the Admin-  
15 istrator may carry out—

- 16 (i) research on program assessment;  
17 (ii) cost, schedule, and technical esti-  
18 mation; and  
19 (iii) other relevant activities for the  
20 purposes of obtaining the highest level of  
21 expertise and the most effective decision-  
22 making tools with which to inform the Ad-  
23 ministrator.

24 (D) MOON TO MARS ACTIVITIES.—The Of-  
25 fice shall maintain an ongoing, focused effort to

1 assess the goals, objectives, requirements, archi-  
2 tectural approach, cost and schedule, and  
3 progress of the Administration's Moon to Mars  
4 activities.

5 (5) INTERNATIONAL SPACE STATION.—Not  
6 later than 1 year after the date of the enactment of  
7 this Act, the Administrator shall submit to the ap-  
8 propriate committees of Congress the results of an  
9 independent estimate by the Office of the cost of  
10 continuing International Space Station operations  
11 through September 30, 2030, including—

12 (A) crew and cargo transportation, re-  
13 search to be undertaken reflecting the priorities  
14 described in section 10816, and maintenance  
15 costs; and

16 (B) opportunities for operational effi-  
17 ciencies that could result in cost savings and in-  
18 creased research productivity and the amount  
19 of those potential savings and productivity in-  
20 creases.

21 **SEC. 10862. MODIFICATION OF LEASE OF NON-EXCESS**  
22 **PROPERTY.**

23 (a) IN GENERAL.—Section 20145 of title 51, United  
24 States Code, is amended in subsection (g), in the first sen-

1 tence, by striking “December 31, 2022” and inserting  
2 “December 31, 2032”.

3 (b) REPORTING REQUIREMENTS.—Subsection (f) of  
4 such section is amended by adding at the end the fol-  
5 lowing:

6 “(3) ANNUAL AND CUMULATIVE NUMBER OF  
7 LEASES.—The annual and cumulative number of  
8 leases entered into under this section, by National  
9 Aeronautics and Space Administration center and  
10 facility.

11 “(4) ESTIMATED COST SAVINGS.—For each ac-  
12 tive lease agreement under this section, the esti-  
13 mated cost savings to the Administration resulting  
14 from reduced maintenance, operating, and associated  
15 costs in the previous fiscal year.

16 “(5) OTHER QUANTIFIABLE BENEFITS.—Other  
17 quantifiable benefits, including additional cost sav-  
18 ings not included under paragraph (4), to the Ad-  
19 ministration resulting from the use of leases under  
20 this section.”.

21 (c) REPORT ON REQUIREMENTS.—Such section is  
22 further amended—

23 (1) by redesignating subsection (g) as sub-  
24 section (h); and

25 (2) by adding after subsection (f) the following:

1       “(g) REPORT ON ENHANCED-USE LEASING RE-  
2 QUIREMENTS.—Not later than 270 days after the date of  
3 the enactment of the National Aeronautics and Space Ad-  
4 ministration Authorization Act of 2022, the Administrator  
5 shall prepare and submit to the Committee on Commerce,  
6 Science, and Transportation of the Senate and the Com-  
7 mittee on Science, Space, and Technology of the House  
8 of Representatives a report on existing requirements for  
9 applicants seeking a lease under this section, including—

10               “(1) any requirement related to the involvement  
11       of foreign entities, foreign entity ownership, and for-  
12       eign entity investment; and

13               “(2) at the discretion of the Administrator, any  
14       other requirement related to the protection and secu-  
15       rity of Administration missions and facilities.”.

16 **DIVISION C—SUPPLEMENTAL APPRO-**  
17 **PRIATIONS TO ADDRESS THREATS TO**  
18 **THE SUPREME COURT OF THE UNITED**  
19 **STATES**

20       The following sums are appropriated, out of any  
21 money in the Treasury not otherwise appropriated, for the  
22 fiscal year ending September 30, 2022, and for other pur-  
23 poses, namely:

1053

1

## TITLE I

2

## DEPARTMENT OF JUSTICE

3

## UNITED STATES MARSHALS SERVICE

4

## SALARIES AND EXPENSES

5

For an additional amount for “Salaries and Ex-

6

penses”, \$10,300,000, to remain available until September

7

30, 2023, for expenses necessary to address threats to the

8

Supreme Court of the United States.

9

## TITLE II

10

## THE JUDICIARY

11

## SUPREME COURT OF THE UNITED STATES

12

## SALARIES AND EXPENSES

13

For an additional amount for “Salaries and Ex-

14

penses”, \$9,100,000, to remain available until September

15

30, 2023, for expenses necessary to address threats to the

16

Supreme Court of the United States.

17

## TITLE III

18

## GENERAL PROVISIONS—THIS ACT

19

SEC. 301. Each amount appropriated or made avail-

20

able by this Act is in addition to amounts otherwise appro-

21

riated for the fiscal year involved.

22

SEC. 302. No part of any appropriation contained in

23

this Act shall remain available for obligation beyond the

24

current fiscal year unless expressly so provided herein.

1        SEC. 303. Unless otherwise provided for by this Act,  
2 the additional amounts appropriated by this Act to appro-  
3 priations accounts shall be available under the authorities  
4 and conditions applicable to such appropriations accounts  
5 for fiscal year 2022.

6        SEC. 304. Each amount provided by this Act is des-  
7 ignated by Congress as being for an emergency require-  
8 ment pursuant to section 4001(a)(1) and section 4001(b)  
9 of S. Con. Res. 14 (117th Congress), the concurrent reso-  
10 lution on the budget for fiscal year 2022.

11        This division may be cited as the “Supreme Court  
12 Security Funding Act of 2022”.