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:

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Sec. 103. Semiconductor incentives.
Sec. 104. Opportunity and inclusion.
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Sec. 10109. Accelerator research and development.
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Except as expressly provided otherwise, any reference to ''this Act'' contained in any division of this Act shall be treated as referring only to the provisions of that division.

DIVISION A—CHIPS ACT OF 2022

SEC. 101. SHORT TITLE.

This division may be cited as the ''CHIPS Act of 2022''.

SEC. 102. CREATING HELPFUL INCENTIVES TO PRODUCE SEMICONDUCTORS (CHIPS) FOR AMERICA FUND.

(a) CHIPS FOR AMERICA FUND.—

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

(2) APPROPRIATION.—

(A) In addition to amounts otherwise available for such purposes, there is appropriated to the Fund established in subsection (a)(1), out of amounts in the Treasury not otherwise appropriated—

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

expended, of which $19,000,000,000 shall be for section 9902 of Public Law 116–283, $2,000,000,000 shall be for subsection (c) of section 9906 of Public Law 116–283, $2,500,000,000 shall be for subsection (d) of section 9906 of Public Law 116–283, and $500,000,000 shall be for subsections (e) and (f) of section 9906 of Public Law 116–283;

(ii) for fiscal year 2023, $7,000,000,000 to remain available until expended, of which $5,000,000,000 shall be for section 9902 of Public Law 116–283 and $2,000,000,000 shall be for subsections (c), (d), (e), and (f) of section 9906 of Public Law 116–283;

(iii) for fiscal year 2024, $6,300,000,000, to remain available until expended, of which $5,000,000,000 shall be for section 9902 of Public Law 116–283 and $1,300,000,000 shall be for subsections (c), (d), (e), and (f) of section 9906 of Public Law 116–283;

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

expended, of which $5,000,000,000 shall be for section 9902 of Public Law 116–283 and $1,100,000,000 shall be for subsections (c), (d), (e), and (f) of section 9906 of Public Law 116–283; and

(v) for fiscal year 2026, $6,600,000,000, to remain available until expended, of which $5,000,000,000 shall be for section 9902 of Public Law 116–283 and $1,600,000,000 shall be for subsections (c), (d), (e), and (f) of section 9906 of Public Law 116–283.

(B) DIRECT LOANS AND LOAN GUARANTEES.—The Secretary of Commerce may use—

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

(I) such costs, including the cost of modifying such loans and loan guarantees shall be as defined in section 502 of the Congressional Budget Act of 1974; and

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

(ii) up to 2 percent of the amounts made available in each fiscal year for salaries and expenses, administration, and oversight purposes to carry out sections 9902 and 9906 of Public Law 116–283, of which $5,000,000 in each of fiscal years 2022 through 2026 shall be transferred to the Office of Inspector General of the Department of Commerce to oversee expenditures from the Fund; and

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

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

assistance to covered entities to incentivize investment in facilities and equipment in the United States for the fabrication, assembly, testing, or packaging of semiconductors at mature technology nodes under subsection (e) of that section, as added by section 103 of this Act.

(4) ALLOCATION AUTHORITY.—

(A) SUBMISSION OF COST ESTIMATES.—The President shall submit to Congress detailed account, program, and project allocations of the full amount made available under subsection (a)(2)—

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

(ii) for each subsequent fiscal year through 2026, as part of the annual budget submission of the President under section 1105(a) of title 31, United States Code.

(B) ALTERNATE ALLOCATION.—

(i) IN GENERAL.—The Committees on Appropriations of the House of Representatives and the Senate may provide for alternate allocation of amounts made avail-

able under subsection (a)(2), including by account, program, and project.

(ii) ALLOCATION BY PRESIDENT.—

(I) NO ALTERNATE ALLOCATIONS.—If Congress has not enacted legislation establishing alternate allocations, including by account, program, and project, by the date on which the Act making full-year appropriations for the Departments of Commerce and Justice, Science, and Related Agencies for the applicable fiscal year is enacted into law, only then shall amounts made available under subsection (a)(2) be allocated by the President or apportioned or allotted by account, program, and project pursuant to title 31, United States Code.

(II) INSUFFICIENT ALTERNATE ALLOCATION.—If Congress enacts legislation establishing alternate allocations, including by account, program, and project, for amounts made available under subsection (a)(2) that are

less than the full amount appropriated under that subsection, the difference between the amount appropriated and the alternate allocation shall be allocated by the President and apportioned and allotted by account, program, and project pursuant to title 31, United States Code.

(b) CHIPS FOR AMERICA DEFENSE FUND.—

(1) ESTABLISHMENT.—There is established in the Treasury of the United States a fund to be known as the ''Creating Helpful Incentives to Produce Semiconductors (CHIPS) for America Defense Fund'' (referred to in this subsection as the ''Fund'') to provide for those requirements that are necessary to carry out section 9903(b) of the William M. (Mac) Thornberry National Defense Authorization Act for Fiscal Year 2021 (15 U.S.C. 4653(b)). Amounts in the Fund shall be transferred to and merged with accounts within the Department of Defense to be used for such purposes. Amounts in the Fund or transferred to and merged with accounts within the Department of Defense may not be used for construction of facilities.

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

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

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

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

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

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

(3) ALLOCATION AUTHORITY.—

(A) SUBMISSION OF COST ESTIMATES.—The President shall submit to Congress detailed account, program element, and project allocations of the full amount made available under subsection (b)(2)—

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

(ii) for each subsequent fiscal year through 2027, as part of the annual budget submission of the President under section 1105(a) of title 31, United States Code.

(B) ALTERNATE ALLOCATION.—

(i) IN GENERAL.—The Committees on Appropriations of the House of Representatives and the Senate may provide for alternate allocation of amounts made available under subsection (b)(2), including by account, program element, and project.

(ii) ALLOCATION BY PRESIDENT.—

(I) NO ALTERNATE ALLOCATIONS.—If Congress has not enacted legislation establishing alternate allocations, including by account, program element, and project, by the date on which the Act making full-year appropriations for the Department of Defense for the applicable fiscal year is enacted into law, only then shall amounts made available under subsection (b)(2) be allocated by the President or apportioned or allotted

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

(II) INSUFFICIENT ALTERNATE ALLOCATION.—If Congress enacts legislation establishing alternate allocations, including by account, program element, and project, for amounts made available under subsection (b)(2) that are less than the full amount appropriated under that subsection, the difference between the amount appropriated and the alternate allocation shall be allocated by the President and apportioned and allotted by account, program element, and project pursuant to title 31, United States Code.

(c) CHIPS FOR AMERICA INTERNATIONAL TECHNOLOGY SECURITY AND INNOVATION FUND.—

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

Fund'' (referred to in this subsection as the ''Fund'') to provide for international information and communications technology security and semiconductor supply chain activities, including to support the development and adoption of secure and trusted telecommunications technologies, secure semiconductors, secure semiconductors supply chains, and other emerging technologies and to carry out sections 9905 and 9202(a)(2) of the William M. (Mac) Thornberry National Defense Authorization Act for Fiscal Year 2021 (15 U.S.C. 4655 and 47 U.S.C. 906(a)(2)), as appropriate. Amounts in the Fund shall be transferred by the Secretary of State to accounts within the Department of State, the United States Agency for International Development, the Export-Import Bank, and the United States International Development Finance Corporation, as appropriate, to be used for such purposes and under the terms and conditions of the account to which transferred.

(2) APPROPRIATION.—

(A) In addition to amounts otherwise available for such purposes, there is appropriated to the Fund established in subsection (c)(1), out

of amounts in the Treasury not otherwise appropriated—

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

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

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

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

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

(B) USE.—In carrying out this subsection, the Secretary of State may use up to $5,000,000 of the amounts made available in each fiscal year for the Fund for salaries and expenses, administration, and oversight purposes, of which $500,000 in each of fiscal years 2023 through 2027 shall be transferred to the Office of Inspector General of the Department

of State to oversee expenditures under the Fund.

(3) ALLOCATION AUTHORITY.—

(A) SUBMISSION OF COST ESTIMATES.—The President shall submit to Congress detailed account, program, project, and activity allocations of the full amount made available under subsection (c)(2)—

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

(ii) for each subsequent fiscal year through 2027, as part of the annual budget submission of the President under section 1105(a) of title 31, United States Code.

(B) ALTERNATE ALLOCATION.—

(i) IN GENERAL.—The Committees on Appropriations of the House of Representatives and the Senate may provide for alternate allocation of amounts made available under subsection (c)(2), including by account, program, project, and activity.

(ii) ALLOCATION BY PRESIDENT.—

(I) NO ALTERNATE ALLOCATIONS.—If Congress has not enacted legislation establishing alternate allocations, including by account, program, project, and activity, by the date on which the Act making full-year appropriations for the Department of State, Foreign Operations, and Related Programs for the applicable fiscal year is enacted into law, only then shall amounts made available under subsection (c)(2) be allocated by the President or apportioned or allotted by account, program, project, and activity pursuant to title 31, United States Code.

(II) INSUFFICIENT ALTERNATE ALLOCATION.—If Congress enacts legislation establishing alternate allocations, including by account, program, project, and activity, for amounts made available under subsection (c)(2) that are less than the full amount appropriated under that subsection, the difference between the

amount appropriated and the alternate allocation shall be allocated by the President and apportioned and allotted by account, program, project, and activity pursuant to title 31, United States Code.

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

(1) ESTABLISHMENT.—There is established in the Treasury of the United States a fund to be known as the ''Creating Helpful Incentives to Produce Semiconductors (CHIPS) for America Workforce and Education Fund'' (referred to in this subsection as the ''Fund'') for the National Science Foundation for microelectronics workforce development activities to meet the requirements under section 9906 of the William M. (Mac) Thornberry National Defense Authorization Act for Fiscal Year 2021 (15 U.S.C. 4656).

(2) APPROPRIATION.—In addition to amounts otherwise available for such purposes, there is appropriated to the Fund established in subsection (d)(1), out of amounts in the Treasury not otherwise appropriated—

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

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

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

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

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

(3) ALLOCATION AUTHORITY.—

(A) SUBMISSION OF COST ESTIMATES.—The President shall submit to Congress detailed account, program, and project allocations of the full amount made available under paragraph (2)—

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

(ii) for each subsequent fiscal year through 2027, as part of the annual budget submission of the President under section 1105(a) of title 31, United States Code.

(B) ALTERNATE ALLOCATION.—

(i) IN GENERAL.—The Committees on Appropriations of the House of Representatives and the Senate may provide for alternate allocation of amounts made available under paragraph (2), including by account, program, and project.

(ii) ALLOCATION BY PRESIDENT.—

(I) NO ALTERNATE ALLOCATIONS.—If Congress has not enacted legislation establishing alternate allocations, including by account, program, and project, by the date on which the Act making full-year appropriations for the Departments of Commerce and Justice, Science, and Related Agencies for the applicable fiscal year is enacted into law, only then shall amounts made available under subsection (d)(2) be allocated by the President or apportioned or allotted by account, program, and project pursuant to title 31, United States Code.

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

islation establishing alternate allocations, including by account, program, and project, for amounts made available under subsection (d)(2) that are less than the full amount appropriated under that subsection, the difference between the amount appropriated and the alternate allocation shall be allocated by the President and apportioned and allotted by account, program, and project pursuant to title 31, United States Code.

(e) SEQUESTRATION.—Section 255(g)(1)(A) of the Balanced Budget and Emergency Deficit Control Act of 1985 (2 U.S.C. 905(g)(1)(A)) is amended by inserting after ''Continuing Fund, Southwestern Power Administration (89–5649–0–2–271).'' the following:

''Creating Helpful Incentives to Produce Semiconductors (CHIPS) for America Fund.

''Creating Helpful Incentives to Produce Semiconductors (CHIPS) for America Defense Fund.

''Creating Helpful Incentives to Produce Semiconductors (CHIPS) for America Inter-

national Technology Security and Innovation Fund.

"Creating Helpful Incentives to Produce Semiconductors (CHIPS) for America Workforce and Education Fund".

(f) BUDGETARY EFFECTS.—

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

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

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

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

(B) for purposes of an allocation to the Committee on Appropriations pursuant to section 302(a) of the Congressional Budget Act of 1974; and

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

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

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

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

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

(2) COVERED FUND.—In this subsection, the term ''covered fund'' means—

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

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

(C) the Creating Helpful Incentives to Produce Semiconductors (CHIPS) for America International Technology Security and Innovation Fund; and

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

SEC. 103. SEMICONDUCTOR INCENTIVES.

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

(1) in paragraph (2)—

(A) by striking ''a private entity, a consortium of private entities, or a consortium of pub-

lic and private entities'' and inserting ''a nonprofit entity, a private entity, a consortium of private entities, or a consortium of nonprofit, public, and private entities'';

(B) by inserting ''production,'' before ''or research and development''; and

(C) by striking ''of semiconductors.'' and inserting ''of semiconductors, materials used to manufacture semiconductors, or semiconductor manufacturing equipment.'';

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

(3) by inserting after paragraph (4), the following:

''(5) The term 'critical manufacturing industry'—

''(A) means an industry, industry group, or a set of related industries or related industry groups—

''(i) assigned a North American Industry Classification System code beginning with 31, 32, or 33; and

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

dustry Classification System code cumulatively—

"(I) manufacture primary products and parts, the sum of which account for not less than 5 percent of the manufacturing value added by industry gross domestic product of the United States; and

"(II) employ individuals for primary products and parts manufacturing activities that, combined, account for not less than 5 percent of manufacturing employment in the United States; and

"(B) may include any other manufacturing industry designated by the Secretary based on the relevance of the manufacturing industry to the national and economic security of the United States, including the impacts of job losses."; and

(4) by inserting after paragraph (6), as so redesignated, the following:

"(7) The term 'foreign country of concern' means—

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

"(B) any country that the Secretary, in consultation with the Secretary of Defense, the Secretary of State, and the Director of National Intelligence, determines to be engaged in conduct that is detrimental to the national security or foreign policy of the United States."; and

(5) by inserting after paragraph (9), as so redesignated, the following:

"(10) The term 'mature technology node' has the meaning given the term by the Secretary.

"(11) The term 'nonprofit entity' means an entity described in section 501(c)(3) of the Internal Revenue Code of 1986 and exempt from taxation under section 501(a) of such Code.".

(b) SEMICONDUCTOR PROGRAM.—Section 9902 of the William M. (Mac) Thornberry National Defense Authorization Act for Fiscal Year 2021 (15 U.S.C. 4652) is amended—

(1) in subsection (a)(1)—

(A) by striking "for semiconductor fabrication" and inserting "for the fabrication";

(B) by inserting ''production,'' before ''or research and development''; and

(C) by striking the period at the end and inserting ''of semiconductors, materials used to manufacture semiconductors, or semiconductor manufacturing equipment.''; and

(2) in subsection (a)(2)—

(A) in subparagraph (B)(i), by striking ''; and'' at the end;

(B) in subparagraph (B)(ii)—

(i) in subclause (III), by striking ''and'' at the end;

(ii) in subclause (IV), by striking the period at the end and inserting a semicolon; and

(iii) by adding at the end the following:

''(V) determined—

''(aa) the type of semiconductor technology, equipment, materials, or research and development the covered entity will produce at the facility described in clause (i); and

"(bb) the customers, or categories of customers, to which the covered entity plans to sell the semiconductor technology, equipment, materials, or research and development described in item (aa); and

"(VI) documented, to the extent practicable, workforce needs and developed a strategy to meet such workforce needs consistent with the commitments described in subclauses (II) and (III);"; and

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

"(iii) with respect to the project described in clause (i), the covered entity has an executable plan to identify and mitigate relevant semiconductor supply chain security risks, such as risks associated with access, availability, confidentiality, integrity, and a lack of geographic diversification in the covered entity's supply chain; and

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

semiconductors, the covered entity has implemented policies and procedures to combat cloning, counterfeiting, and relabeling of semiconductors, as applicable.''; (D) in subparagraph (C)—

(i) in clause (i)—

(I) in subclause (II), by striking ''is in the interest of the United States'' and inserting ''is in the economic and national security interests of the United States''; and

(II) in subclause (III), by striking ''and'' at the end;

(ii) in clause (ii)(IV), by striking ''and'' at the end;

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

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

''(iii) the Secretary shall consider the type of semiconductor technology produced by the covered entity and whether that semiconductor technology advances the economic and national security interests of the United States;

"(iv) the Secretary may not approve an application, unless the covered entity provides a plan that does not use Federal financial assistance to assist efforts to physically relocate existing facility infrastructure to another jurisdiction within the United States, unless the project is in the interest of the United States; and";

(E) by redesignating subparagraph (D) as subparagraph (E); and

(F) by inserting after subparagraph (C) the following:

"(D) PRIORITY.—In awarding Federal financial assistance to covered entities under this subsection, the Secretary shall—

"(i) give priority to ensuring that a covered entity receiving financial assistance will—

"(I) manufacture semiconductors necessary to address gaps and vulnerabilities in the domestic supply chain across a diverse range of technology and process nodes; and

"(II) provide a secure supply of semiconductors necessary for the na-

tional security, manufacturing, critical infrastructure, and technology leadership of the United States and other essential elements of the economy of the United States; and

"(ii) ensure that the assistance is awarded to covered entities for both advanced and mature technology nodes to meet the priorities described in clause (i).";

(3) in subsection (a)(4)(A), by striking "used for semiconductors" and inserting "used for the purposes";

(4) in subsection (a)(5)—

(A) in subparagraph (A), by striking "major";

(B) in subparagraph (D), by striking "major"; and

(C) in subparagraph (E)(i), by striking "major";

(5) by inserting after subsection (a)(5) the following:

"(6) EXPANSION CLAWBACK.—

"(A) DEFINITION OF LEGACY SEMICONDUCTOR.—

"(i) IN GENERAL.—In this paragraph, the term 'legacy semiconductor'—

"(I) includes—

"(aa) a semiconductor technology that is of the 28 nanometer generation or older for logic;

"(bb) with respect to memory technology, analog technology, packaging technology, and any other relevant technology, any legacy generation of semiconductor technology relative to the generation described in item (aa), as determined by the Secretary, in consultation with the Secretary of Defense and the Director of National Intelligence; and

"(cc) any additional semiconductor technology identified by the Secretary in a public notice issued under clause (ii); and

"(II) does not include a semiconductor that is critical to national secu-

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

"(ii) UPDATES.—Not later than 2 years after the date of enactment of the CHIPS Act of 2022, and not less frequently than once every 2 years thereafter for the 8-year period after the last award under this section is made, the Secretary, after public notice and an opportunity for comment and if applicable and necessary, shall issue a public notice identifying any additional semiconductor technology included in the meaning of the term 'legacy semiconductor' under clause (i).

"(iii) FUNCTIONS OF THE SECRETARY.—The functions of the Secretary under this paragraph shall not be subject to sections 551, 553 through 559, and 701 through 706 of title 5, United States Code.

"(iv) CONSULTATION.—In carrying out clause (ii), the Secretary shall consult with the Director of National Intelligence and the Secretary of Defense.

"(v) CONSIDERATIONS.—In carrying out clause (ii), the Secretary shall consider—

"(I) state-of-the-art semiconductor technologies in the United States and internationally, including in foreign countries of concern; and

"(II) consistency with export controls relating to semiconductors.

"(B) DEFINITION OF SEMICONDUCTOR MANUFACTURING.—In this paragraph, the term 'semiconductor manufacturing'—

"(i) has the meaning given the term by the Secretary, in consultation with the Secretary of Defense and the Director of National Intelligence; and

"(ii) includes front-end semiconductor fabrication.

"(C) REQUIRED AGREEMENT.—

"(i) IN GENERAL.—On or before the date on which the Secretary awards Federal financial assistance to a covered entity under this section, the covered entity shall enter into an agreement with the Secretary specifying that, during the 10-year period

beginning on the date of the award, subject to clause (ii), the covered entity may not engage in any significant transaction, as defined in the agreement, involving the material expansion of semiconductor manufacturing capacity in the People's Republic of China or any other foreign country of concern.

"(ii) EXCEPTIONS.—The prohibition in the agreement required under clause (i) shall not apply to—

"(I) existing facilities or equipment of a covered entity for manufacturing legacy semiconductors; or

"(II) significant transactions involving the material expansion of semiconductor manufacturing capacity that—

"(aa) produces legacy semiconductors; and

"(bb) predominately serves the market of a foreign country of concern.

"(iii) AFFILIATED GROUP.—For the purpose of applying the requirements in an

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

"(D) NOTIFICATION REQUIREMENTS.—During the applicable term of the agreement of a covered entity required under subparagraph (C)(i), the covered entity shall notify the Secretary of any planned significant transactions of the covered entity involving the material expansion of semiconductor manufacturing capacity in the People's Republic of China or any other foreign country of concern.

"(E) VIOLATION OF AGREEMENT.—

"(i) NOTIFICATION TO COVERED ENTITIES.—Not later than 90 days after the date of receipt of a notification described in subparagraph (D) from a covered entity, the Secretary, in consultation with the Secretary of Defense and the Director of National Intelligence, shall—

"(I) determine whether the significant transaction described in the notification would be a violation of the agreement of the covered entity required under subparagraph (C)(i); and

"(II) notify the covered entity of the Secretary's decision under subclause (I).

"(ii) OPPORTUNITY TO REMEDY.—Upon a notification under clause (i)(II) that a planned significant transaction of a covered entity is a violation of the agreement of the covered entity required under subparagraph (C)(i), the Secretary shall—

"(I) immediately request from the covered entity tangible proof that the planned significant transaction has ceased or been abandoned; and

"(II) provide the covered entity 45 days to produce and provide to the Secretary the tangible proof described in subclause (I).

"(iii) FAILURE BY THE COVERED ENTITY TO CEASE OR REMEDY THE ACTIV-

ITY.—Subject to clause (iv), if a covered entity fails to remedy a violation as set forth under clause (ii), the Secretary shall recover the full amount of the Federal financial assistance provided to the covered entity under this section.

"(iv) MITIGATION.—If the Secretary, in consultation with the Secretary of Defense and the Director of National Intelligence, determines that a covered entity planning a significant transaction that would violate the agreement required under subparagraph (C)(i) could take measures in connection with the transaction to mitigate any risk to national security, the Secretary—

"(I) may negotiate, enter into, and enforce any agreement or condition for the mitigation; and,

"(II) waive the recovery requirement under clause (iii).

"(F) SUBMISSION OF RECORDS.—

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

the compliance of the covered entity with the agreement required under subparagraph (C)(i).

"(ii) ELIGIBILITY.—In order to be eligible for Federal financial assistance under this section, a covered entity shall agree to provide records and other necessary information requested by the Secretary under clause (i).

"(G) CONFIDENTIALITY OF RECORDS.—

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

"(I) shall be exempt from disclosure under section 552(b)(3) of title 5, United States Code; and

"(II) shall not be made public.

"(ii) EXCEPTIONS.—Clause (i) shall not prevent the disclosure of any of the following by the Secretary:

"(I) Information relevant to any administrative or judicial action or proceeding.

"(II) Information that a covered entity has consented to be disclosed to third parties.

"(III) Information necessary to fulfill the requirement of the congressional notification under subparagraph (H).

"(H) CONGRESSIONAL NOTIFICATION.—Not later than 60 days after the date on which the Secretary finds a violation by a covered entity of an agreement required under subparagraph (C)(i), and after providing the covered entity with an opportunity to provide information in response to that finding, the Secretary shall provide to the appropriate Committees of Congress—

"(i) a notification of the violation;

"(ii) a brief description of how the Secretary determined the covered entity to be in violation; and

"(iii) a summary of any actions or planned actions by the Secretary in response to the violation.

"(I) REGULATIONS.—The Secretary may issue regulations implementing this paragraph."; and

(6) by adding at the end the following:

"(d) SENSE OF CONGRESS.—It is the sense of Congress that, in carrying out subsection (a), the Secretary should allocate funds in a manner that—

"(1) strengthens the security and resilience of the semiconductor supply chain, including by mitigating gaps and vulnerabilities;

"(2) provides a supply of secure semiconductors relevant for national security;

"(3) strengthens the leadership of the United States in semiconductor technology;

"(4) grows the economy of the United States and supports job creation in the United States;

"(5) bolsters the semiconductor and skilled technical workforces in the United States;

"(6) promotes the inclusion of economically disadvantaged individuals and small businesses; and

"(7) improves the resiliency of the semiconductor supply chains of critical manufacturing industries.

"(e) ADDITIONAL ASSISTANCE FOR MATURE TECHNOLOGY NODES.—

"(1) IN GENERAL.—The Secretary shall establish within the program established under subsection (a) an additional program that provides Federal financial assistance to covered entities to incentivize investment in facilities and equipment in the United States for the fabrication, assembly, testing, or packaging of semiconductors at mature technology nodes.

"(2) ELIGIBILITY AND REQUIREMENTS.—In order for an entity to qualify to receive Federal financial assistance under this subsection, the covered entity shall agree to—

"(A) submit an application under subsection (a)(2)(A);

"(B) meet the eligibility requirements under subsection (a)(2)(B);

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

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

"(D) commit to using any Federal financial assistance received under this section to in-

crease the production of semiconductors at mature technology nodes; and

"(E) be subject to the considerations described in subsection (a)(2)(C).

"(3) PROCEDURES.—In granting Federal financial assistance to covered entities under this subsection, the Secretary may use the procedures established under subsection (a).

"(4) CONSIDERATIONS.—In addition to the considerations described in subsection (a)(2)(C), in granting Federal financial assistance under this subsection, the Secretary may consider whether a covered entity produces or supplies equipment or materials used in the fabrication, assembly, testing, or packaging of semiconductors at mature technology nodes that are necessary to support a critical manufacturing industry.

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

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

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

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

"(g) LOANS AND LOAN GUARANTEES.—

"(1) IN GENERAL.—Subject to the requirements of subsection (a) and this subsection, the Secretary may make or guarantee loans to covered entities as financial assistance under this section.

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

"(A) the covered entity—

"(i) has a reasonable prospect of repaying the principal and interest on the loan; and

"(ii) has met such other criteria as may be established and published by the Secretary; and

"(B) the amount of the loan (when combined with amounts available to the loan recipi-

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

"(3) REASONABLE PROSPECT OF REPAYMENT.—The Secretary shall base a determination of whether there is a reasonable prospect of repayment of the principal and interest on a loan under paragraph (2)(A)(i) on a comprehensive evaluation of whether the covered entity has a reasonable prospect of repaying the principal and interest, including, as applicable, an evaluation of—

"(A) the strength of the contractual terms of the project the covered entity plans to perform (if commercially reasonably available);

"(B) the forecast of noncontractual cash flows supported by market projections from reputable sources, as determined by the Secretary;

"(C) cash sweeps and other structure enhancements;

"(D) the projected financial strength of the covered entity—

"(i) at the time of loan close; and

"(ii) throughout the loan term after the project is completed;

"(E) the financial strength of the investors and strategic partners of the covered entity, if applicable;

"(F) other financial metrics and analyses that the private lending community and nationally recognized credit rating agencies rely on, as determined appropriate by the Secretary; and

"(G) such other criteria the Secretary may determine relevant.

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

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

"(B) shall have a term of not more than 25 years.

"(5) ADDITIONAL TERMS.—A loan or guarantee provided under this subsection may include any other terms and conditions that the Secretary determines to be appropriate.

"(6) RESPONSIBLE LENDER.—No loan may be guaranteed under this subsection, unless the Secretary determines that—

"(A) the lender is responsible; and

"(B) adequate provision is made for servicing the loan on reasonable terms and protecting the financial interest of the United States.

"(7) ADVANCED BUDGET AUTHORITY.—New loans may not be obligated and new loan guarantees may not be committed to under this subsection, unless appropriations of budget authority to cover the costs of such loans and loan guarantees are made in advance in accordance with section 504(b) of the Federal Credit Reform Act of 1990 (2 U.S.C. 661c(b)).

"(8) CONTINUED OVERSIGHT.—The loan agreement for a loan guaranteed under this subsection shall provide that no provision of the loan agreement may be amended of waived without the consent of the Secretary.

"(h) OVERSIGHT.—Not later than 4 years after disbursement of the first financial award under subsection (a), the Inspector General of the Department of Com-

merce shall audit the program under this section to assess—

"(1) whether the eligibility requirements for covered entities receiving financial assistance under the program are met;

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

"(3) whether the covered entities receiving financial assistance under this program have carried out the commitments made to worker and community investment under subsection (a)(2)(B)(ii)(II) by the target date for completion set by the Secretary under subsection (a)(5)(A);

"(4) whether the required agreement entered into by covered entities and the Secretary under subsection (a)(6)(C)(i), including the notification process, has been carried out to provide covered entities sufficient guidance about a violation of the required agreement;

"(5) whether the Secretary has provided timely Congressional notification about violations of the required agreement under subsection (a)(6)(C)(i), including the required information on how the Secretary reached a determination of whether a covered

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

"(6) whether the Secretary has sufficiently reviewed any covered entity engaging in a listed exception under subsection (a)(6)(C)(ii).

"(i) PROHIBITION ON USE OF FUNDS.—No funds made available under this section may be used to construct, modify, or improve a facility outside of the United States.".

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

(1) in subsection (a)(3)(A)(ii)—

(A) in subclause (II), by inserting ", including for technologies based on organic and inorganic materials" after "components"; and

(B) in subclause (V), by striking "and supply chain integrity" and inserting "supply chain integrity, and workforce development";

(2) in subsection (c)—

(A) in paragraph (1)—

(i) by inserting "and grow the domestic semiconductor workforce" after "proto-

typing of advanced semiconductor technology''; and

(ii) by adding at the end the following: ''The Secretary may make financial assistance awards, including construction awards, in support of the national semiconductor technology center.''; and

(B) in paragraph (2)—

(i) in subparagraph (B), by inserting ''and capitalize'' before ''an investment fund''; and

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

''(C) To work with the Secretary of Labor, the Director of the National Science Foundation, the Secretary of Energy, the private sector, institutions of higher education, and workforce training entities to incentivize and expand geographically diverse participation in graduate, undergraduate, and community college programs relevant to microelectronics, including through—

''(i) the development and dissemination of curricula and research training experiences; and

"(ii) the development of workforce training programs and apprenticeships in advanced microelectronic design, research, fabrication, and packaging capabilities.";

(3) in subsection (d)—

(A) by striking "the Manufacturing USA institute" and inserting "a Manufacturing USA institute"; and

(B) by adding at the end the following: "The Director may make financial assistance awards, including construction awards, in support of the National Advanced Packaging Manufacturing Program.";

(4) in subsection (f)—

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

(i) by striking "a Manufacturing USA Institute" and inserting "not more than 3 Manufacturing USA Institutes";

(ii) by striking "is focused on semiconductor manufacturing." and inserting "are focused on semiconductor manufacturing. The Secretary of Commerce may award financial assistance to any Manufac-

turing USA Institute for work relating to semiconductor manufacturing.''; and

(iii) by striking ''Such institute may emphasize'' and inserting ''Such institutes may emphasize''; and

(5) by adding at the end the following:

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

(d) ADDITIONAL AUTHORITIES.—Division H of title XCIX of the William M. (Mac) Thornberry National Defense Authorization Act for Fiscal Year 2021 (15 U.S.C. 4651 et seq.) is amended by adding at the end the following:

''SEC. 9909. ADDITIONAL AUTHORITIES.

''(a) IN GENERAL.—In carrying out the responsibilities of the Department of Commerce under this division, the Secretary may—

''(1) enter into agreements, including contracts, grants and cooperative agreements, and other transactions as may be necessary and on such terms as the Secretary considers appropriate;

''(2) make advance payments under agreements and other transactions authorized under paragraph

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

"(3) require a person or other entity to make payments to the Department of Commerce upon application and as a condition for receiving support through an award of assistance or other transaction;

"(4) procure temporary and intermittent services of experts and consultants in accordance with section 3109 of title 5, United States Code;

"(5) notwithstanding section 3104 of title 5, United States Code, or the provisions of any other law relating to the appointment, number, classification, or compensation of employees, make appointments of scientific, engineering, and professional personnel, and fix the basic pay of such personnel at a rate to be determined by the Secretary at rates not in excess of the highest total annual compensation payable at the rate determined under section 104 of title 3, United States Code, except that the Secretary shall appoint not more than 25 personnel under this paragraph;

"(6) with the consent of another Federal agency, enter into an agreement with that Federal agency to use, with or without reimbursement, any serv-

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

"(7) establish such rules, regulations, and procedures as the Secretary considers appropriate.

"(b) REQUIREMENT.—Any funds received from a payment made by a person or entity pursuant to subsection (a)(3) shall be credited to and merged with the account from which support to the person or entity was made".

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

"9909. Additional authorities.".

SEC. 104. OPPORTUNITY AND INCLUSION.

(a) ESTABLISHMENT.—Not later than 180 days after the date of enactment of this Act, the Secretary of Commerce shall establish activities in the Department of Commerce, within the program established under section 9902 of the William M. (Mac) Thornberry National Defense Authorization Act for Fiscal Year 2021 (15 U.S.C. 4652), to carry out this section using funds appropriated under this Act.

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

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

(c) ACTIVITIES.—Personnel assigned by the Secretary to carry out the activities under this section shall—

(1) assess the eligibility of a covered entity, as defined in section 9901 of the William M. (Mac) Thornberry National Defense Authorization Act for Fiscal Year 2021 (15 U.S.C. 4651), for financial assistance for a project with respect to the requirements under subclauses (II) and (III) of section 9902(a)(2)(B)(ii) of the William M. (Mac) Thornberry National Defense Authorization Act for Fiscal Year 2021 (15 U.S.C. 4652(a)(2)(B)(ii)(II) and (III));

(2) ensure that each covered entity, as defined in section 9901 of the William M. (Mac) Thornberry National Defense Authorization Act for Fiscal Year 2021 (15 U.S.C. 4651),that is awarded financial assistance under section 9902 of that Act (15 U.S.C. 4652) is carrying out the commitments of the covered entity to economically disadvantaged individuals as described in the application of the covered entity under that section by the target dates for completion

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

(3) increase participation of and outreach to economically disadvantaged individuals, minority-owned businesses, veteran-owned businesses, and women-owned businesses, as defined by the Secretary of Commerce, respectively, in the geographic area of a project under section 9902 of the William M. (Mac) Thornberry National Defense Authorization Act for Fiscal Year 2021 (15 U.S.C. 4652) and serve as a resource for those individuals, businesses, and covered entities.

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

(e) REPORT.—Beginning on the date that is 1 year after the date on which the Secretary of Commerce establishes the activities described in subsection (c), the Secretary of Commerce shall submit to the appropriate committees of Congress, as defined in section 9901(1) of the William M. (Mac) Thornberry National Defense Author-

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

SEC. 105. ADDITIONAL GAO REPORTING REQUIREMENTS.

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

(1) in paragraph (1)—

(A) in subparagraph (B)—

(i) in clause (i), by striking ''; and'' and inserting a semicolon; and

(ii) by adding at the end the following:

''(iii) the Federal Government could take specific actions to address shortages in the semiconductor supply chain, including—

''(I) demand-side incentives, including incentives related to the information and communications technology supply chain; and

''(II) additional incentives, at national and global scales, to accelerate utilization of leading-edge semicon-

ductor nodes to address shortages in mature semiconductor nodes; and''; and

(B) in subparagraph (C)—

(i) in clause (iii), by striking ''; and'' and inserting a semicolon; and

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

''(v) how projects are supporting the semiconductor needs of critical infrastructure industries in the United States, including those industries designated by the Cybersecurity and Infrastructure Security Agency as essential infrastructure industries; and''; and

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

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

''(i) semiconductor industry data regarding businesses that are—

''(I) majority owned and controlled by minority individuals;

"(II) majority owned and controlled by women; or

"(III) majority owned and controlled by both women and minority individuals;

"(ii) the number and amount of contracts and subcontracts awarded by each covered entity using funds made available under subsection (a) disaggregated by recipients of each such contract or subcontracts that are majority owned and controlled by minority individuals and majority owned and controlled by women; and

"(iii) aggregated workforce data, including data by race or ethnicity, sex, and job categories.".

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

SEC. 106. APPROPRIATIONS FOR WIRELESS SUPPLY CHAIN INNOVATION.

(a) DIRECT APPROPRIATIONS.—In addition to amounts otherwise available for such purposes, there is appropriated to the Public Wireless Supply Chain Innovation Fund established under section 9202(a)(1) of the William M. (Mac) Thornberry National Defense Authorization Act for Fiscal Year 2021 (15 U.S.C. 4652(a)(1)), out of amounts in the Treasury not otherwise appropriated—

(1) $150,000,000 for fiscal year 2022, to remain available until September 30, 2031; and

(2) $1,350,000,000 for fiscal year 2023, to remain available until September 30, 2032.

(b) USE OF FUNDS, ADMINISTRATION, AND OVERSIGHT.—Of the amounts made available under subsection (a)—

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

(2) not less than $2,000,000 per fiscal year shall be transferred to the Office of Inspector General of the Department of Commerce for oversight

related to activities conducted using amounts provided under this section.

(c) ALLOCATION AUTHORITY.—

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

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

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

(2) ALTERNATE ALLOCATION.—

(A) IN GENERAL.—The Committees on Appropriations of the House of Representatives and the Senate may provide for alternate allocation of amounts recommended for allocation in a given fiscal year from amounts made available under subsection (a), including by account, program, and project.

(B) ALLOCATION BY PRESIDENT.—

(i) NO ALTERNATE ALLOCATIONS.—If Congress has not enacted legislation establishing alternate allocations, including by account, program, and project, by the date on which the Act making full-year appropriations for the Departments of Commerce and Justice, Science, and Related Agencies for the applicable fiscal year is enacted into law, only then shall amounts recommended for allocation for that fiscal year from amounts made available under subsection (a) be allocated by the President or apportioned or allotted by account, program, and project pursuant to title 31, United States Code.

(ii) INSUFFICIENT ALTERNATE ALLOCATION.—If Congress enacts legislation establishing alternate allocations, including by account, program, and project, for amounts recommended for allocation in a given fiscal year from amounts made available under subsection (a) that are less than the full amount recommended for allocation for that fiscal year, the difference between the amount recommended for allo-

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

(d) SEQUESTRATION.—Section 255(g)(1)(A) of the Balanced Budget and Emergency Deficit Control Act of 1985 (2 U.S.C. 905(g)(1)(A)) is amended by inserting after ''Postal Service Fund (18–4020–0–3–372).'' the following:

''Public Wireless Supply Chain Innovation Fund.''.

(e) BUDGETARY EFFECTS.—

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

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

(3) CLASSIFICATION OF BUDGETARY EFFECTS.—Notwithstanding Rule 3 of the Budget Scorekeeping Guidelines set forth in the joint ex-

planatory statement of the committee of conference accompanying Conference Report 105–217 and section 250(c)(8) of the Balanced Budget and Emergency Deficit Control Act of 1985, the budgetary effects of this section shall not be estimated—

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

(B) for purposes of an allocation to the Committee on Appropriations pursuant to section 302(a) of the Congressional Budget Act of 1974; and

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

SEC. 107. ADVANCED MANUFACTURING INVESTMENT CREDIT.

(a) IN GENERAL.—Subpart E of part IV of subchapter A of chapter 1 of the Internal Revenue Code of 1986 is amended by inserting after section 48C the following new section:

"SEC. 48D. ADVANCED MANUFACTURING INVESTMENT CREDIT.

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

for any taxable year is an amount equal to 25 percent of the qualified investment for such taxable year with respect to any advanced manufacturing facility of an eligible taxpayer.

"(b) QUALIFIED INVESTMENT.—

"(1) IN GENERAL.—For purposes of subsection (a), the qualified investment with respect to any advanced manufacturing facility for any taxable year is the basis of any qualified property placed in service by the taxpayer during such taxable year which is part of an advanced manufacturing facility.

"(2) QUALIFIED PROPERTY.—

"(A) IN GENERAL.—For purposes of this subsection, the term 'qualified property' means property—

"(i) which is tangible property,

"(ii) with respect to which depreciation (or amortization in lieu of depreciation) is allowable,

"(iii) which is—

"(I) constructed, reconstructed, or erected by the taxpayer, or

"(II) acquired by the taxpayer if the original use of such property commences with the taxpayer, and

"(iv) which is integral to the operation of the advanced manufacturing facility.

"(B) BUILDINGS AND STRUCTURAL COMPONENTS.—

"(i) IN GENERAL.—The term 'qualified property' includes any building or its structural components which otherwise satisfy the requirements under subparagraph (A).

"(ii) EXCEPTION.—Clause (i) shall not apply with respect to a building or portion of a building used for offices, administrative services, or other functions unrelated to manufacturing.

"(3) ADVANCED MANUFACTURING FACILITY.—For purposes of this section, the term 'advanced manufacturing facility' means a facility for which the primary purpose is the manufacturing of semiconductors or semiconductor manufacturing equipment.

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

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

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

"(c) ELIGIBLE TAXPAYER.—For purposes of this section, the term 'eligible taxpayer' means any taxpayer which—

"(1) is not a foreign entity of concern (as defined in section 9901(6) of the William M. (Mac) Thornberry National Defense Authorization Act for Fiscal Year 2021), and

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

"(d) ELECTIVE PAYMENT.—

"(1) IN GENERAL.—Except as otherwise provided in paragraph (2)(A), in the case of a taxpayer making an election (at such time and in such manner as the Secretary may provide) under this subsection with respect to the credit determined under subsection (a) with respect to such taxpayer, such taxpayer shall be treated as making a payment

against the tax imposed by subtitle A (for the taxable year with respect to which such credit was determined) equal to the amount of such credit.

"(2) SPECIAL RULES.—For purposes of this subsection—

"(A) APPLICATION TO PARTNERSHIPS AND S CORPORATIONS.—

"(i) IN GENERAL.—In the case of the credit determined under subsection (a) with respect to any property held directly by a partnership or S corporation, any election under paragraph (1) shall be made by such partnership or S corporation. If such partnership or S corporation makes an election under such paragraph (in such manner as the Secretary may provide) with respect to such credit—

"(I) the Secretary shall make a payment to such partnership or S corporation equal to the amount of such credit,

"(II) paragraph (3) shall be applied with respect to such credit before determining any partner's dis-

tributive share, or shareholder's pro rata share, of such credit,

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

"(IV) a partner's distributive share of such tax exempt income shall be based on such partner's distributive share of the otherwise applicable credit for each taxable year.

"(ii) COORDINATION WITH APPLICATION AT PARTNER OR SHAREHOLDER LEVEL.—In the case of any property held directly by a partnership or S corporation, no election by any partner or shareholder shall be allowed under paragraph (1) with respect to any credit determined under subsection (a) with respect to such property.

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

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

"(C) TIMING.—The payment described in paragraph (1) shall be treated as made on the later of the due date (determined without regard to extensions) of the return of tax for the taxable year or the date on which such return is filed.

"(D) TREATMENT OF PAYMENTS TO PARTNERSHIPS AND S CORPORATIONS.—For purposes of section 1324 of title 31, United States Code, the payments under subparagraph (A)(i)(I) shall be treated in the same manner as a refund due from a credit provision referred to in subsection (b)(2) of such section.

"(E) ADDITIONAL INFORMATION.—As a condition of, and prior to, any amount being treated as a payment which is made by the taxpayer under paragraph (1) or any payment being made pursuant to subparagraph (A), the

Secretary may require such information or registration as the Secretary deems necessary or appropriate for purposes of preventing duplication, fraud, improper payments, or excessive payments under this section.

"(F) EXCESSIVE PAYMENT.—

"(i) IN GENERAL.—In the case of any amount treated as a payment which is made by the taxpayer under paragraph (1), or any payment made pursuant to subparagraph (A), which the Secretary determines constitutes an excessive payment, the tax imposed on such taxpayer by chapter 1 for the taxable year in which such determination is made shall be increased by an amount equal to the sum of—

"(I) the amount of such excessive payment, plus

"(II) an amount equal to 20 percent of such excessive payment.

"(ii) REASONABLE CAUSE.—Clause (i)(II) shall not apply if the taxpayer demonstrates to the satisfaction of the Secretary that the excessive payment resulted from reasonable cause.

"(iii) EXCESSIVE PAYMENT DEFINED.—For purposes of this subparagraph, the term 'excessive payment' means, with respect to property for which an election is made under this subsection for any taxable year, an amount equal to the excess of—

"(I) the amount treated as a payment which is made by the taxpayer under paragraph (1), or the amount of the payment made pursuant to subparagraph (A), with respect to such property for such taxable year, over

"(II) the amount of the credit which, without application of this subsection, would be otherwise allowable (determined without regard to section 38(c)) under subsection (a) with respect to such property for such taxable year.

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

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

"(4) MIRROR CODE POSSESSIONS.—In the case of any possession of the United States with a mirror code tax system (as defined in section 24(k)), this subsection shall not be treated as part of the income tax laws of the United States for purposes of determining the income tax law of such possession unless such possession elects to have this subsection be so treated.

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

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

"(B) any payment made pursuant to paragraph (2)(A).

"(6) REGULATIONS.—The Secretary shall issue such regulations or other guidance as may be necessary or appropriate to carry out the purposes of this subsection, including—

"(A) regulations or other guidance providing rules for determining a partner's dis-

tributive share of the tax exempt income described in paragraph (2)(A)(i)(III), and

"(B) guidance to ensure that the amount of the payment or deemed payment made under this subsection is commensurate with the amount of the credit that would be otherwise allowable (determined without regard to section 38(c)).

"(e) TERMINATION OF CREDIT.—The credit allowed under this section shall not apply to property the construction of which begins after December 31, 2026.".

(b) RECAPTURE IN CONNECTION WITH CERTAIN EXPANSIONS.—

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

"(3) CERTAIN EXPANSIONS IN CONNECTION WITH ADVANCED MANUFACTURING FACILITIES.—

"(A) IN GENERAL.—If there is a an applicable transaction by an applicable taxpayer before the close of the 10-year period beginning on the date such taxpayer placed in service investment credit property which is eligible for

the advanced manufacturing investment credit under section 48D(a), then the tax under this chapter for the taxable year in which such transaction occurs shall be increased by 100 percent of the aggregate decrease in the credits allowed under section 38 for all prior taxable years which would have resulted solely from reducing to zero any credit determined under section 46 which is attributable to the advanced manufacturing investment credit under section 48D(a) with respect to such property.

"(B) EXCEPTION.—Subparagraph (A) shall not apply if the applicable taxpayer demonstrates to the satisfaction of the Secretary that the applicable transaction has been ceased or abandoned within 45 days of a determination and notice by the Secretary.

"(C) REGULATIONS AND GUIDANCE.—The Secretary shall issue such regulations or other guidance as the Secretary determines necessary or appropriate to carry out the purposes of this paragraph, including regulations or other guidance which provide for requirements for recordkeeping or information reporting for purposes

of administering the requirements of this paragraph.''.

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

''(D) APPLICABLE TRANSACTION.—For purposes of this subsection—

''(i) IN GENERAL.—The term 'applicable transaction' means, with respect to any applicable taxpayer, any significant transaction (as determined by the Secretary, in coordination with the Secretary of Commerce and the Secretary of Defense) involving the material expansion of semiconductor manufacturing capacity of such applicable taxpayer in the People's Republic of China or a foreign country of concern (as defined in section 9901(7) of the William M. (Mac) Thornberry National Defense Authorization Act for Fiscal Year 2021).

''(ii) EXCEPTION.—Such term shall not include a transaction which primarily

involves the expansion of manufacturing capacity for legacy semiconductors (as defined in section 9902(a)(6) of the William M. (Mac) Thornberry National Defense Authorization Act for Fiscal Year 2021).

''(E) APPLICABLE TAXPAYER.—For purposes of this subsection, the term 'applicable taxpayer' means any taxpayer who has been allowed a credit under section 48D(a) for any prior taxable year.''.

(3) CONFORMING AMENDMENTS.—

(A) Section 50(a)(4) of the Internal Revenue Code of 1986, as redesignated by paragraph (1), is amended—

(i) by inserting '', or any applicable transaction to which paragraph (3)(A) applies'' after ''paragraphs (1) and (2)'', and

(ii) by inserting ''or applicable transaction'' after ''such cessation''.

(B) Section 50(a)(6)(C) of such Code, as redesignated by paragraph (1), is amended by striking ''paragraph (1) or (2)'' and inserting ''paragraph (1), (2), or (3)''.

(C) Section 1371(d)(1) of such Code is amended by striking ''section 50(a)(4)'' and inserting ''section 50(a)(5)''.

(c) EXEMPTION OF ELECTIVE PAYMENTS FROM SEQUESTRATION.—Subsection (d) of section 255 of the Balanced Budget and Emergency Deficit Control Act of 1985 (2 U.S.C. 905) is amended to read as follows:

''(d) REFUNDABLE INCOME TAX CREDITS AND CERTAIN ELECTIVE PAYMENTS.—

''(1) REFUNDABLE INCOME TAX CREDITS.—Payments to individuals made pursuant to provisions of the Internal Revenue Code of 1986 establishing refundable tax credits shall be exempt from reduction under any order issued under this part.

''(2) CERTAIN ELECTIVE PAYMENTS.—Payments made to taxpayers pursuant to elections under subsection (d) of section 48D of the Internal Revenue Code of 1986, or amounts treated as payments which are made by taxpayers under paragraph (1) of such subsection, shall be exempt from reduction under any order issued under this part.''.

(d) CONFORMING AMENDMENTS.—

(1) Paragraph (6) of section 46 of the Internal Revenue Code of 1986 is amended to read as follows:

"(6) the advanced manufacturing investment credit.".

(2) Section 49(a)(1)(C) of such Code is amended—

(A) by striking "and" at the end of clause (iv),

(B) by striking the period at the end of clause (v) and inserting ", and", and

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

"(vi) the basis of any qualified property (as defined in subsection (b)(2) of section 48D) which is part of an advanced manufacturing facility (as defined in subsection (b)(3) of such section).".

(3) Section 50(a)(2)(E) of such Code is amended by striking "or 48C(b)(2)" and inserting "48C(b)(2), or 48D(b)(5)".

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

"Sec. 48D. Advanced manufacturing investment credit.".

(e) BUDGETARY EFFECTS.—

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

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

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

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

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

(B) for purposes of an allocation to the Committee on Appropriations pursuant to section 302(a) of the Congressional Budget Act of 1974; and

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

(f) EFFECTIVE DATE.—

(1) IN GENERAL.—Except as provided in paragraph (2), the amendments made by this section shall apply to property placed in service after December 31, 2022, and, for any property the construction of which begins prior to January 1, 2023, only to the extent of the basis thereof attributable to the construction, reconstruction, or erection after the date of enactment of this Act.

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

DIVISION B—RESEARCH AND INNOVATION

SEC. 10000. TABLE OF CONTENTS.

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DIVISION B—RESEARCH AND INNOVATION

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Sec. 10243. Report to Congress on collaborations with government agencies.
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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.

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.
Sec. 10263. Promoting domestic production of technologies developed under Manufacturing USA Program.

TITLE III—NATIONAL SCIENCE FOUNDATION FOR THE FUTURE

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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.
Sec. 10313. Graduate STEM education.
Sec. 10314. STEM workforce data.
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.
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Subtitle C—Broadening Participation

Sec. 10321. Presidential awards for excellence in mathematics and science.
Sec. 10322. Robert Noyce Teacher Scholarship program update.
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Sec. 10324. Broadening participation on major facilities awards.
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Subtitle D—NSF Research Security

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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.

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

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SEC. 10001. SHORT TITLE.

This division may be cited as the ''Research and Development, Competition, and Innovation Act''.

SEC. 10002. DEFINITIONS.

In this division:

(1) ARTIFICIAL INTELLIGENCE.—The term ''artificial intelligence'' or ''AI'' has the meaning given such term in section 5002 of the William M. (Mac) Thornberry National Defense Authorization Act for Fiscal Year 2021 (15 U.S.C. 9401).

(2) AWARDEE.—The term ''awardee'' means the legal entity to which Federal assistance is awarded and that is accountable to the Federal Government for the use of the funds provided.

(3) AWARD PERSONNEL.—The term ''award personnel'' means principal investigators and co-principal investigators, faculty, postdoctoral researchers, and other employees supported by a grant, cooperative agreement, or contract under Federal law.

(4) BIOMANUFACTURING.—The term ''biomanufacturing'' means the utilization of biological systems to develop new and advance existing products, tools, and processes at commercial scale.

(5) EMERGING RESEARCH INSTITUTION.—The term ''emerging research institution'' means an institution of higher education with an established undergraduate or graduate program that has less than $50,000,000 in Federal research expenditures.

(6) ENGINEERING BIOLOGY.—The term ''engineering biology'' means the application of engineering design principles and practices to biological systems, including molecular and cellular systems, to advance fundamental understanding of complex natural systems and to enable novel or optimize functions and capabilities.

(7) EPSCoR.—The term ''EPSCoR'' has the meaning given the term in section 502 of the America COMPETES Reauthorization Act of 2010 (42 U.S.C. 1862p note).

(8) EPSCoR INSTITUTION.—The term ''EPSCoR institution'' means an institution of higher education, nonprofit organization, or other institution located in a jurisdiction eligible to participate in the program under section 113 of the National

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

(9) FEDERAL LABORATORY.—The term ''Federal laboratory'' has the meaning given such term in section 4 of the Stevenson-Wydler Technology Innovation Act of 1980 (15 U.S.C. 3703).

(10) FEDERAL RESEARCH AGENCY.—The term ''Federal research agency'' means any Federal agency with an annual extramural research expenditure of over $100,000,000 in fiscal year 2022 constant dollars.

(11) FOUNDATION.—The term ''Foundation'' means the National Science Foundation.

(12) HISTORICALLY BLACK COLLEGE AND UNIVERSITY.—The term ''historically Black college and university'' has the meaning given the term ''part B institution'' in section 322 of the Higher Education Act of 1965 (20 U.S.C. 1061).

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

(14) INTERAGENCY WORKING GROUP ON INCLUSION IN STEM.—The term ''interagency working group on inclusion in STEM'' means the interagency

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

(15) LABOR ORGANIZATION.—The term ''labor organization'' has the meaning given the term in section 2(5) of the National Labor Relations Act (29 U.S.C. 152(5)), except that such term shall also include—

(A) any organization composed of labor organizations, such as a labor union federation or a State or municipal labor body; and

(B) any organization which would be included in the definition for such term under such section 2(5) but for the fact that the organization represents—

(i) individuals employed by the United States, any wholly owned Government corporation, any Federal Reserve Bank, or any State or political subdivision thereof;

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

(iii) individuals employed as agricultural laborers.

(16) LOW-INCOME INDIVIDUAL.—The term ''low-income individual'' means an individual from a family whose taxable income for the preceding year did not exceed 150 percent of an amount equal to the poverty level determined by using criteria of poverty established by the Bureau of the Census.

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

(18) MANUFACTURING USA INSTITUTE.—The term ''Manufacturing USA institute'' means a Manufacturing USA institute described in section 34(d) of the National Institute of Standards and Technology Act (15 U.S.C. 278s(d)).

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

tution, or Native American-serving nontribal institution as defined in section 371(c) of such Act (20 U.S.C. 1067q(c)).

(20) NATIONAL ACADEMIES.—The term ''National Academies'' means the National Academies of Sciences, Engineering, and Medicine.

(21) NON-PROFIT ORGANIZATION.—The term ''non-profit organization'' means an organization which is described in section 501(c)(3) of the Internal Revenue Code of 1986 and exempt from tax under section 501(a) of such code.

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

(23) QUANTUM INFORMATION SCIENCE.—The term ''quantum information science'' has the meaning given such term in section 2 of the National Quantum Initiative Act (15 U.S.C. 8801).

(24) RECIPIENT.—The term ''recipient'' means an entity, usually a non-Federal entity, that receives a Federal award directly from a Federal research agency. The term ''recipient'' does not include entities that receive subawards or individuals that are the beneficiaries of the award.

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

support provided to an individual or entity by a Federal research agency to carry out research and development activities, which may include support in the form of a grant, contract, cooperative agreement, or other such transaction. The term does not include a grant, contract, agreement or other transaction for the procurement of goods or services to meet the administrative needs of a Federal research agency.

(26) SKILLED TECHNICAL WORK.—The term ''skilled technical work'' means an occupation that requires a high level of knowledge in a technical domain and does not require a bachelor's degree for entry.

(27) STEM.—The term ''STEM'' means science, technology, engineering, and mathematics, including computer science.

(28) STEM EDUCATION.—The term ''STEM education'' has the meaning given the term in section 2 of the STEM Education Act of 2015 (42 U.S.C. 6621 note).

(29) TECHNICAL STANDARD.—The term ''technical standard'' has the meaning given such term in section 12(d)(5) of the National Technology Transfer and Advancement Act of 1995 (15 U.S.C. 272 note).

(30) TRIBAL COLLEGE OR UNIVERSITY.—The term ''Tribal College or University'' has the meaning given such term in section 316 of the Higher Education Act of 1965 (20 U.S.C. 1059c).

SEC. 10003. BUDGETARY EFFECTS.

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

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

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

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

(2) for purposes of an allocation to the Committee on Appropriations pursuant to section 302(a) of the Congressional Budget Act of 1974; and

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

TITLE I—DEPARTMENT OF ENERGY SCIENCE FOR THE FUTURE

SEC. 10101. MISSION OF THE OFFICE OF SCIENCE.

Section 209 of the Department of Energy Organization Act (42 U.S.C. 7139) is amended by adding at the end the following:

''(d) USER FACILITIES.—The Director shall carry out the construction, operation, and maintenance of user facilities to support the mission described in subsection (c). As practicable, these facilities shall serve the needs of the Department, industry, the academic community, and other relevant entities for the purposes of advancing the missions of the Department, improving the competitiveness of the United States, protecting public health and safety, and addressing other national priorities including emergencies.

''(e) COORDINATION.—

''(1) IN GENERAL.—The Secretary—

''(A) shall ensure the coordination of the Office of Science with the other activities of the Department, including the transfer of knowl-

edge, capabilities, and relevant technologies from basic research programs of the Department to applied research and development programs of the Department for the purpose of enabling development of mission-relevant technologies;

"(B) shall support joint activities among the programs of the Department;

"(C) shall coordinate with other relevant Federal agencies operating under existing authorizations relating to subjects relating to the mission described in subsection (c) in supporting advancements in related research areas as appropriate; and

"(D) may form partnerships to enhance the utilization of and ensure access to user facilities by other Federal agencies.

"(2) OFFICE OF SCIENCE.—The Director—

"(A) shall ensure the coordination of programs and activities carried out by the Office of Science; and

"(B) shall direct all programs which have not recently completed a future planning roadmap consistent with the funding of such programs authorized under the Research and De-

velopment, Competition, and Innovation Act to complete such a roadmap.''.

SEC. 10102. BASIC ENERGY SCIENCES PROGRAM.

(a) DEPARTMENT OF ENERGY RESEARCH AND INNOVATION ACT.—Section 303 of the Department of Energy Research and Innovation Act (42 U.S.C. 18641) is amended—

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

(2) by inserting before subsection (c), as so redesignated, the following:

''(a) PROGRAM.—As part of the activities authorized under section 209 of the Department of Energy Organization Act (42 U.S.C. 7139), the Director shall carry out a research and development program in basic energy sciences, including materials sciences and engineering, chemical sciences, physical biosciences, geosciences, and other disciplines, to understand, model, and control matter and energy at the electronic, atomic, and molecular levels in order to provide the foundations for new energy technologies, address scientific grand challenges, and support the energy, environment, and national security missions of the Department.

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

under this section, the Director shall prioritize research and development of sustainable chemistry to support clean, safe, and economic alternatives and methodologies to traditional chemical products and processes.''; (3) in subsection (d), as so redesignated—

(A) in paragraph (3)—

(i) in subparagraph (C), by striking ''and'' at the end;

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

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

''(D) autonomous chemistry and materials synthesis and characterization facilities that leverage advances in artificial intelligence; and''; and

(B) by adding at the end the following:

''(4) ADVANCED PHOTON SOURCE UPGRADE.—

''(A) DEFINITIONS.—In this paragraph:

''(i) FLUX.—The term 'flux' means the rate of flow of photons.

''(ii) HARD X-RAY.—The term 'hard x-ray' means a photon with energy greater than 20 kiloelectron volts.

"(B) UPGRADE.—The Secretary shall provide for the upgrade to the Advanced Photon Source described in the publication approved by the Basic Energy Sciences Advisory Committee on June 9, 2016, entitled 'Report on Facility Upgrades', including the development of a multibend achromat lattice to produce a high flux of coherent x-rays within the hard x-ray energy region and a suite of beamlines optimized for this source.

"(C) START OF OPERATIONS.—The Secretary shall, subject to the availability of appropriations, ensure that the start of full operations of the upgrade under this paragraph occurs before March 31, 2026.

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

"(5) SPALLATION NEUTRON SOURCE PROTON POWER UPGRADE.—

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

"(B) PROTON POWER UPGRADE DEFINED.—In this paragraph, the term 'proton power upgrade' means the Spallation Neutron Source power upgrade described in—

"(i) the publication entitled 'Facilities for the Future of Science: A Twenty-Year Outlook', published by the Office of Science of the Department in December, 2003;

"(ii) the publication entitled 'Four Years Later: An Interim Report on Facilities for the Future of Science: A Twenty-Year Outlook', published by the Office of Science of the Department in August, 2007; and

"(iii) the publication approved by the Basic Energy Sciences Advisory Committee on June 9, 2016, entitled 'Report on Facility Upgrades'.

"(C) START OF OPERATIONS.—The Secretary shall, subject to the availability of appropriations, ensure that the start of full operations of the upgrade under this paragraph occurs before July 30, 2028, with the option for early operation in 2025.

"(D) FUNDING.—Out of funds authorized to be appropriated under subsection (j), there is authorized to be appropriated to the Secretary to carry out the upgrade under this paragraph—

"(i) $17,000,000 for fiscal year 2023;

"(ii) $14,202,000 for fiscal year 2024; and

"(iii) $1,567,000 for fiscal year 2025.

"(6) SPALLATION NEUTRON SOURCE SECOND TARGET STATION.—

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

"(B) SECOND TARGET STATION DEFINED.—In this paragraph, the term 'second target station' means the Spallation Neutron Source second target station described in—

"(i) the publication entitled, 'Facilities for the Future of Science: A Twenty-Year Outlook', published by the Office of Science of the Department in December, 2003;

"(ii) the publication entitled, 'Four Years Later: An Interim Report on Facili-

ties for the Future of Science: A Twenty-Year Outlook', published by the Office of Science of the Department in August, 2007; and

"(iii) the publication approved by the Basic Energy Sciences Advisory Committee on June 9, 2016, entitled 'Report on Facility Upgrades'.

"(C) START OF OPERATIONS.—The Secretary shall, subject to the availability of appropriations, ensure that the start of full operations of the second target station under this paragraph occurs before December 31, 2033, with the option for early operation in 2029.

"(D) FUNDING.—Out of funds authorized to be appropriated under subsection (j), there are authorized to be appropriated to the Secretary to carry out the activities under this paragraph, including construction—

"(i) $127,000,000 for fiscal year 2023;

"(ii) $205,000,000 for fiscal year 2024;

"(iii) $279,000,000 for fiscal year 2025;

"(iv) $300,000,000 for fiscal year 2026; and

"(v) $281,000,000 for fiscal year 2027.

"(7) ADVANCED LIGHT SOURCE UPGRADE.—

"(A) DEFINITIONS.—In this paragraph:

"(i) FLUX.—The term 'flux' means the rate of flow of photons.

"(ii) SOFT X-RAY.—The term 'soft x-ray' means a photon with energy in the range from 50 to 2,000 electron volts.

"(B) UPGRADE.—The Secretary shall provide for the upgrade to the Advanced Light Source described in the publication approved by the Basic Energy Sciences Advisory Committee on June 9, 2016, entitled 'Report on Facility Upgrades', including the development of a multibend achromat lattice to produce a high flux of coherent x-rays within the soft x-ray energy region.

"(C) START OF OPERATIONS.—The Secretary shall, subject to the availability of appropriations, ensure that the start of full operations of the upgrade under this paragraph occurs before September 30, 2029.

"(D) FUNDING.—Out of funds authorized to be appropriated under subsection (j), there are authorized to be appropriated to the Secretary to carry out the upgrade under this paragraph—

"(i) $135,000,000 for fiscal year 2023;

"(ii) $102,500,000 for fiscal year 2024;

"(iii) $50,000,000 for fiscal year 2025; and

"(iv) $1,400,000 for fiscal year 2026.

"(8) LINAC COHERENT LIGHT SOURCE II HIGH ENERGY UPGRADE.—

"(A) DEFINITIONS.—In this paragraph:

"(i) HIGH ENERGY.—The term 'high energy', with respect to an x-ray, means a photon with an energy in the 5 to 13 kiloelectron volt range.

"(ii) HIGH REPETITION RATE.—The term 'high repetition rate' means the delivery of x-ray pulses up to 1,000,000 pulses per second.

"(iii) ULTRA-SHORT PULSE.—The term 'ultra-short pulse', with respect to an

x-ray, means that the x-ray has bursts capable of durations of less than 100 femtoseconds.

"(B) UPGRADE.—The Secretary shall—

"(i) provide for the upgrade to the Linac Coherent Light Source II facility described in the publication approved by the Basic Energy Sciences Advisory Committee on June 9, 2016, entitled 'Report on Facility Upgrades', including the development of experimental capabilities for high energy x-rays to reveal fundamental scientific discoveries; and

"(ii) ensure such upgrade enables the production and use of high energy, ultrashort pulse x-rays delivered at a high repetition rate.

"(C) START OF OPERATIONS.—The Secretary shall, subject to the availability of appropriations, ensure that the start of full operations of the upgrade under this paragraph occurs before December 31, 2026.

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

retary to carry out the upgrade under this paragraph—

"(i) $100,000,000 for fiscal year 2023;

"(ii) $130,000,000 for fiscal year 2024;

"(iii) $135,000,000 for fiscal year 2025; and

"(iv) $99,343,000 for fiscal year 2026.

"(9) CRYOMODULE REPAIR AND MAINTENANCE FACILITY.—

"(A) IN GENERAL.—The Secretary shall provide for the construction of a cryomodule repair and maintenance facility to service the Linac Coherent Light Source II and subsequent upgrades.

"(B) CONSULTATION REQUIRED.—The Secretary shall consult with the private sector, institutions of higher education, National Laboratories, and relevant Federal agencies to ensure that the facility described in subparagraph (A) has the capability to maintain, repair, and test superconducting radio frequency accelerator components.

"(C) FUNDING.—Out of funds authorized to be appropriated under subsection (j), there are authorized to be appropriated to the Secretary to carry out the activities under this paragraph—

"(i) $29,300,000 for fiscal year 2023;

"(ii) $24,000,000 for fiscal year 2024;

"(iii) $20,000,000 for fiscal year 2025; and

"(iv) $15,700,000 for fiscal year 2026.

"(10) NANOSCALE SCIENCE RESEARCH CENTER RECAPITALIZATION PROJECT.—

"(A) IN GENERAL.—The Secretary shall provide for the recapitalization of the Nanoscale Science Research Centers, to include the upgrade of equipment at each Center supported by the Office of Science on the date of enactment of the Research and Development, Competition, and Innovation Act, to accelerate advances in the various fields of science including nanoscience, materials, chemistry, biology, and quantum information science.

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

are authorized to be appropriated to the Secretary to carry out the recapitalization under this paragraph—

"(i) $25,000,000 for fiscal year 2023; and

"(ii) $25,000,000 for fiscal year 2024.

"(11) NATIONAL SYNCHROTRON LIGHT SOURCE II BEAMLINE BUILDOUT.—

"(A) IN GENERAL.—The Secretary shall provide for the development and construction of experimental stations to provide significant additional beamline and instrument capacity, complement the existing portfolio of beamlines, and complete the buildout of the National Synchrotron Light Source II.

"(B) START OF OPERATIONS.—Subject to the availability of appropriations, the Secretary—

"(i) shall begin carrying out subparagraph (A) not later than September 30, 2036; and

"(ii) may begin carrying out subparagraph (A)—

"(I) in calendar year 2033; or

"(II) after the construction of individual beamlines is complete."; and

(4) by adding at the end the following:

"(h) COMPUTATIONAL MATERIALS AND CHEMICAL SCIENCES.—

"(1) IN GENERAL.—The Director shall support a program of research and development for the application of advanced computing practices to foundational and emerging research problems in chemistry and materials science. Research activities shall include—

"(A) chemical catalysis research and development;

"(B) the use of large data sets to model materials phenomena, including through advanced characterization of materials, materials synthesis, processing, and innovative use of experimental and theoretical data;

"(C) codesign of chemical system and chemistry modeling software with advanced computing systems and hardware technologies; and

"(D) modeling of chemical processes, assemblies, and reactions such as molecular dy-

namics and quantum chemistry, including through novel computing methods.

"(2) COMPUTATIONAL MATERIALS AND CHEMICAL SCIENCES CENTERS.—

"(A) IN GENERAL.—In carrying out the activities authorized under paragraph (1), the Director shall select and establish up to 6 computational materials and chemical sciences centers to—

"(i) develop open-source, robust, and validated computational codes and user-friendly software, coupled with innovative use of experimental and theoretical data, to enable the design, discovery, and development of new materials and chemical systems; and

"(ii) focus on overcoming challenges and maximizing the benefits of exascale and other high performance computing underpinned by accelerated node technologies.

"(B) SELECTION.—The Director shall select centers under subparagraph (A) on a competitive, merit-reviewed basis. The Director shall consider applications from the National

Laboratories, institutions of higher education, multi-institutional collaborations, and other appropriate entities.

"(C) DURATION.—

"(i) NEW CENTERS.—A center selected under subparagraph (A) shall receive support for a period of not more than 5 years beginning on the date of establishment of that center, subject to the availability of appropriations.

"(ii) EXISTING CENTERS.—A center already in existence on the date of enactment of the Research and Development, Competition, and Innovation Act may continue to receive support for a period of not more than 5 years beginning on the date of establishment of that center.

"(D) RENEWAL.—Upon the expiration of any period of support of a center under this subsection, the Director may renew support for the center, on a merit-reviewed basis, for a period of not more than 5 years.

"(i) MATERIALS RESEARCH DATABASE.—

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

and provide access to a database of computed information on known and predicted materials properties and computational tools to accelerate breakthroughs in materials discovery and design.

"(2) PROGRAM.—In carrying out this subsection, the Director shall—

"(A) conduct cooperative research among National Laboratories, industry, academia, and other research institutions to advance understanding, prediction, and manipulation of materials and facilitate the design of novel materials;

"(B) develop and maintain data infrastructure at user facilities that generate data to collect, analyze, label, and otherwise prepare the data for inclusion in the database;

"(C) leverage existing high performance computing systems to conduct high throughput calculations, and develop computational and data mining algorithms for the prediction of material properties;

"(D) strengthen the foundation for new technologies and advanced manufacturing; and

"(E) drive the development of advanced materials for applications that span the Depart-

ment's missions in energy, environment, and national security.

"(3) COORDINATION.—In carrying out this subsection, the Director shall leverage programs and activities across the Department, including computational materials and chemical sciences centers established under subsection (h).

"(4) FUNDING.—Out of funds authorized to be appropriated under subsection (j), there is authorized to be appropriated to the Secretary to carry out activities under this subsection $10,000,000 for each of fiscal years 2023 through 2027.

"(j) AUTHORIZATION OF APPROPRIATIONS.—Out of funds authorized to be appropriated to the Office of Science in a fiscal year, there are authorized to be appropriated to the Secretary to carry out the activities described in this section—

"(1) $2,685,414,000 for fiscal year 2023;

"(2) $2,866,890,840 for fiscal year 2024;

"(3) $2,987,727,170 for fiscal year 2025;

"(4) $3,062,732,781 for fiscal year 2026; and

"(5) $3,080,067,167 for fiscal year 2027.".

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

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

"(4) FUNDS.—Of the funds authorized to be appropriated for basic energy sciences in a fiscal year, there is authorized to be appropriated to the Secretary to carry out activities under this subsection $50,000,000 for each of fiscal years 2023 through 2027."; and

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

"(4) FUNDS.—Of the funds authorized to be appropriated for basic energy sciences in a fiscal year, there is authorized to be appropriated to the Secretary to carry out activities under this subsection $50,000,000 for each of fiscal years 2023 through 2027.".

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

(1) in subsection (a)—

(A) in paragraph (1)—

(i) in subparagraph (A)(ii), by striking "and" after the semicolon at the end;

(ii) in subparagraph (B), by striking the period at the end and inserting ''; and''; and

(iii) by adding at the end the following:

''(C) to ensure the competitiveness of the United States in energy storage by fostering an ecosystem linking fundamental research and development to deployment of storage solutions while minimizing the environmental impacts of energy storage technologies.''; and

(B) in paragraph (2)—

(i) in subparagraph (A), by striking ''and'' after the semicolon at the end;

(ii) in subparagraph (B), by striking the period at the end and inserting ''; and''; and

(iii) by adding at the end the following:

''(C) any other relevant office of the Department.'';

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

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

year, there is authorized to be appropriated to the Secretary to carry out activities under this subsection $50,000,000 for each of fiscal years 2023 through 2027.";

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

"(4) FUNDING.—Of the funds authorized to be appropriated for basic energy sciences in a fiscal year, there is authorized to be appropriated to the Secretary to carry out activities under this subsection $50,000,000 for each of fiscal years 2023 through 2027."; and

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

"(4) FUNDING.—Of the funds authorized to be appropriated for basic energy sciences in a fiscal year, there is authorized to be appropriated to the Secretary to carry out activities under this subsection $20,000,000 for each of fiscal years 2023 through 2027.".

(d) FOUNDATIONAL NUCLEAR SCIENCE.—

(1) IN GENERAL.—The Director of the Office of Science shall support a program of research and development to bridge scientific barriers to, and expand theoretical and fundamental knowledge rel-

evant to, understanding nuclear materials and matter for the benefit of commerce, medicine, and national security.

(2) ACTIVITIES.—As part of the program described in paragraph (1)—

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

(i) research in nuclear materials science, including the application of advanced computing practices to foundational and emerging research areas in nuclear materials science and discovery, such as—

(I) the advanced characterization of materials;

(II) materials synthesis;

(III) processing;

(IV) the innovative use of experimental and theoretical data; and

(V) mechanical behavior in unique environments, including the effects of radiation;

(ii) electrochemistry research and associated techniques for processing nuclear materials;

(iii) the development of advanced instrumentation and nuclear data collection to inform the activities described in clauses (i) and (ii); and

(iv) any other area of research, as determined by the Director of the Office of Science; and

(B) the Assistant Secretary for Nuclear Energy shall consult with the Director of the Office of Science to support the direction of translational research, development, and validation of physical concepts developed under the program.

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

(e) CARBON MATERIALS SCIENCE INITIATIVE.—

(1) INITIATIVE.—

(A) IN GENERAL.—The Director of the Office of Science (referred to in this subsection as the ''Director'') shall establish a research initiative, to be known as the ''Carbon Materials

Science Initiative'' (referred to in this subsection as the ''Initiative''), to expand the fundamental knowledge of coal, coal-wastes, and carbon ore chemistry useful for understanding the conversion of carbon to material products.

(B) COORDINATION.—In carrying out programs and activities under the Initiative, the Director shall leverage expertise and resources from the Office of Fossil Energy and Carbon Management and the United States Geological Survey.

(C) TEAMS.—

(i) IN GENERAL.—In carrying out the Initiative, the Director shall establish and organize activities among multidisciplinary teams to leverage, to the maximum extent practicable, expertise from the National Laboratories, institutions of higher education, and the private sector.

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

(2) RESEARCH PROGRAM.—

(A) IN GENERAL.—The Director shall carry out under the Initiative a program to support, and discover fundamental knowledge relevant to, carbon materials and carbon ore processing research.

(B) ACTIVITIES.—As part of the program described in subparagraph (A), the Director shall, in coordination with the Assistant Secretary of Energy for Fossil Energy and Carbon Management, as appropriate, support research to pursue distinct lines of scientific inquiry, including—

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

(ii) methods of improving performance, cost, and availability of materials for use in carbon capture systems; and

(iii) unconventional pathways and materials for conversion of carbon dioxide molecules, minerals, and materials.

(C) REVIEW.—The Director shall periodically review activities carried out under the program described in subparagraph (A) to evaluate

the achievement of scientific objectives and research milestones.

(D) COORDINATION WITH EXISTING PROGRAMS AND CENTERS.—In carrying out the program described in subparagraph (A), the Director shall—

(i) ensure coordination and knowledge sharing with—

(I) the United States Geological Survey; and

(II) the programs and the Carbon Utilization Research Center established under section 969A of the Energy Policy Act of 2005 (42 U.S.C. 16298a); and

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

(3) CARBON MATERIALS RESEARCH CENTERS.—

(A) IN GENERAL.—In carrying out the activities authorized under paragraph (2), the Director shall establish 1 center in each of the 2 major coal-producing regions of the United States, each of which shall—

(i) be known as a ''Carbon Materials Research Center'' (referred to in this paragraph as a ''Center''); and

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

(I) developing and advancing methods of extracting, processing, or recycling carbon or other valuable materials or minerals from raw coal, coal-waste, or other solid carbon materials, for the development of new carbon-based materials;

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

(III) overcoming the challenges and maximizing the benefits of commercially extracting, producing, or improving coal-derived carbon and resulting products; and

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

(B) SELECTION.—The Director shall—

(i) select Centers under subparagraph (A) on a competitive, merit-reviewed basis; and

(ii) consider applications from the National Laboratories, institutions of higher education, multi-institutional collaborations, and other appropriate entities.

(C) DURATION.—A Center shall receive support for a period of not more than 5 years beginning on the date of establishment of that Center, subject to the availability of appropriations.

(D) RENEWAL.—On the expiration of any period of support of a Center, the Director may renew support for that Center, on a merit-reviewed basis, for a period of not more than 5 years.

(E) EXISTING FACILITIES.—The Director shall—

(i) ensure that the research activities carried out by the Centers are not duplicative of existing efforts; and

(ii) if practicable, leverage existing user facilities and other capabilities of the Department of Energy to carry out the research objectives of the Centers.

(f) CARBON SEQUESTRATION RESEARCH AND GEOLOGIC COMPUTATIONAL SCIENCE INITIATIVE.—

(1) INITIATIVE.—

(A) IN GENERAL.—The Secretary of Energy (referred to in this subsection as the ''Secretary'') shall establish a research initiative, to be known as the ''Carbon Sequestration Research and Geologic Computational Science Initiative'' (referred to in this subsection as the ''Initiative''), to expand the fundamental knowledge, data collection, data analysis, and modeling of subsurface geology for the purpose of advancing carbon sequestration in geologic formations.

(B) LEVERAGING.—In carrying out programs and activities under the Initiative, the Secretary shall leverage expertise and resources from the Office of Fossil Energy and Carbon

Management and the United States Geological Survey.

(C) TEAMS.—

(i) IN GENERAL.—In carrying out the Initiative, the Secretary shall establish and organize activities among multidisciplinary teams to leverage, to the maximum extent practicable, expertise from the National Laboratories, institutions of higher education, and the private sector.

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

(D) ADDITIONAL ACTIVITIES.—The Secretary may organize additional activities under this subsection through other organizational structures.

(2) RESEARCH PROGRAM.—

(A) IN GENERAL.—The Secretary shall carry out under the Initiative a program to support research needed for, and discover knowledge relevant to, the sequestration of carbon in geologic formations.

(B) ACTIVITIES.—As part of the program described in subparagraph (A), the Director of the Office of Science shall support fundamental research to pursue distinct lines of scientific inquiry, including—

(i) gathering geologic data for pore space characterization, including improvements to geologic seismic imaging;

(ii) evaluating pore space quality, including evaluation of geologic samples, to determine appropriate sequestration zones for carbon;

(iii) testing carbon sequestration;

(iv) monitoring carbon migration in geologic formations;

(v) advancements in data analytics, including the analysis of seismic data, and computational science to improve the advanced computing, visualization, and imaging of geologic formations for the sequestration of carbon; and

(vi) predictive understanding of coupled processes in complex subsurface geologic systems for secure carbon storage.

(C) REVIEW.—The Secretary shall periodically review activities carried out under the program described in subparagraph (A) to evaluate achievement of scientific objectives and research milestones.

(3) CARBON STORAGE RESEARCH AND GEOLOGIC COMPUTATIONAL SCIENCE CENTERS.—

(A) IN GENERAL.—In carrying out the activities authorized under paragraph (2), the Secretary shall select and establish not more than 2 carbon storage research and geologic computational science centers (referred to in this paragraph as a ''Center'') to develop and advance improvements to data collection, analysis, and modeling of subsurface geology for the purpose of advancing carbon sequestration in geologic formations.

(B) SELECTION.—

(i) IN GENERAL.—The Secretary shall—

(I) select Centers under subparagraph (A) on a competitive, merit-reviewed basis; and

(II) to the maximum extent practicable, locate each Center in a geo-

graphically diverse region with established and ongoing geologic carbon sequestration research and demonstration.

(ii) APPLICATIONS.—In selecting Centers under subparagraph (A), the Secretary shall consider applications from institutions of higher education, multi-institutional collaborations, and other appropriate entities.

(C) DURATION.—

(i) NEW CENTERS.—A Center established after the date of enactment of this Act shall receive support for a period of not more than 5 years beginning on the date of establishment of that Center, subject to the availability of appropriations.

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

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

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

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

(A) ensure coordination with—

(i) the United States Geological Survey; and

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

(B) avoid duplication of efforts to the maximum extent practicable.

(g) FUNDING FOR CARBON INITIATIVES.—Of the funds authorized to be appropriated for basic energy sciences in a fiscal year, there is authorized to be appropriated to the Secretary to carry out activities under subsections (e) and (f) $50,000,000 for each of fiscal years 2023 through 2027.

SEC. 10103. BIOLOGICAL AND ENVIRONMENTAL RESEARCH.

(a) PROGRAM; BIOLOGICAL SYSTEMS; BIOMOLECULAR CHARACTERIZATION AND IMAGING SCIENCE.—Section 306 of the Department of Energy Research and Innovation Act (42 U.S.C. 18644) is amended—

(1) in subsection (c), by redesignating paragraphs (6) through (8) as paragraphs (5) through (7), respectively;

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

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

''(a) PROGRAM.—As part of the duties of the Director authorized under section 209 of the Department of Energy Organization Act (42 U.S.C. 7139), and coordinated with the activities authorized under sections 303 and 304, the Director shall carry out a program of research and development in the areas of biological systems science and climate and environmental science, including subsurface science, relevant to the development of new energy technologies and to support the energy, environmental, and national security missions of the Department.

''(b) BIOLOGICAL SYSTEMS.—The Director shall carry out research and development activities in genomic science including fundamental research on plants and microbes to increase systems-level understanding of the complex biological systems, which may include activities—

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

bioproducts and accelerate breakthroughs and new knowledge that would enable the cost-effective, sustainable production of—

"(A) advanced biofuels;

"(B) bioenergy; and

"(C) biobased materials;

"(2) to conduct foundational functional systems biology research—

"(A) to support expanded biosystems design research; and

"(B) to understand—

"(i) fundamental genome structure; and

"(ii) phenomes, including functional genomics of gene products at genome scale;

"(3) to develop biosystems designs and synthetic biology approaches for new nonfood plant-derived and microbially derived bioproducts as a basis for new bioeconomy and biotechnology applications in bioproducts production, resource recovery, recycling, and upcycling ventures;

"(4) to better understand the behavior of microbiomes in the environment and the inter-

dependencies between plants and microbes in a sustainable ecosystem;

"(5) to improve fundamental understanding of plant and microbial processes impacting the global carbon cycle, including processes for removing carbon dioxide from the atmosphere, through photosynthesis and other biological processes, for sequestration, storage, and utilization;

"(6) to understand the microbiome mechanisms and microbiota used to transform, immobilize, or remove contaminants from subsurface environments and that affect the cycling and disposition of carbon, nutrients, and contaminants in the environment;

"(7) to develop the computational approaches and integrated platforms for open access collaborative science;

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

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

gene editing tools and technologies work in nature, in the laboratory, and in practice;

"(B) to deepen genome-enabled knowledge of the roles of microbes and microbial communities, including fungi, in—

"(i) supporting plant and tree growth, productivity, performance, adaptation, and resilience in changing environmental conditions; and

"(ii) optimizing end uses of biomass;

"(C) to develop biosystems design methods and tools to increase the efficiency of photosynthesis in plants; and

"(D) to increase the scale and pace of characterizing the functions and physical characteristics of microbes and microbial communities to improve biosystems design;

"(9) to conduct research focused on developing analysis techniques and simulation capabilities, including artificial intelligence and machine learning, on high-performance computing platforms to accelerate collaborative and reproducible systems biology research;

"(10) to develop and improve new technologies for bioimaging, measurement, and characterization

purposes to understand the structural, spatial, and temporal relationships of metabolic processes governing phenotypic expression in plants and microbes;

''(11) to conduct research focused on genotype-to-phenotype translations to develop a predictive understanding of cellular function under a variety of relevant environmental and bioenergy-related conditions;

''(12) to conduct metagenomic and metadata assembly research sequencing and analysis; and

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

''(c) BIOMOLECULAR CHARACTERIZATION AND IMAGING SCIENCE.—The Director shall carry out research and development activities in biomolecular characterization and imaging science, including development of new and integrative imaging and analysis platforms and biosensors to understand the expression, structure, and function of genome information encoded within cells and for real-time measurements in ecosystems and field sites of relevance to the mission of the Department.''; and

(4) by adding at the end the following:

''(l) DEFINITIONS.—In this section:

''(1) ADVANCED BIOFUEL.—The term 'advanced biofuel' has the meaning given the term in

section 9001 of the Farm Security and Rural Investment Act of 2002 (7 U.S.C. 8101).

"(2) BIOENERGY.—The term 'bioenergy' means energy derived from biofuels.

"(3) BIOMASS.—The term 'biomass' has the meaning given the term in section 203(b) of the Energy Policy Act of 2005 (42 U.S.C. 15852(b)).

"(4) BIOPRODUCT.—The term 'bioproduct' has the meaning given the term 'biobased product' in section 9001 of the Farm Security and Rural Investment Act of 2002 (7 U.S.C. 8101).".

(b) LOW-DOSE RADIATION RESEARCH PROGRAM.—Paragraph (8) of subsection (e) of section 306 of the Department of Energy Research and Innovation Act (42 U.S.C. 18644), as redesignated by subsection (a)(2), is amended—

(1) in subparagraph (C), by striking "and";

(2) in subparagraph (D), by striking the period at the end and inserting a semicolon; and

(3) by adding at the end the following:

"(E) $40,000,000 for fiscal year 2025;

"(F) $50,000,000 for fiscal year 2026; and

"(G) $50,000,000 for fiscal year 2027.".

(c) LOW-DOSE RADIATION AND SPACE RADIATION RESEARCH PROGRAM.—Subsection (f) of section 306 of

the Department of Energy Research and Innovation Act (42 U.S.C. 18644), as redesignated by subsection (a)(2), is amended to read as follows:

"(f) LOW-DOSE RADIATION AND SPACE RADIATION RESEARCH PROGRAM.—

"(1) IN GENERAL.—The Secretary, in consultation with the Administrator of the National Aeronautics and Space Administration, shall carry out a basic research program on the similarities and differences between the effects of exposure to low-dose radiation on Earth, in low Earth orbit, and in the space environment.

"(2) PURPOSE.—The purpose of the program described in paragraph (1) is to accelerate breakthroughs in low-dose and low dose-rate radiation research and development as described in subsection (e) and to inform the advancement of new tools, technologies, and advanced materials needed to facilitate long-duration space exploration.".

(d) CLIMATE, ENVIRONMENTAL SCIENCE, AND OTHER ACTIVITIES.—Section 306 of the Department of Energy Research and Innovation Act (42 U.S.C. 18644) (as amended by subsection (a)) is amended by inserting after subsection (f) the following:

"(g) EARTH AND ENVIRONMENTAL SYSTEMS SCIENCES ACTIVITIES.—

"(1) IN GENERAL.—As part of the activities authorized under subsection (a), and in coordination with activities carried out under subsection (b), the Director shall coordinate with the National Oceanic and Atmospheric Administration, the National Science Foundation, the Environmental Protection Agency, the National Aeronautics and Space Administration, the Department of Agriculture, the Department of the Interior, and any other relevant agencies to carry out activities relating to Earth and environmental systems science research, which may include activities—

"(A) to understand, observe, measure, and model the response of Earth's atmosphere and biosphere to changing concentrations of greenhouse gas emissions and any associated changes in climate, including frequency and intensity of extreme weather events;

"(B) to understand the coupled physical, chemical, and biological processes to transform, immobilize, remove, or move carbon, nitrogen, and other energy production-derived contaminants such as radionuclides and heavy metals,

and understand the process of sequestration and transformation of these, carbon dioxide, and other relevant molecules in subsurface environments;

"(C) to understand, observe, and model the cycling of water, carbon, and nutrients in terrestrial systems across spatiotemporal scales;

"(D) to understand the biological, biogeochemical, and physical processes across the multiple scales that control the flux of environmentally relevant compounds between the terrestrial surface and the atmosphere; and

"(E) to understand and predict interactions among natural and human systems to inform potential mitigation and adaptation options for increased concentrations of greenhouse gas emissions and any associated changes in climate.

"(2) PRIORITIZATION.—In carrying out the program authorized under paragraph (1), the Director shall prioritize—

"(A) the development of software and algorithms to enable the productive application of environmental systems and extreme weather in

climate and Earth system prediction models in high-performance computing systems; and

"(B) capabilities that support the Department's mission needs for energy and infrastructure security, resilience, and reliability.

"(3) ENVIRONMENTAL SYSTEMS SCIENCE RESEARCH.—

"(A) IN GENERAL.—As part of the activities described in paragraph (1), the Director shall carry out research to advance an integrated, robust, and scale-aware predictive understanding of environmental systems, including the role of hydrobiogeochemistry, from the subsurface to the top of the vegetative canopy that considers effects of seasonal to interannual variability and change.

"(B) CLEAN WATER AND WATERSHED RESEARCH.—As part of the activities described in subparagraph (A), the Director shall—

"(i) support interdisciplinary research to significantly advance our understanding of water availability, quality, and the impact of human activity and a changing climate on urban and rural watershed sys-

tems, including in freshwater environments;

"(ii) consult with the Interagency Research, Development, and Demonstration Coordination Committee on the Nexus of Energy and Water for Sustainability established under section 1010 of the Energy Act of 2020 (Public Law 116–260) on energy-water nexus research activities;

"(iii) engage with representatives of research and academic institutions, nonprofit organizations, State, territorial, local, and Tribal governments, and industry, who have expertise in technologies, technological innovations, or practices relating to the energy-water nexus, as applicable; and

"(iv) coordinate with the National Oceanic and Atmospheric Administration, the National Science Foundation, the Environmental Protection Agency, the National Aeronautics and Space Administration, the Department of Agriculture, the Department of the Interior, and any other relevant agency.

"(C) COORDINATION.—

"(i) DIRECTOR.—The Director shall carry out activities under this paragraph in accordance with priorities established by the Secretary to support and accelerate the decontamination of relevant facilities managed by the Department.

"(ii) SECRETARY.—The Secretary shall ensure the coordination of activities of the Department, including activities under this paragraph, to support and accelerate the decontamination of relevant facilities managed by the Department.

"(4) CLIMATE AND EARTH MODELING.—As part of the activities described in paragraph (1), the Director, in collaboration with the Advanced Scientific Computing Research program described in section 304 and other programs carried out by the Department, as applicable, and in coordination with the National Oceanic and Atmospheric Administration, the National Science Foundation, the National Aeronautics and Space Administration, and other relevant agencies, shall carry out research to develop, evaluate, and use high-resolution regional climate, global climate, Earth system, and other rel-

evant models to inform decisions on reducing greenhouse gas emissions and the resulting impacts of a changing global climate. Such modeling shall include—

"(A) integrated capabilities for modeling multisectoral interactions, including the impacts of climate policies on human systems and the interdependencies and risks at the energy-water-land nexus;

"(B) greenhouse gas emissions, air quality, energy supply and demand, and other critical elements; and

"(C) interaction among human and Earth systems informed by interdisciplinary research, including the economic and social sciences.

"(5) MIDSCALE FUNDING MECHANISM.—

"(A) IN GENERAL.—Any of the activities authorized in this subsection may be carried out, in lieu of individual research grants—

"(i) by competitively selected midscale, multi-institutional research centers;

"(ii) by large-scale experiments or user facilities; or

"(iii) through existing facilities and systems of the Department or the National Oceanic and Atmospheric Administration.

"(B) CONSIDERATION.—The Biological and Environmental Research Advisory Committee shall provide recommendations to the Director on projects most suitable for the research centers described in subparagraph (A).

"(6) ATMOSPHERIC SYSTEMS AND SCIENCES RESEARCH PROGRAM.—

"(A) IN GENERAL.—As part of the activities carried out under paragraph (1), the Director shall carry out a program, to be known as the 'Atmospheric Systems and Sciences Research Program', to use observations to improve understanding of atmospheric processes, under which the Director, in coordination, and as appropriate, collaboration, with the National Oceanic and Atmospheric Administration and other relevant Federal agencies conducting research under the topics described in this subparagraph, shall conduct research relating to—

"(i) better understanding the atmosphere and the interaction of the atmosphere with the surface of the Earth;

"(ii) understanding sources of uncertainty in Earth system models, including with respect to the interdependence of clouds, atmospheric aerosols, radiation processes, and precipitation;

"(iii) understanding the radiative balance and hydrological cycle of Earth;

"(iv) demonstrating the improved predictability of regional and global atmospheric models due to improved process-level understanding;

"(v) atmospheric regimes with large uncertainties in earth system prediction, aerosol processes, warm boundary-layer processes, convective processes, and high-latitude processes;

"(vi) reduced uncertainty and improved simulation capability of earth system models of the atmospheric system in a holistic, comprehensive fashion; and

"(vii) understanding and modeling representation of priority research areas, including aerosol, warm boundary layer, convective, and high-latitude processes.

"(B) ACTIVITIES.—In carrying out the Atmospheric Systems and Sciences Research Program, the Director shall, in coordination, and as appropriate, in collaboration, with other relevant Federal agencies—

"(i) collect data and conduct research to advance atmospheric and Earth system modeling capabilities;

"(ii) develop or participate in existing or future integrated, scalable test-beds that—

"(I) incorporate process-level understanding of the life cycles of aerosols, clouds, and precipitation; and

"(II) can be incorporated into other models;

"(iii) improve data, analysis, and prediction systems in marine, littoral, terrestrial, and arctic environments, including those environments sensitive to changes in the climate, relating to the energy and science mission of the Department; and

"(iv) support the development of technologies relating to—

"(I) more accurate cloud, aerosol, and other atmospheric sensors;

"(II) observing sensor networks; and

"(III) computational predictive modeling.

"(C) USE OF ATMOSPHERIC RADIATION MEASUREMENT PROGRAM FACILITIES AND INFRASTRUCTURE.—To support the Atmospheric Systems and Sciences Research Program and, in coordination, and as appropriate, in collaboration, with the National Oceanic and Atmospheric Administration and other relevant Federal agencies, to improve fundamental understanding of the physical and chemical processes that impact the formation, life cycle, and radiative impacts of cloud and aerosol particles, atmospheric processes, and surface or subsurface phenomena, the Director shall use the facilities and infrastructure of the Atmospheric Radiation Measurement User Facility, the Global Monitoring Laboratory of the National Oceanic and Atmospheric Administration, or other Earth and Environmental Systems Sciences User Facilities—

"(i) to provide support to environmental scientists by collecting high-quality and well-characterized in-situ, remote-sensing, and aircraft observations of—

"(I) the microphysical properties of clouds and atmospheric aerosols;

"(II) the coincident and highly detailed dynamical and thermodynamic properties of the atmospheric environment that contains those clouds and aerosols;

"(III) the properties of precipitation;

"(IV) the properties of radiation and the background environment; and

"(V) the properties of surface or subsurface phenomena;

"(ii) to carry out laboratory studies and ground-based and airborne field campaigns to target specific atmospheric and surface or subsurface processes relating to the energy and science mission of the Department in different locations and across a range of environments, including by de-

veloping technologies to assist in advancing predictive capabilities;

"(iii) to build data sets that can be incorporated into atmospheric models; and

"(iv) to enhance observations by using modeling and simulations that test the accuracy of climate model parameterizations.

"(h) BIOLOGICAL AND ENVIRONMENTAL RESEARCH USER FACILITIES.—

"(1) IN GENERAL.—The Director shall carry out a program for the development, construction, operation, and maintenance of user facilities to enhance the collection and analysis of observational data related to complex biological, climate, and environmental systems.

"(2) SELECTION.—

"(A) IN GENERAL.—The Director shall select user facilities under paragraph (1) on a competitive, merit-reviewed basis.

"(B) APPLICANTS.—In selecting user facilities under paragraph (1), the Director shall consider applications from the National Laboratories, institutions of higher education, multi-institutional collaborations, and other appropriate entities.

"(3) FACILITY REQUIREMENTS.—To the maximum extent practicable, the user facilities developed, constructed, operated, or maintained under paragraph (1) shall include—

"(A) distributed field research and observation platforms for understanding earth system processes;

"(B) analytical techniques, instruments, and modeling resources, including high-throughput molecular phenotyping, for understanding and predicting the functional processes of biological and environmental systems;

"(C) integrated high-throughput sequencing, advanced bioanalytic techniques, DNA design and synthesis, metabolomics, and computational analysis; and

"(D) such other facilities as the Director considers appropriate, consistent with section 209 of the Department of Energy Organization Act (42 U.S.C. 7139).

"(4) EXISTING FACILITIES.—In carrying out the program established under paragraph (1), the Director is encouraged to evaluate the capabilities of existing user facilities and, to the maximum extent

practicable, invest in modernization of those capabilities to address emerging research priorities.

"(5) EARTH AND ENVIRONMENTAL SYSTEMS SCIENCES USER FACILITIES.—In carrying out the program established under paragraph (1), the Director shall operate at least 1 user facility to advance the collection, validation, and analysis of atmospheric data, including through activities—

"(A) to advance knowledge of the Earth and environmental systems and improve model representations; and

"(B) to measure the impact of atmospheric gases, aerosols, and clouds on the Earth and environmental systems.

"(6) MICROBIAL MOLECULAR PHENOTYPING CAPABILITY PROJECT.—

"(A) IN GENERAL.—The Secretary shall provide for the expansion of the Environmental Molecular Sciences Laboratory, or subsequent facility successor, to advance high-throughput microbial plant and molecular phenotyping capability to accelerate discovery of new protein functions and metabolic pathways in microbial systems.

"(B) CAPABILITIES.—In carrying out subparagraph (A), the Secretary shall ensure the following capabilities:

"(i) Coupled high-throughput autonomous experimental and multimodal analytical capabilities.

"(ii) Direct integration of automated multiomics analyses, biomolecular and cellular imaging, and functional biological assays with high-throughput microbial culturing and cultivation capabilities at timescales relevant to biological processes under natural and perturbed environmental conditions.

"(C) DATA COORDINATION.—In carrying out subparagraph (A), the Secretary shall ensure integration and coordination with existing data platforms and user facilities of the Department.

"(D) START OF OPERATIONS.—Subject to the availability of appropriations, the Secretary shall begin carrying out subparagraph (A) not later than September 29, 2027.

"(E) FUNDING.—Of the funds authorized to be appropriated under subsection (k) for a

fiscal year, there are authorized to be appropriated to the Secretary to carry out this paragraph—

"(i) $550,000 for fiscal year 2023;

"(ii) $29,000,000 for fiscal year 2024;

"(iii) $32,000,000 for fiscal year 2025;

"(iv) $30,500,000 for fiscal year 2026; and

"(v) $27,500,000 for fiscal year 2027.

"(7) USER FACILITIES INTEGRATION AND COLLABORATION PROGRAM.—

"(A) IN GENERAL.—The Director shall support a program of collaboration between user facilities to encourage and enable researchers to more readily integrate the tools, expertise, resources, and capabilities of multiple Office of Science user facilities (as described in subsection (d) of section 209 of the Department of Energy Organization Act (42 U.S.C. 7139)) to further research and advance emerging technologies.

"(B) ACTIVITIES.—The program shall advance the integration of automation, robotics, computational biology, bioinformatics, bio-

sensing, cellular platforms and other relevant emerging technologies as determined by the Director to enhance productivity and scientific impact of user facilities.

"(8) COORDINATION.—In carrying out the program authorized under paragraph (1), the Director shall ensure that the Office of Science coordinates with—

"(A) the National Oceanic Atmospheric Administration, the Environmental Protection Agency, the National Aeronautics and Space Administration, the Department of Agriculture, the Department of the Interior, and any other relevant Federal agency on the collection, validation, and analysis of atmospheric data; and

"(B) relevant stakeholders, including institutions of higher education, nonprofit research institutions, industry, State, territorial, local, and Tribal governments, and other appropriate entities to ensure access to the best available relevant atmospheric and historical weather data.

"(i) TERRESTRIAL-AQUATIC INTERFACE RESEARCH INITIATIVE.—

"(1) IN GENERAL.—The Director shall carry out a research program to enhance the understanding of terrestrial-aquatic interface. In carrying out the program, the Director shall prioritize efforts to enhance the collection of observational data, and shall develop models to analyze the natural and human processes that interact in littoral zones.

"(2) LITTORAL DATA COLLECTION SYSTEM.—The Director shall establish an integrated system of geographically diverse field research sites in order to improve the scientific understanding and predictability of the major land water interfaces of the United States through improved data quantity and quality, including in—

"(A) the Great Lakes region;

"(B) the Pacific coast;

"(C) the Atlantic coast;

"(D) the Arctic;

"(E) the Gulf coast; and

"(F) the coasts of United States territories and freely associated States.

"(3) EXISTING INFRASTRUCTURE.—In carrying out the programs and establishing the field research sites under paragraphs (1) and (2), the Secretary shall leverage existing research and development in-

frastructure supported by the Department, including the Department's existing marine and coastal research lab.

"(4) COORDINATION.—For the purposes of carrying out the programs and establishing the field research sites under paragraphs (1) and (2), the Secretary may enter into agreements with Federal departments and agencies with complementary capabilities, including the National Oceanic and Atmospheric Administration and any other relevant Federal agency as appropriate.

"(5) REPORT.—Not earlier than 2 years after the date of enactment of the Research and Development, Competition, and Innovation Act, the Director shall provide to the Committee on Science, Space, and Technology, the Committee on Natural Resources, and the Committee on Appropriations of the House of Representatives, and the Committee on Energy and Natural Resources and the Committee on Appropriations of the Senate, a report examining whether the system described in paragraph (2) should be established as a National User Facility within the Department or as a research facility within another Federal agency.

"(6) INTEROPERABILITY.—

"(A) IN GENERAL.—The Director shall ensure that activities carried out under paragraphs (1) and (2), including observation, data collection, monitoring, and model development and enhancements, are interoperable and may be integrated with existing related systems at the National Oceanic and Atmospheric Administration and other relevant Federal agencies, as practicable.

"(B) RESOURCES.—In carrying out subparagraph (A), in support of interoperability, as practicable, the Director may make available to other Federal agencies high performance computing resources.

"(C) NOAA.—The National Oceanic and Atmospheric Administration shall integrate the data collected under the programs carried out under paragraphs (1) and (2) into relevant data systems and models, as practicable.

"(j) ENGINEERED ECOSYSTEMS INITIATIVE.—

"(1) IN GENERAL.—The Secretary shall establish within the Biological and Environmental Research program an initiative focused on the development of engineered ecosystems through the applica-

tion of artificial intelligence, novel sensing capabilities, and other emerging technologies.

"(2) INTERAGENCY COORDINATION.—The Secretary shall coordinate with the Director of the National Science Foundation, the Administrator of the National Oceanic and Atmospheric Administration, the Director of the U.S. Geological Survey, the Secretary of Agriculture, and other relevant officials to avoid duplication of research and observational activities and to ensure that activities carried out under the initiative established under paragraph (1) are complimentary to activities being undertaken by other agencies.

"(3) REPORT.—Not later than 180 days after the date of enactment of the Research and Development, Competition, and Innovation Act, the Secretary shall submit to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Energy and Natural Resources of the Senate a report on the activity authorized under this subsection.

"(k) AUTHORIZATION OF APPROPRIATIONS.—Out of funds authorized to be appropriated for the Office of Science in a fiscal year, there are authorized to be appro-

priated to the Secretary to carry out the activities described in this section—

"(1) $885,420,000 for fiscal year 2023;

"(2) $946,745,200 for fiscal year 2024;

"(3) $1,001,149,912 for fiscal year 2025;

"(4) $1,068,818,907 for fiscal year 2026; and

"(5) $1,129,948,041 for fiscal year 2027.".

(e) BIOENERGY RESEARCH CENTERS.—Section 977 of the Energy Policy Act of 2005 (42 U.S.C. 16317) is amended by striking subsection (f) and inserting the following:

"(f) BIOENERGY RESEARCH CENTERS.—

"(1) IN GENERAL.—In carrying out the program under section 306(a) of the Department of Energy Research and Innovation Act (42 U.S.C. 18644(a)), the Director shall support up to 6 bioenergy research centers to conduct fundamental research in plant and microbial systems biology, biological imaging and analysis, and genomics, and to accelerate advanced research and development of advanced biofuels, bioenergy or biobased materials, chemicals, and products that are produced from a variety of regionally diverse feedstocks, and to facilitate the translation of research results to industry.

The activities of the centers authorized under this subsection may include—

"(A) accelerating the domestication of bioenergy-relevant plants, microbes, and associated microbial communities to enable high-impact, value-added coproduct development at multiple points in the bioenergy supply chain;

"(B) developing the science and technological advances to ensure process sustainability is considered in the creation of advanced biofuels and bioproducts from lignocellulosic biomass; and

"(C) using the latest tools in genomics, molecular biology, catalysis science, chemical engineering, systems biology, and computational and robotics technologies to sustainably produce and transform biomass into advanced biofuels and bioproducts.

"(2) SELECTION AND DURATION.—

"(A) IN GENERAL.—A center established under paragraph (1) shall be selected on a competitive, merit-reviewed basis for a period of not more than 5 years, subject to the availability of appropriations, beginning on the date of establishment of that center.

"(B) APPLICATIONS.—The Director shall consider applications from National Laboratories, multi-institutional collaborations, and other appropriate entities.

"(C) EXISTING CENTERS.—A center already in existence on the date of enactment of the Research and Development, Competition, and Innovation Act may continue to receive support for a period of not more than 5 years beginning on the date of establishment of that center.

"(D) NEW CENTERS.—The Director shall select any new center pursuant to paragraph (1) on a competitive, merit-reviewed basis, with special consideration for applications from an institution of higher education (as defined in section 101 of the Higher Education Act of 1965 (20 U.S.C. 1001)) that is located in an eligible jurisdiction (as defined in section 2203(b)(3)(A) of the Energy Policy Act of 1992 (42 U.S.C. 13503(b)(3)(A))).

"(3) RENEWAL.—After the end of the applicable period described in paragraph (2), the Director may renew support for a center for a period of not more than 5 years on a merit-reviewed basis. For a

center in operation for 10 years after its previous selection on a competitive, merit-reviewed basis, the Director may renew support for the center on a competitive, merit-reviewed basis for a period of not more than 5 years, and may subsequently provide an additional renewal on a merit-reviewed basis for a period of not more than 5 years.

"(4) ACTIVITIES.—Centers shall undertake research activities to accelerate the production of advanced biofuels and bioproducts from biomass resources by identifying the most suitable species of plants for use as energy crops; and improving methods of breeding, propagation, planting, producing, harvesting, storage and processing. Activities may include the following:

"(A) Research activities to increase sustainability, including—

"(i) advancing knowledge of how bioenergy crop interactions with biotic and abiotic environmental factors influence crop growth, yield, and quality;

"(ii) identifying the most impactful research areas that address the economics of advanced biofuels and bioproducts production; and

"(iii) utilizing multiscale modeling to advance predictive understanding of advanced biofuel cropping ecosystems.

"(B) Research activities to further feedstock development, including lignocellulosic, algal, gaseous wastes including carbon oxides and methane, and direct air capture of single carbon gases via plants and microbes, including—

"(i) developing genetic and genomic tools, high-throughput analytical tools, and biosystems design approaches to enhance bioenergy feedstocks and their associated microbiomes;

"(ii) conducting field testing of new potential bioenergy feedstock crops under environmentally benign and geographically diverse conditions to assess viability and robustness; and

"(iii) developing quantitative models informed by experimentation to predict how bioenergy feedstocks perform under diverse conditions.

"(C) Research activities to improve lignocellulosic deconstruction and separation methods, including—

"(i) developing feedstock-agnostic deconstruction processes capable of efficiently fractionating biomass into targeted output streams;

"(ii) gaining a detailed understanding of plant cell wall biosynthesis, composition, structure, and properties during deconstruction; and

"(iii) improving enzymes and approaches for biomass breakdown and cellulose, hemicellulose, and lignin processing.

"(D) Research activities to improve the feedstock conversion process for advanced biofuels and bioproducts, including—

"(i) developing high-throughput methods to screen or select high-performance microbial strains and communities to improve product formation rates, yields, and selectivity;

"(ii) establishing a broad set of platform microorganisms and microbial communities suitable for metabolic engineering

to produce advanced biofuels and bioproducts and high-throughput methods for experimental validation of gene function;

"(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;

"(iv) advancing technologies for the use of batch, continuous, and consolidated bioprocessing;

"(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;

"(vi) developing high-throughput, real-time, in situ analytical techniques to understand and characterize the pre- and post-bioproduct separation streams in detail;

"(vii) creating methodologies for efficiently identifying viable target molecules, identifying high-value bioproducts in existing biomass streams, and utilizing current byproduct streams;

"(viii) identifying and improving plant feedstocks with enhanced extractable levels of desired bioproducts or bioproduct precursors, including lignin streams; and

"(ix) developing integrated biological and chemical catalytic approaches to valorize and produce a diverse portfolio of advanced biofuels and bioproducts.

"(5) INDUSTRY PARTNERSHIPS.—Centers shall establish industry partnerships to translate research results to commercial applications.

"(6) COORDINATION.—In coordination with the Bioenergy Technologies Office of the Department, the Secretary shall support interdisciplinary research activities to improve the capacity, efficiency, resilience, security, reliability, and affordability, of the production and use of advanced biofuels and bioproducts, as well as activities to enable positive impacts and avoid the potential negative impacts that the production and use of advanced biofuels and bio-

products may have on ecosystems, people, and historically marginalized communities.

"(7) FUNDING.—Of the funds authorized to be appropriated under subsection (k) of section 306 of the Department of Energy Research and Innovation Act (42 U.S.C. 18644) for a fiscal year, there is authorized to be appropriated to the Secretary to carry out this subsection $30,000,000 per center established under paragraph (1) for each of fiscal years 2023 through 2027.

"(8) DEFINITIONS.—In this subsection:

"(A) ADVANCED BIOFUEL.—The term 'advanced biofuel' has the meaning given the term in section 9001 of the Farm Security and Rural Investment Act of 2002 (7 U.S.C. 8101).

"(B) BIOENERGY.—The term 'bioenergy' means energy derived from biofuels.

"(C) BIOMASS.—The term 'biomass' has the meaning given the term in section 203(b) of the Energy Policy Act of 2005 (42 U.S.C. 15852(b)).

"(D) BIOPRODUCT.—The term 'bioproduct' has the meaning given the term 'biobased product' in section 9001 of the Farm

Security and Rural Investment Act of 2002 (7 U.S.C. 8101).''.

SEC. 10104. ADVANCED SCIENTIFIC COMPUTING RESEARCH PROGRAM.

(a) ADVANCED SCIENTIFIC COMPUTING RESEARCH.—Section 304 of the Department of Energy Research and Innovation Act (42 U.S.C. 18642) is amended—

(1) by redesignating subsections (a) through (c) as subsections (b) through (d), respectively;

(2) by inserting before subsection (b), as so redesignated, the following:

''(a) IN GENERAL.—As part of the activities authorized under section 209 of the Department of Energy Organization Act (42 U.S.C. 7139), the Director shall carry out, in coordination with academia and relevant public and private sector entities, a research, development, and demonstration program—

''(1) to steward applied mathematics, computational science, and computer science research relevant to the missions of the Department and the competitiveness of the United States;

''(2) to develop modeling, simulation, and other computational tools relevant to other scientific dis-

ciplines and to the development of new energy technologies and other technologies;

''(3) to advance computing and networking capabilities for data-driven discovery; and

''(4) to develop advanced scientific computing hardware and software tools for science and engineering.'';

(3) in subsection (c), as so redesignated—

(A) by striking ''The Director'' and inserting the following:

''(1) DIRECTOR.—The Director''; and

(B) by adding at the end the following:

''(2) COORDINATION.—The Under Secretary for Science shall ensure the coordination of the activities of the Department, including activities under this section, to determine and meet the computational and networking research and facility needs of the Office of Science and all other relevant energy technology and energy efficiency programs within the Department and with other Federal agencies as appropriate.'';

(4) by amending subsection (d), as so redesignated, to read as follows:

"(d) APPLIED MATHEMATICS AND SOFTWARE DEVELOPMENT FOR HIGH-END COMPUTING SYSTEMS AND COMPUTER SCIENCES RESEARCH.—

"(1) IN GENERAL.—The Director shall carry out activities to develop, test, and support—

"(A) mathematics, statistics, and algorithms for modeling complex systems relevant to the missions of the Department, including on advanced computing architectures; and

"(B) tools, languages, programming environments, and operations for high-end computing systems (as defined in section 2 of the American Super Computing Leadership Act of 2017 (15 U.S.C. 5541)).

"(2) PORTFOLIO BALANCE.—

"(A) IN GENERAL.—The Director shall maintain a balanced portfolio within the advanced scientific computing research and development program established under section 976 of the Energy Policy Act of 2005 (42 U.S.C. 16316) that supports robust investment in—

"(i) applied mathematical, computational, and computer sciences research needs relevant to the mission of the Department, including foundational areas

that are critical to the advancement of energy sciences and technologies and new and emerging computing technologies; and

"(ii) associated high-performance computing hardware and facilities.

"(B) EXASCALE ECOSYSTEM SUSTAINMENT.—

"(i) SENSE OF CONGRESS.—It is the sense of Congress that the Exascale Computing Project has successfully created a broad ecosystem that provides shared software packages, novel evaluation systems, and applications relevant to the science and engineering requirements of the Department, and that such products must be maintained and improved in order that the full potential of the deployed systems can be continuously realized.

"(ii) SUSTAINMENT.—The Secretary shall seek to sustain and evolve the ecosystem described in clause (i) to ensure that the exascale software stack and other research software will continue to be maintained, hardened, and otherwise optimized for long-term use on exascale systems and

beyond and reliable availability to the user community.''; and

(5) by adding at the end the following:

''(e) ADVANCED COMPUTING PROGRAM.—

''(1) IN GENERAL.—The Secretary shall establish a program to develop and implement a strategy for achieving computing systems with capabilities beyond exascale computing systems. In establishing this program, the Secretary shall—

''(A) maintain foundational research programs in mathematical, computational, and computer sciences focused on new and emerging computing needs within the mission of the Department, including post-Moore's law computing architectures, novel approaches to modeling and simulation, artificial intelligence and scientific machine learning, quantum computing, edge computing, extreme heterogeneity, including potential quantum accelerators, and distributed high-performance computing;

''(B) retain best practices and maintain support for essential hardware, applications, and software elements of the Exascale Computing Program that are necessary for sus-

taining the vitality of a long-term capable software ecosystem for exascale and beyond; and

"(C) develop a Department-wide strategy for balancing on-premises and cloud-based computing and scientific data management.

"(2) REPORT.—Not later than 1 year after the date of enactment of the Research and Development, Competition, and Innovation Act, the Secretary shall submit to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Energy and Natural Resources of the Senate a report on the development and implementation of the strategy described in paragraph (1).

"(f) GUIDANCE ON MITIGATION OF BIAS IN HIGH-PERFORMANCE COMPUTING CAPABILITIES.—In leveraging high-performance computing systems for research purposes, including through the use of machine learning algorithms for data analysis and artificial intelligence, the Secretary shall issue, and ensure adherence to, guidance for the Department, the National Laboratories, and users as to how those capabilities should be employed in a manner that mitigates and, to the maximum extent practicable, avoids harmful algorithmic bias.

"(g) ARCHITECTURAL RESEARCH IN HETEROGENEOUS COMPUTING SYSTEMS.—

"(1) IN GENERAL.—The Secretary shall carry out a program of research and development in heterogeneous and reconfigurable computing systems to expand understanding of the potential for heterogeneous and reconfigurable computing systems to deliver high performance, high efficiency computing for Department mission challenges. The program shall include research and development that explores the convergence of big data analytics, simulations, and artificial intelligence to drive the design of heterogeneous computing system architectures.

"(2) COORDINATION.—In carrying out the program described in paragraph (1), the Secretary shall ensure coordination between research activities undertaken by the Advanced Scientific Computing Research program and materials research supported by the Basic Energy Sciences program within the Office of Science.

"(h) ENERGY EFFICIENT COMPUTING PROGRAM.—

"(1) IN GENERAL.—The Secretary shall support a program of fundamental research, development, and demonstration of energy efficient computing and data center technologies relevant to advanced computing applications, including high-per-

formance computing, artificial intelligence, and scientific machine learning.

"(2) EXECUTION.—

"(A) PROGRAM.—In carrying out the program under paragraph (1), the Secretary shall—

"(i) establish a partnership for National Laboratories, industry partners, and institutions of higher education for codesign of energy efficient hardware, technology, software, and applications across all applicable program offices of the Department, and provide access to energy efficient computing resources to such partners;

"(ii) develop hardware and software technologies that decrease the energy needs of advanced computing practices, including through data center codesign;

"(iii) consider multiple heterogeneous computing architectures in collaboration with the program established under subsection (g), including neuromorphic computing, persistent computing, and ultrafast networking; and

"(iv) provide, as appropriate, on a competitive, merit-reviewed basis, access for researchers from institutions of higher education, National Laboratories, industry, and other Federal agencies to the energy efficient computing technologies developed pursuant to clause (i).

"(B) SELECTION OF PARTNERS.—In selecting participants for the partnership established under subparagraph (A)(i), the Secretary shall select participants through a competitive, merit review process.

"(C) REPORT.—Not later than 1 year after the date of enactment of the Research and Development, Competition, and Innovation Act, the Secretary shall submit to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Energy and Natural Resources of the Senate a report on—

"(i) the activities conducted under subparagraph (A); and

"(ii) the coordination and management of the program under subparagraph

(A) to ensure an integrated research program across the Department.

"(i) ENERGY SCIENCES NETWORK.—

"(1) IN GENERAL.—The Secretary shall provide for upgrades to the Energy Sciences Network user facility in order to meet the research needs of the Department for highly reliable data transport capabilities optimized for the requirements of large-scale science.

"(2) CAPABILITIES.—In carrying out paragraph (1), the Secretary shall ensure the following capabilities:

"(A) To provide high bandwidth scientific networking across the continental United States and the Atlantic Ocean.

"(B) To ensure network reliability.

"(C) To protect the network infrastructure from cyberattacks.

"(D) To manage transport of exponentially increasing levels of data from the Department's National Laboratories and sites, user facilities, experiments, and sensors.

"(E) To contribute to the integration of heterogeneous computing frameworks and systems.

"(j) COMPUTATIONAL SCIENCE GRADUATE FELLOWSHIP.—

"(1) IN GENERAL.—The Secretary shall support the Computational Science Graduate Fellowship program in order to facilitate collaboration between graduate students and researchers at the National Laboratories, and contribute to the development of a diverse and inclusive computational workforce to help advance research in all areas of computational science relevant to the mission of the Department, including quantum computing.

"(2) FUNDING.—Of the funds authorized to be appropriated for the Advanced Scientific Computing Research Program, there are authorized to be appropriated to the Secretary for carrying out activities under this subsection—

"(A) $15,750,000 for fiscal year 2023;

"(B) $16,537,500 for fiscal year 2024;

"(C) $17,364,375 for fiscal year 2025;

"(D) $18,232,594 for fiscal year 2026; and

"(E) $19,144,223 for fiscal year 2027.

"(k) AUTHORIZATION OF APPROPRIATIONS.—Out of funds authorized to be appropriated for the Office of Science in a fiscal year, there are authorized to be appro-

priated to the Secretary to carry out the activities described in this section—

"(1) $1,126,950,000 for fiscal year 2023;

"(2) $1,194,109,500 for fiscal year 2024;

"(3) $1,265,275,695 for fiscal year 2025;

"(4) $1,340,687,843 for fiscal year 2026; and

"(5) $1,420,599,500 for fiscal year 2027.".

(b) QUANTUM SCIENCE NETWORK.—

(1) DEFINITIONS.—Section 2 of the National Quantum Initiative Act (15 U.S.C. 8801) is amended—

(A) by redesignating paragraph (7) as paragraph (8); and

(B) by inserting after paragraph (6) the following:

"(7) QUANTUM NETWORK INFRASTRUCTURE.—The term 'quantum network infrastructure' means any facility, expertise, or capability that is necessary to enable the development and deployment of scalable and diverse quantum network technologies.".

(2) DEPARTMENT OF ENERGY QUANTUM NETWORK INFRASTRUCTURE RESEARCH AND DEVELOPMENT PROGRAM.—

(A) IN GENERAL.—Title IV of the National Quantum Initiative Act (15 U.S.C. 8851

et seq.) is amended by adding at the end the following:

"SEC. 403. DEPARTMENT OF ENERGY QUANTUM NETWORK INFRASTRUCTURE RESEARCH AND DEVELOPMENT PROGRAM.

"(a) IN GENERAL.—The Secretary of Energy (referred to in this section as the 'Secretary') shall carry out a research, development, and demonstration program to accelerate innovation in quantum network infrastructure in order to—

"(1) facilitate the advancement of distributed quantum computing systems through the internet and intranet;

"(2) improve the precision of measurements of scientific phenomena and physical imaging technologies;

"(3) develop secure national quantum communications technologies and strategies;

"(4) demonstrate quantum networking utilizing the Department of Energy's Energy Sciences Network User Facility; and

"(5) advance the relevant domestic supply chains, manufacturing capabilities, and associated simulations or modeling capabilities.

"(b) PROGRAM.—In carrying out this section, the Secretary shall—

"(1) coordinate with—

"(A) the Director of the National Science Foundation;

"(B) the Director of the National Institute of Standards and Technology;

"(C) the Chair of the Subcommittee on Quantum Information Science of the National Science and Technology Council established under section 103(a); and

"(D) the Chair of the Subcommittee on the Economic and Security Implications of Quantum Science;

"(2) conduct cooperative research with industry, National Laboratories, institutions of higher education, and other research institutions to facilitate new quantum infrastructure methods and technologies, including—

"(A) quantum-limited detectors, ultra-low loss optical channels, space-to-ground connections, and classical networking and cybersecurity protocols;

"(B) entanglement and hyper-entangled state sources and transmission, control, and measurement of quantum states;

"(C) quantum interconnects that allow short range local connections between quantum processors;

"(D) transducers for quantum sources and signals between optical wavelength regimes, including telecommunications regimes and quantum computer-relevant domains, including microwaves;

"(E) development of quantum memory buffers and small-scale quantum computers that are compatible with photon-based quantum bits in the optical or telecommunications wavelengths;

"(F) long-range entanglement distribution, including allowing entanglement-based protocols between small- and large scale quantum processors, at the terrestrial and space-based level using quantum repeaters and optical or laser communications;

"(G) quantum routers, multiplexers, repeaters, and related technologies necessary to

create secure long-distance quantum communication; and

"(H) integration of systems across the quantum technology stack into traditional computing networks, including the development of remote controlled, high-performance, and reliable implementations of key quantum network components by leveraging the expertise, infrastructure and supplemental investments at the National Laboratories in the Energy Sciences Network User Facility;

"(3) engage with the Quantum Economic Development Consortium and other organizations, as applicable, to transition component technologies to help facilitate as appropriate the development of a quantum supply chain for quantum network technologies;

"(4) advance basic research in advanced scientific computing, particle and nuclear physics, and material science to enhance the understanding, prediction, and manipulation of materials, processes, and physical phenomena relevant to quantum network infrastructure;

"(5) develop experimental tools and testbeds in collaboration with the Energy Sciences Network

User Facility necessary to support cross-cutting fundamental research and development activities with diverse stakeholders from industry, National Laboratories, and institutions of higher education; and

"(6) consider quantum network infrastructure applications that span the Department of Energy's missions in energy, environment, and national security.

"(c) LEVERAGING.—In carrying out this section, the Secretary shall leverage resources, infrastructure, and expertise across the Department of Energy and from—

"(1) the National Institute of Standards and Technology;

"(2) the National Science Foundation;

"(3) the National Aeronautics and Space Administration;

"(4) other relevant Federal agencies;

"(5) the National Laboratories;

"(6) industry stakeholders;

"(7) institutions of higher education; and

"(8) the National Quantum Information Science Research Centers.

"(d) RESEARCH PLAN.—Not later than 180 days after the date of enactment of the Research and Development, Competition, and Innovation Act, the Secretary

shall submit to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Energy and Natural Resources of the Senate a 4-year research plan that identifies and prioritizes basic research needs relating to quantum network infrastructure.

''(e) STANDARD OF REVIEW.—The Secretary shall review activities carried out under this section to determine the achievement of technical milestones.

''(f) FUNDING.—Of the funds authorized to be appropriated for the Department of Energy's Office of Science, there is authorized to be appropriated to the Secretary to carry out the activities under this section $100,000,000 for each of fiscal years 2023 through 2027.

"SEC. 404. DEPARTMENT OF ENERGY QUANTUM USER EXPANSION FOR SCIENCE AND TECHNOLOGY PROGRAM.

''(a) IN GENERAL.—The Secretary of Energy (referred to in this section as the 'Secretary') shall establish and carry out a program, to be known as the 'Quantum User Expansion for Science and Technology program' or 'QUEST program', to encourage and facilitate access to United States quantum computing hardware and quantum computing clouds for research purposes—

"(1) to enhance the United States quantum research enterprise;

"(2) to educate the future quantum computing workforce;

"(3) to accelerate the advancement of United States quantum computing capabilities; and

"(4) to advance the relevant domestic supply chains, manufacturing processes, and associated simulations or modeling capabilities.

"(b) PROGRAM.—In carrying out this section, the Secretary shall—

"(1) coordinate with—

"(A) the Director of the National Science Foundation;

"(B) the Director of the National Institute of Standards and Technology;

"(C) the Chair of the Subcommittee on Quantum Information Science of the National Science and Technology Council established under section 103(a); and

"(D) the Chair of the Subcommittee on the Economic and Security Implications of Quantum Science;

"(2) provide researchers based within the United States with access to, and use of, United

States quantum computing resources through a competitive, merit-reviewed process;

"(3) consider applications from the National Laboratories, multi-institutional collaborations, institutions of higher education, industry stakeholders, and any other entities that the Secretary determines are appropriate to provide national leadership on quantum computing related issues;

"(4) coordinate with private sector stakeholders, the user community, and interagency partners on program development and best management practices; and

"(5) to the extent practicable, balance user access to commercial prototypes available for use across a broad class of applications and Federal research prototypes that enable benchmarking a wider variety of early-stage devices.

"(c) LEVERAGING.—In carrying out this section, the Secretary shall leverage resources and expertise across the Department of Energy and from—

"(1) the National Institute of Standards and Technology;

"(2) the National Science Foundation;

"(3) the National Aeronautics and Space Administration;

"(4) other relevant Federal agencies;

"(5) the National Laboratories;

"(6) industry stakeholders;

"(7) institutions of higher education; and

"(8) the National Quantum Information Science Research Centers.

"(d) SECURITY.—In carrying out the activities authorized by this section, the Secretary, in consultation with the Director of the National Science Foundation and the Director of the National Institute of Standards and Technology, shall ensure proper security controls are in place to protect sensitive information, as appropriate.

"(e) FUNDING.—Of the funds authorized to be appropriated for the Department of Energy's Office of Science, there are authorized to be appropriated to the Secretary to carry out the activities under this section—

"(1) $30,000,000 for fiscal year 2023;

"(2) $31,500,000 for fiscal year 2024;

"(3) $33,075,000 for fiscal year 2025;

"(4) $34,728,750 for fiscal year 2026; and

"(5) $36,465,188 for fiscal year 2027.".

(B) CLERICAL AMENDMENT.—The table of contents in section 1(b) of the National Quantum Initiative Act (Public Law 115–368; 132

Stat. 5092) is amended by inserting after the 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.".

SEC. 10105. FUSION ENERGY RESEARCH.

(a) FUSION ENERGY RESEARCH.—Section 307 of the Department of Energy Research and Innovation Act (42 U.S.C. 18645) is amended—

(1) in subsection (b)—

(A) in paragraph (2), by redesignating subparagraphs (A) and (B) as clauses (i) and (ii), respectively, and indenting appropriately;

(B) by redesignating paragraphs (1) and (2) as subparagraphs (A) and (B), respectively, and indenting appropriately;

(C) in the matter preceding subparagraph (A) (as so redesignated), by striking "As part of" and inserting the following:

"(1) IN GENERAL.—As part of"; and

(D) by adding at the end the following:

"(2) AUTHORIZATION OF APPROPRIATIONS.—Out of funds authorized to be appropriated under subsection (q), there is authorized to be appropriated to the Secretary to carry out activities de-

scribed in paragraph (1) $50,000,000 for each of fiscal years 2023 through 2027.";

(2) in subsection (d)(3)—

(A) by striking "(o)" and inserting "(q)";

(B) by striking "subsection (d)" and inserting "this subsection"; and

(C) by striking "2025" and inserting "2027";

(3) in subsection (e)(4)—

(A) by striking "(o)" and inserting "(q)";

(B) by striking "subsection (e)" and inserting "this subsection"; and

(C) by striking "2025" and inserting "2027";

(4) in subsection (i)(10)—

(A) in the matter preceding subparagraph (A)—

(i) by striking "(o)" and inserting "(q)"; and

(ii) by striking "subsection (i)" and inserting "this subsection";

(B) in subparagraph (D), by striking "and" at the end;

(C) in subparagraph (E), by striking the period at the end and inserting a semicolon; and

(D) by adding at the end the following:

"(F) $45,000,000 for fiscal year 2026; and

"(G) $45,000,000 for fiscal year 2027.";

(5) by striking subsection (j) and inserting the following:

"(j) FUSION REACTOR SYSTEM DESIGN.—

"(1) IN GENERAL.—Not later than 180 days after the date of enactment of the Research and Development, Competition, and Innovation Act, the Director shall establish not less than 2 national teams described in paragraph (2) that shall—

"(A) develop conceptual pilot plant designs and technology roadmaps; and

"(B) create an engineering design of a pilot plant that will bring fusion to commercial viability.

"(2) NATIONAL TEAMS.—A national team referred to in paragraph (1) shall—

"(A) be composed of developers, manufacturers, universities, National Laboratories, and representatives of the engineering, procurement, and construction industries; and

"(B) include public-private partnerships.

"(3) AUTHORIZATION OF APPROPRIATIONS.—Of the funds authorized to be appropriated for Fusion Energy Sciences in a fiscal year, there are authorized to be appropriated to the Secretary to carry out this subsection—

"(A) $35,000,000 for fiscal year 2023;

"(B) $50,000,000 for fiscal year 2024;

"(C) $65,000,000 for fiscal year 2025;

"(D) $80,000,000 for fiscal year 2026; and

"(E) $80,000,000 for fiscal year 2027.";

(6) by redesignating subsection (o) as subsection (r);

(7) by inserting after subsection (n) the following:

"(o) HIGH-PERFORMANCE COMPUTATION COLLABORATIVE RESEARCH PROGRAM.—

"(1) IN GENERAL.—The Secretary shall carry out a program to conduct and support collaborative research, development, and demonstration of fusion energy technologies, through high-performance computation modeling and simulation techniques, in order—

"(A) to support fundamental research in plasmas and matter at very high temperatures and densities;

"(B) to inform the development of a broad range of fusion energy systems; and

"(C) to facilitate the translation of research results in fusion energy science to industry.

"(2) COORDINATION.—In carrying out the program under paragraph (1), the Secretary shall coordinate with relevant Federal agencies, and prioritize the following objectives:

"(A) To use expertise from the private sector, institutions of higher education, and the National Laboratories to leverage existing, and develop new, computational software and capabilities that prospective users may use to accelerate research and development of fusion energy systems.

"(B) To develop computational tools to simulate and predict fusion energy science phenomena that may be validated through physical experimentation.

"(C) To increase the utility of the research infrastructure of the Department by coordi-

nating with the Advanced Scientific Computing Research program within the Office of Science.

"(D) To leverage experience from existing modeling and simulation entities sponsored by the Department.

"(E) To ensure that new experimental and computational tools are accessible to relevant research communities, including private sector entities engaged in fusion energy technology development.

"(F) To ensure that newly developed computational tools are compatible with modern virtual engineering and visualization capabilities to accelerate the realization of fusion energy technologies and systems.

"(3) DUPLICATION.—The Secretary shall ensure the coordination of, and avoid unnecessary duplication of, the activities of the program under paragraph (1) with the activities of—

"(A) other research entities of the Department, including the National Laboratories, the Advanced Research Projects Agency—Energy, and the Advanced Scientific Computing Research program within the Office of Science; and

"(B) industry.

"(4) HIGH-PERFORMANCE COMPUTING FOR FUSION INNOVATION CENTER.—

"(A) IN GENERAL.—In carrying out the program under paragraph (1), the Secretary shall, in coordination with the Innovation Network for Fusion Energy, establish and operate a national High-Performance Computing for Fusion Innovation Center (referred to in this paragraph as the 'Center'), to support the program under paragraph (1) by providing, to the extent practicable, a centralized entity for multidisciplinary, collaborative, fusion energy research and development through high-performance computing and advanced data analytics technologies and processes.

"(B) ELIGIBLE ENTITIES.—An entity eligible to serve as the Center shall be—

"(i) a National Laboratory;

"(ii) an institution of higher education;

"(iii) a multi-institutional collaboration; or

"(iv) any other entity that the Secretary determines to be appropriate.

"(C) APPLICATION; SELECTION.—

"(i) APPLICATION.—To be eligible to serve as the Center, an eligible entity shall submit to the Secretary an application at such time, in such manner, and containing such information as the Secretary may require.

"(ii) SELECTION.—The Secretary shall select the Center on a competitive, merit-reviewed basis.

"(D) EXISTING ACTIVITIES.—The Center may incorporate existing research activities that are consistent with the program under paragraph (1).

"(E) PRIORITIES.—

"(i) IN GENERAL.—The Center shall prioritize activities that utilize expertise and infrastructure from a balance among the private sector, institutions of higher education, and the National Laboratories to enhance existing computation tools and develop new computational software and capabilities to accelerate the commercial application of fusion energy systems.

"(ii) MAINTENANCE OF RESOURCE AVAILABILITY.—The Secretary may enter into contracts with commercial cloud computing providers to ensure that resource availability within the Department is not reduced or disproportionately distributed as a result of Center activities.

"(F) DURATION.—Subject to subparagraph (G), the Center shall receive support for a period of not more than 5 years, subject to the availability of appropriations.

"(G) RENEWAL.—On the expiration of the period of support of the Center under subparagraph (F), the Secretary may renew support for the Center, on a merit-reviewed basis, for a period of not more than 5 years.

"(p) MATERIAL PLASMA EXPOSURE EXPERIMENT.—

"(1) IN GENERAL.—The Secretary shall construct a Material Plasma Exposure Experiment facility as described in the 2020 publication approved by the Fusion Energy Sciences Advisory Committee entitled 'Powering the Future: Fusion and Plasmas'. The Secretary shall consult with the private sector, institutions of higher education, National Laboratories, and relevant Federal agencies to ensure that

the facility is capable of meeting Federal research needs for steady state, high-heat-flux, and plasma-material interaction testing of fusion materials over a range of fusion energy relevant parameters.

"(2) FACILITY CAPABILITIES.—The Secretary shall ensure that the facility described in paragraph (1) will provide the following capabilities:

"(A) A magnetic field at the target of 1 Tesla.

"(B) An energy flux at the target of 10 MW/m^2.

"(C) The ability to expose previously irradiated plasma facing material samples to plasma.

"(3) START OF OPERATIONS.—The Secretary shall, subject to the availability of appropriations, ensure that the start of full operations of the facility described in paragraph (1) occurs before December 31, 2027.

"(4) FUNDING.—Of the funds authorized to be appropriated for Fusion Energy Sciences, there are authorized to be appropriated to the Secretary for the Office of Fusion Energy Sciences to complete construction of the facility described in paragraph (1)—

"(A) $21,895,000 for fiscal year 2023; and

"(B) $3,800,000 for fiscal year 2024.

"(q) MATTER IN EXTREME CONDITIONS INSTRUMENT UPGRADE.—

"(1) IN GENERAL.—The Secretary shall provide for the upgrade to the Matter in Extreme Conditions endstation at the Linac Coherent Light Source as described in the 2020 publication approved by the Fusion Energy Sciences Advisory Committee entitled 'Powering the Future: Fusion and Plasmas'. The Secretary shall consult with the private sector, institutions of higher education, National Laboratories, and relevant Federal agencies to ensure that this facility is capable of meeting Federal research needs for understanding physical and chemical changes to plasmas at fundamental timescales, and explore new regimes of dense material physics, astrophysics, planetary physics, and short-pulse laser-plasma interactions.

"(2) START OF OPERATIONS.—The Secretary shall, subject to the availability of appropriations, ensure that the start of full operations of the facility described in paragraph (1) occurs before December 31, 2028."; and

(8) in subsection (r) (as so redesignated)—

(A) by striking ''There'' and inserting ''Out of funds authorized to be appropriated for the Office of Science in a fiscal year, there''; and

(B) by striking paragraphs (3) through (5) and inserting the following:

''(3) $1,025,500,400 for fiscal year 2023;

''(4) $1,043,489,724 for fiscal year 2024;

''(5) $1,053,266,107 for fiscal year 2025;

''(6) $1,047,962,074 for fiscal year 2026; and

''(7) $1,114,187,798 for fiscal year 2027.''.

(b) ITER CONSTRUCTION.—Section 972(c)(3) of the Energy Policy Act of 2005 (42 U.S.C. 16312(c)(3)) is amended—

(1) in subparagraph (A), by striking ''and'' at the end; and

(2) by striking subparagraph (B) and inserting the following:

''(B) $379,700,000 for fiscal year 2023;

''(C) $419,250,000 for fiscal year 2024;

''(D) $415,000,000 for fiscal year 2025;

''(E) $370,500,000 for fiscal year 2026; and

''(F) $411,078,000 for fiscal year 2027.''.

SEC. 10106. HIGH ENERGY PHYSICS PROGRAM.

(a) PROGRAM.—Section 305 of the Department of Energy Research and Innovation Act (42 U.S.C. 18643) is amended—

(1) by redesignating subsections (b) through (d) as subsections (d) through (f), respectively; and

(2) by inserting after subsection (a) the following:

''(b) PROGRAM.—As part of the activities authorized under section 209 of the Department of Energy Organization Act (42 U.S.C. 7139), the Director shall carry out a research program in elementary particle physics and advanced technology research and development to improve the understanding of the fundamental properties of the universe, including constituents of matter and energy and the nature of space and time.

''(c) HIGH ENERGY FRONTIER RESEARCH.—As part of the program described in subsection (b), the Director shall carry out research using high energy accelerators and advanced detectors, including accelerators and detectors that will function as national user facilities, to create and study interactions of elementary particles and investigate fundamental forces.''.

(b) INTERNATIONAL COLLABORATION.—Section 305 of the Department of Energy Research and Innovation Act (42 U.S.C. 18643) is amended by striking subsection (d)

(as redesignated by subsection (a)(1)) and inserting the following:

"(d) INTERNATIONAL COLLABORATION.—The Director shall—

"(1) as practicable and in coordination with other appropriate Federal agencies as necessary, ensure the access of United States researchers to the most advanced accelerator facilities and research capabilities in the world, including the Large Hadron Collider;

"(2) to the maximum extent practicable, continue to leverage United States participation in the Large Hadron Collider, and prioritize expanding international partnerships and investments in the Long-Baseline Neutrino Facility and Deep Underground Neutrino Experiment; and

"(3) to the maximum extent practicable, prioritize engagement in collaborative efforts in support of future international facilities that would provide access to the most advanced accelerator facilities in the world to United States researchers.".

(c) COSMIC FRONTIER RESEARCH.—Section 305 of the Department of Energy Research and Innovation Act (42 U.S.C. 18645) is amended by striking subsection (f)

(as redesignated by subsection (a)(1)) and inserting the following:

"(f) COSMIC FRONTIER RESEARCH.—The Director shall carry out research activities on the nature of the primary contents of the universe, including the nature of dark energy and dark matter. These activities shall, to the maximum extent practicable, be consistent with the research priorities identified by the High Energy Physics Advisory Panel or the National Academy of Sciences, and may include—

"(1) collaborations with the National Aeronautics and Space Administration, the National Science Foundation, or international partners on relevant projects; and

"(2) the development of space-based, land-based, water-based, and underground facilities and experiments.".

(d) FURTHER ACTIVITIES.—Section 305 of the Department of Energy Research and Innovation Act (42 U.S.C. 18645) (as amended by subsection (c)), is amended by adding at the end the following:

"(g) FACILITY CONSTRUCTION AND MAJOR ITEMS OF EQUIPMENT.—

"(1) PROJECTS.—Consistent with the Office of Science's project management practices, the Director

shall, to the maximum extent practicable, by incorporating the findings and recommendations of the 2014 Particle Physics Project Prioritization Panel (P5) report entitled 'Building for Discovery', support construction or fabrication of—

"(A) an international Long-Baseline Neutrino Facility based in the United States;

"(B) the Proton Improvement Plan II;

"(C) Second Generation Dark Matter experiments;

"(D) the Legacy Survey of Space and Time camera;

"(E) upgrades to detectors and other components of the Large Hadron Collider; and

"(F) the Cosmic Microwave Background Stage 4 project; and

"(G) other high priority projects recommended in the most recent report of the Particle Physics Project Prioritization Panel of the High Energy Physics Advisory Panel.

"(2) LONG-BASELINE NEUTRINO FACILITY.—

"(A) IN GENERAL.—The Secretary shall support construction of a Long-Baseline Neutrino Facility to facilitate the international Deep Underground Neutrino Experiment to ex-

amine the fundamental properties of neutrinos, explore physics beyond the Standard Model, and better clarify the existence and nature of antimatter.

"(B) FACILITY CAPABILITIES.—The Secretary shall ensure that the facility described in subparagraph (A) will provide, at a minimum, the following capabilities:

"(i) A neutrino beam with wideband capability of 1.2 megawatts of beam power and upgradable to 2.4 megawatts of beam power.

"(ii) 3 caverns excavated for a 70 kiloton fiducial detector mass and supporting surface buildings and utilities.

"(iii) Cryogenic systems to support neutrino detectors.

"(C) START OF OPERATIONS.—The Secretary shall, subject to the availability of appropriations, ensure that the start of full operations of the facility described in subparagraph (A) occurs before December 31, 2031.

"(D) FUNDING.—Out of funds authorized to be appropriated under subsection (k), there are authorized to be appropriated to the Sec-

retary to carry out construction of the project described in subparagraph (A)—

"(i) $180,000,000 for fiscal year 2023;

"(ii) $255,000,000 for fiscal year 2024;

"(iii) $305,000,000 for fiscal year 2025;

"(iv) $305,000,000 for fiscal year 2026; and

"(v) $305,000,000 for fiscal year 2027.

"(3) PROTON IMPROVEMENT PLAN–II ACCELERATOR UPGRADE PROJECT.—

"(A) IN GENERAL.—The Secretary shall support construction of the Proton Improvement Plan II, an upgrade to the Fermilab accelerator complex identified in the 2014 Particle Physics Project Prioritization Panel (P5) report entitled 'Building for Discovery', to provide the world's most intense beam of neutrinos to the international Long Baseline Neutrino Facility and to carry out a broad range of future high energy physics experiments. The Secretary shall work with international partners to enable fur-

ther significant contributions to the capabilities of that project.

"(B) FACILITY CAPABILITIES.—The Secretary shall ensure that the facility described in subparagraph (A) will provide, at a minimum, the following capabilities:

"(i) A state-of-the-art 800 megaelectron volt superconducting linear accelerator.

"(ii) Proton beam power of 1.2 megawatts at the start of LBNF/DUNE, upgradeable to 2.4 megawatts of beam power.

"(iii) A flexible design to enable high power beam delivery to multiple users simultaneously and customized beams tailored to specific scientific needs.

"(iv) Sustained high reliability operation of the Fermilab accelerator complex.

"(C) START OF OPERATIONS.—The Secretary shall, subject to the availability of appropriations, ensure that the start of full operations of the facility described in subparagraph (A) occurs before December 31, 2028.

"(D) FUNDING.—Out of funds authorized to be appropriated under subsection (k), there are authorized to be appropriated to the Secretary to carry out construction of the facility described in subparagraph (A)—

"(i) $130,000,000 for fiscal year 2023;

"(ii) $120,000,000 for fiscal year 2024;

"(iii) $120,000,000 for fiscal year 2025;

"(iv) $115,000,000 for fiscal year 2026; and

"(v) $110,000,000 for fiscal year 2027.

"(4) COSMIC MICROWAVE BACKGROUND STAGE 4.—

"(A) IN GENERAL.—The Secretary, in partnership with the Director of the National Science Foundation, shall support construction of the Cosmic Microwave Background Stage 4 project to survey the cosmic microwave background to test theories of cosmic inflation as described in the 2014 Particle Physics Prioritization Panel (P5) report entitled 'Build-

ing for Discovery: Strategic Plan for U.S. Particle Physics in the Global Context.'.

"(B) CONSULTATION.—The Secretary shall consult with the private sector, institutions of higher education, National Laboratories, and relevant Federal agencies to ensure that the project described in subparagraph (A) is capable of meeting Federal research needs in accessing the ultra-high energy physics of inflation and important neutrino properties.

"(C) EXPERIMENTAL CAPABILITIES.—The Secretary shall ensure to the maximum extent practicable that the facility described in subparagraph (A) will provide, at a minimum, 500,000 superconducting detectors deployed on an array of millimeter-wave telescopes with the required range in frequency, sensitivity, and survey speed that will provide sufficient capability to enable an order of magnitude advance in observations of the Cosmic Microwave Background, delivering transformative discoveries in fundamental physics, cosmology, and astrophysics.

"(D) START OF OPERATIONS.—The Secretary shall, subject to the availability of appro-

priations, ensure that the start of full operations of the facility described in subparagraph (A) occurs before December 31, 2030.

"(E) FUNDING.—Out of funds authorized to be appropriated under subsection (k), there are authorized to be appropriated to the Secretary to carry out construction of the facility described in subparagraph (A)—

"(i) $10,000,000 for fiscal year 2023;

"(ii) $25,000,000 for fiscal year 2024;

"(iii) $60,000,000 for fiscal year 2025;

"(iv) $80,000,000 for fiscal year 2026; and

"(v) $80,000,000 for fiscal year 2027.

"(h) ACCELERATOR AND DETECTOR UPGRADES.—The Director shall upgrade accelerator facilities and detectors, as necessary and appropriate, to increase beam power, sustain high reliability, and improve precision measurement to advance the highest priority particle physics research programs. In carrying out facility upgrades, the Director shall continue to work with international partners, when appropriate and in the United States' interest, to leverage investments and expertise in critical

technologies to help build and upgrade accelerator and detector facilities in the United States.

"(i) ACCELERATOR AND DETECTOR RESEARCH AND DEVELOPMENT.—As part of the program described in subsection (b), the Director shall carry out research and development in particle beam physics, accelerator science and technology, and particle and radiation detection with relevance to the specific needs of the High Energy Physics program, in coordination with the Accelerator Research and Development program authorized under section 310.

"(j) UNDERGROUND SCIENCE.—The Director shall—

"(1) support an underground science program consistent with the missions of the Department and the scientific needs of the High Energy Physics program, including those articulated in the most recent report of the Particle Physics Project Prioritization Panel of the High Energy Physics Advisory Panel, that leverages the capabilities of relevant underground science and engineering facilities;

"(2) carry out a competitive grant program to award scientists and engineers at institutions of higher education, nonprofit institutions, and National Laboratories to conduct research in underground science and engineering; and

"(3) submit to the Committee on Energy and Natural Resources of the Senate and the Committee on Science, Space, and Technology of the House of Representatives a report on the inventory of underground mines in the United States that may be suitable for future development of underground science and engineering facilities and any anticipated challenges associated with repurposing, repair, facility siting, or construction.

"(k) AUTHORIZATION OF APPROPRIATIONS.—Out of funds authorized to be appropriated for the Office of Science in a fiscal year, there are authorized to be appropriated to the Secretary to carry out the activities described in this section—

"(1) $1,159,520,000 for fiscal year 2023;

"(2) $1,289,891,200 for fiscal year 2024;

"(3) $1,428,284,672 for fiscal year 2025;

"(4) $1,499,881,752 for fiscal year 2026; and

"(5) $1,554,874,657 for fiscal year 2027.".

SEC. 10107. NUCLEAR PHYSICS PROGRAM.

Section 308 of the Department of Energy Research and Innovation Act (Public Law 115–246; 132 Stat. 3150) is amended to read as follows:

"SEC. 308. NUCLEAR PHYSICS.

"(a) PROGRAM.—As part of the activities authorized under section 209 of the Department of Energy Organization Act (42 U.S.C. 7139), the Director shall carry out a research program, and support relevant facilities, to discover and understand various forms of nuclear matter.

"(b) ELECTRON ION COLLIDER.—

"(1) IN GENERAL.—The Secretary shall support construction of an Electron Ion Collider as described in the 2015 Long Range Plan of the Nuclear Science Advisory Committee and the report from the National Academies of Science, Engineering, and Medicine entitled 'An Assessment of U.S.-Based Electron-Ion Collider Science', in order to measure the internal structure of the proton and the nucleus and answer fundamental questions about the nature of visible matter.

"(2) FACILITY CAPABILITY.—The Secretary shall ensure that the facility described in paragraph (1) meets the requirements in the 2015 Long Range Plan described in that paragraph, including—

"(A) at least 70 percent polarized beams of electrons and light ions;

"(B) ion beams from deuterium to the heaviest stable nuclei;

"(C) variable center of mass energy from 20 to 140 GeV;

"(D) high collision luminosity of $10^{33-34}cm^{-2}s^{-1}$; and

"(E) the possibility of more than 1 interaction region.

"(3) START OF OPERATIONS.—The Secretary shall, subject to the availability of appropriations, ensure that the start of full operations of the facility under this subsection occurs before December 31, 2030.

"(4) FUNDING.—Out of funds authorized to be appropriated under subsection (c), there are authorized to be appropriated to the Secretary to carry out construction of the facility under this subsection—

"(A) $90,000,000 for fiscal year 2023;

"(B) $181,000,000 for fiscal year 2024;

"(C) $219,000,000 for fiscal year 2025;

"(D) $297,000,000 for fiscal year 2026; and

"(E) $301,000,000 for fiscal year 2027.

"(c) AUTHORIZATION OF APPROPRIATIONS.—Out of funds authorized to be appropriated for the Office of Science in a fiscal year, there are authorized to be appro-

priated to the Secretary to carry out the activities described in this section—

"(1) $840,480,000 for fiscal year 2023;

"(2) $976,508,800 for fiscal year 2024;

"(3) $1,062,239,328 for fiscal year 2025;

"(4) $1,190,833,688 for fiscal year 2026; and

"(5) $1,248,463,709 for fiscal year 2027.".

SEC. 10108. SCIENCE LABORATORIES INFRASTRUCTURE PROGRAM.

Section 309 of the Department of Energy Research and Innovation Act (42 U.S.C. 18647) is amended by adding at the end the following:

"(c) APPROACH.—In carrying out the program under subsection (a), the Director shall use all available approaches and mechanisms, as the Secretary determines to be appropriate, including—

"(1) capital line items;

"(2) minor construction projects;

"(3) energy savings performance contracts;

"(4) utility energy service contracts;

"(5) alternative financing; and

"(6) expense funding.

"(d) SUBMISSION TO CONGRESS.—For each fiscal year through fiscal year 2027, at the same time as the annual budget submission of the President, the Secretary

shall submit to the Committee on Appropriations and the Committee on Energy and Natural Resources of the Senate and the Committee on Appropriations and the Committee on Science, Space, and Technology of the House of Representatives a list of projects for which the Secretary will provide funding under this section, including a description of each project and the funding profile for the project.

''(e) AUTHORIZATION OF APPROPRIATIONS.—Out of funds authorized to be appropriated for the Office of Science in a fiscal year, there is authorized to be appropriated to the Secretary to carry out the activities described in this section $550,000,000 for each of fiscal years 2023 through 2027.''.

SEC. 10109. ACCELERATOR RESEARCH AND DEVELOPMENT.

The Department of Energy Research and Innovation Act (42 U.S.C. 18601 et seq.) is amended by adding at the end the following:

''SEC. 310. ACCELERATOR RESEARCH AND DEVELOPMENT.

''(a) PROGRAM.—As part of the activities authorized under section 209 of the Department of Energy Organization Act (42 U.S.C. 7139), the Director shall carry out a research program—

"(1) to advance accelerator science and technology relevant to the Department, other Federal agencies, and United States industry;

"(2) to foster partnerships to develop, demonstrate, and enable the commercial application of accelerator technologies;

"(3) to support the development of a skilled, diverse, and inclusive accelerator workforce; and

"(4) to provide access to accelerator design and engineering resources.

"(b) ACCELERATOR RESEARCH.—In carrying out the program authorized under subsection (a), the Director shall support—

"(1) research activities in cross-cutting accelerator technologies including superconducting magnets and accelerators, beam physics, data analytics-based accelerator controls, simulation software, new particle sources, advanced laser technology, and transformative research; and

"(2) optimal operation of the Accelerator Test Facility.

"(c) ACCELERATOR DEVELOPMENT.—In carrying out the program authorized under subsection (a), the Director shall support partnerships to foster the development, demonstration, and commercial application of accelerator tech-

nologies, including advanced superconducting wire and cable, superconducting RF cavities, and high efficiency radiofrequency power sources for accelerators.

"(d) RESEARCH COLLABORATIONS.—In developing accelerator technologies under the program authorized under subsection (a), the Director shall—

"(1) consider the requirements necessary to support translational research and development for medical, industrial, security, and defense applications; and

"(2) leverage investments in accelerator technologies and fundamental research in particle physics by partnering with institutions of higher education, industry, and other Federal agencies to enable the commercial application of advanced accelerator technologies.

"(e) AUTHORIZATION OF APPROPRIATIONS.—Out of funds authorized to be appropriated for the Office of Science in a fiscal year, there are authorized to be appropriated to the Secretary to carry out the activities described in this section—

"(1) $19,080,000 for fiscal year 2023;

"(2) $20,224,800 for fiscal year 2024;

"(3) $21,438,288 for fiscal year 2025;

"(4) $22,724,585 for fiscal year 2026; and

"(5) $24,088,060 for fiscal year 2027.".

SEC. 10110. ISOTOPE RESEARCH, DEVELOPMENT, AND PRODUCTION.

(a) IN GENERAL.—The Department of Energy Research and Innovation Act (42 U.S.C. 18601 et seq.) is amended by adding after section 310 (as added by section 10109) the following:

"SEC. 311. ISOTOPE RESEARCH, DEVELOPMENT, AND PRODUCTION.

"(a) DEFINITION OF CRITICAL RADIOACTIVE AND STABLE ISOTOPE.—

"(1) IN GENERAL.—In this section, the term 'critical radioactive and stable isotope' means a radioactive and stable isotope—

"(A) the domestic commercial production of which is unavailable or inadequate to satisfy the demand of research, medical, industrial, or related industries in the United States; and

"(B) the supply of which is augmented through—

"(i) Department production; or

"(ii) foreign suppliers.

"(2) EXCLUSION.—In this section, the term 'critical radioactive and stable isotope' does not include the medical isotope molybdenum-99, the pro-

duction and supply of which is addressed in the American Medical Isotopes Production Act of 2012 (Public Law 112–239; 126 Stat. 2211) (including the amendments made by that Act).

"(b) PROGRAM.—The Director shall—

"(1) carry out, in coordination with other relevant programs across the Department, a program—

"(A) for the production of critical radioactive and stable isotopes, including the development of techniques to produce isotopes, that the Secretary determines are needed and of sufficient quality and quantity for research, medical, industrial, or related purposes;

"(B) for the production of critical radioactive and stable isotopes that are in short supply or projected to be in short supply in the future, including byproducts, surplus materials, and related isotope services;

"(C) to maintain and enhance the infrastructure required to produce and supply critical radioactive and stable isotope products and related services;

"(D) to conduct research and development on new and improved isotope production and

processing techniques that can make critical radioactive and stable isotopes available for research and application as soon as possible while assisting in workforce development;

"(E) to reduce domestic dependency on the foreign supply of critical radioactive and stable isotopes to ensure national preparedness; and

"(F) to the maximum extent practicable, in accordance with—

"(i) evidence-based reports, such as the 2015 report of the Nuclear Science Advisory Committee entitled 'Meeting Isotope Needs and Capturing Opportunities for the Future'; and

"(ii) assessments of isotope supply chains, including the assessment described in paragraph (3), any reports submitted pursuant to subsection (d), and other current and future assessments;

"(2) ensure that isotope production activities carried out under this subsection are consistent with the statement of policy entitled 'Policies and Procedures for Transfer of Commercial Radioisotope Production and Distribution to Private Industry' (30 Fed. Reg. 3247 (March 9, 1965));

"(3) assess the domestic requirements of current and emerging critical radioactive and stable isotopes and associated applications, including by consulting end-users, to identify areas that may require Federal investment for expedited development of domestic production capacity for those isotopes, including through public-private partnerships, as appropriate;

"(4) ensure that actions taken by the Department do not interfere with, delay, compete with, or otherwise adversely affect efforts by the private sector to make available or otherwise facilitate the supply of critical radioactive and stable isotopes, including efforts under existing agreements between the Department or contractors of the Department and the private sector; and

"(5) in coordination with the Assistant Secretary for Nuclear Energy, assess options for demonstrating the production of critical radioactive and stable isotopes in research, test, or commercial nuclear reactors and accelerators, including reactors and accelerators operated at universities.

"(c) ADVISORY COMMITTEE.—

"(1) IN GENERAL.—Not later than 90 days after the date of enactment of this section, the Sec-

retary shall establish an advisory committee (referred to in this subsection as the 'committee') in alignment with the program established under subsection (b)—

"(A) to carry out the activities previously executed as part of the Isotope Subcommittee of the Nuclear Science Advisory Committee; and

"(B) to provide expert advice and assistance to the Director in carrying out that program.

"(2) REPORT.—

"(A) IN GENERAL.—Not later than 1 year after the committee is established, the committee shall—

"(i) update the 2015 Nuclear Science Advisory Committee Isotopes Subcommittee Report entitled 'Meeting Isotope Needs and Capturing Opportunities for the Future'; and

"(ii) periodically update that report thereafter as needed.

"(B) INCLUSIONS.—An updated report under subparagraph (A) shall include an assessment of—

"(i) current demand in the United States for critical radioactive and stable isotopes;

"(ii) the impact of continued reliance on foreign supply of critical radioactive and stable isotopes;

"(iii) proposed mitigation strategies, including increasing domestic production sources for critical radioactive and stable isotopes, that—

"(I) are not commercially available; or

"(II) are commercially produced in quantities that are not sufficient—

"(aa) to satisfy domestic demand; and

"(bb) to minimize production constraints and supply disruptions to the United States healthcare and industrial isotope industries;

"(iv) current facilities, including upgrades to those facilities, and new facilities needed to meet domestic critical isotope needs; and

"(v) workforce development needs.

"(3) NONDUPLICATION.—The committee shall work in alignment with, and shall not duplicate the efforts of, preexisting advisory committees that are advising the program established under subsection (b).

"(4) FACA.—The committee shall be subject to the Federal Advisory Committee Act (5 U.S.C. App.).

"(d) REPORT.—

"(1) IN GENERAL.—Not later than the end of the first fiscal year beginning after the date of enactment of this section, and biennially thereafter, the Secretary of Energy Advisory Board shall submit to the Committees on Energy and Natural Resources and Environment and Public Works of the Senate and the Committees on Science, Space, and Technology and Energy and Commerce of the House of Representatives a report describing the progress made under the program established under subsection (b) during the preceding 2 fiscal years.

"(2) INCLUSIONS.—Each report under paragraph (1) shall include—

"(A) an updated assessment of any critical radioactive and stable isotope shortages in the United States;

"(B) a description of—

"(i) any disruptions in the international supply of critical radioactive and stable isotopes during the preceding 2 fiscal years; and

"(ii) the impact of those disruptions on related activities; and

"(C)(i) a projection of anticipated disruptions in the international supply, or supply constraints, of critical radioactive and stable isotopes during the next 2 fiscal years; and

"(ii) the anticipated impact of those disruptions or constraints, as applicable, on related domestic activities.

"(e) AUTHORIZATION OF APPROPRIATIONS.—Out of funds authorized to be appropriated for the Office of Science in a fiscal year, there are authorized to be appropriated to the Secretary to carry out this section—

"(1) $175,708,000 for fiscal year 2023;

"(2) $196,056,480 for fiscal year 2024;

"(3) $215,759,869 for fiscal year 2025;

"(4) $200,633,461 for fiscal year 2026; and

"(5) $146,293,469 for fiscal year 2027.".

(b) DEMONSTRATION OF ISOTOPE PRODUCTION.—Section 952(a) of the Energy Policy Act of 2005 (42 U.S.C. 16272(a)) is amended—

(1) by redesignating paragraph (2) as paragraph (4) and moving the paragraph so as to appear after paragraph (3); and

(2) by inserting after paragraph (1) the following:

"(2) ISOTOPE DEMONSTRATION EVALUATION.—

"(A) IN GENERAL.—Not later than 1 year after the date of enactment of the Research and Development, Competition, and Innovation Act, the Secretary, acting through the Assistant Secretary for Nuclear Energy, shall evaluate the technical and economic feasibility of the establishment of an isotope demonstration subprogram of the program established under paragraph (1) to support the development and commercial demonstration of critical radioactive and stable isotope production in existing commercial nuclear power plants.

"(B) CONSULTATION.—The Secretary, acting through the Assistant Secretary for Nuclear Energy, shall consult with the Director of the

Office of Science in carrying out the evaluation under subparagraph (A).

"(C) DEFINITION OF CRITICAL RADIOACTIVE AND STABLE ISOTOPE.—In this paragraph, the term 'critical radioactive and stable isotope' has the meaning given the term in section 311(a) of the Department of Energy Research and Innovation Act.".

(c) RADIOISOTOPE PROCESSING FACILITY.—

(1) IN GENERAL.—The Secretary of Energy (referred to in this subsection as "the Secretary") shall construct a radioisotope processing facility to provide for the growing radiochemical processing capability needs associated with the production of critical radioactive isotopes authorized under section 311 of the Department of Energy Research and Innovation Act.

(2) FUNDING.—Out of funds authorized to be appropriated under section 311(e) of the Department of Energy Research and Innovation Act, there are authorized to be appropriated to the Secretary to carry out this subsection—

(A) $30,500,000 for fiscal year 2023;

(B) $75,000,000 for fiscal year 2024;

(C) $105,000,000 for fiscal year 2025;

(D) $83,000,000 for fiscal year 2026; and

(E) $43,000,000 for fiscal year 2027.

(d) STABLE ISOTOPE PRODUCTION AND RESEARCH CENTER.—

(1) IN GENERAL.—The Secretary of Energy (referred to in this subsection as ''the Secretary'') shall establish a stable isotope production and research center—

(A) to expand the ability of the United States to perform multiple stable isotope production campaigns at large-scale production, as authorized under section 311 of the Department of Energy Research and Innovation Act;

(B) to mitigate the dependence of the United States on foreign-produced stable isotopes;

(C) to promote economic resilience; and

(D) to conduct research and development on stable isotope production and associated methods and technology.

(2) FUNDING.—Out of funds authorized to be appropriated under section 311(e) of the Department of Energy Research and Innovation Act, there are authorized to be appropriated to the Secretary to carry out this subsection—

(A) $74,400,000 for fiscal year 2023;

(B) $46,000,000 for fiscal year 2024;

(C) $31,200,000 for fiscal year 2025;

(D) $33,300,000 for fiscal year 2026; and

(E) $13,900,000 for fiscal year 2027.

SEC. 10111. INCREASED COLLABORATION WITH TEACHERS AND SCIENTISTS.

(a) IN GENERAL.—The Department of Energy Research and Innovation Act (42 U.S.C. 18601 et seq.) is amended by adding after section 311 (as added by section 10110), the following:

"SEC. 312. INCREASED COLLABORATION WITH TEACHERS AND SCIENTISTS.

''The Director shall support the development of a scientific workforce through programs that facilitate collaboration between and among teachers at elementary schools and secondary schools served by local educational agencies, students at institutions of higher education, early-career researchers, faculty at institutions of higher education, and the National Laboratories, including through the use of proven techniques to expand the number of individuals from underrepresented groups pursuing and attaining skills or undergraduate and graduate degrees relevant to the mission of the Office of Science.''.

(b) AUTHORIZATION OF APPROPRIATIONS.—Section 3169 of the Department of Energy Science Education Enhancement Act (42 U.S.C. 7381e) is amended—

(1) by striking ''There are'' and inserting ''Out of funds authorized to be appropriated for the Office of Science of the Department of Energy in a fiscal year, there are''; and

(2) by striking ''fiscal year 1991'' and inserting ''each of fiscal years 2023 through 2027''.

(c) BROADENING PARTICIPATION IN WORKFORCE DEVELOPMENT FOR TEACHERS AND SCIENTISTS.—

(1) IN GENERAL.—The Department of Energy Science Education Enhancement Act is amended by inserting after section 3167 (42 U.S.C. 7381c–1) the following:

''SEC. 3167A. BROADENING PARTICIPATION FOR TEACHERS AND SCIENTISTS.

''(a) IN GENERAL.—The Secretary shall—

''(1) expand opportunities to increase the number of highly skilled science, technology, engineering, and mathematics (STEM) professionals working in disciplines relevant to the mission of the Department; and

''(2) broaden the recruitment pool to increase participation from Historically Black Colleges or

Universities (as defined in section 3167B(f)), Hispanic-serving institutions (as defined in that section), Tribal Colleges or Universities (as defined in that section), minority-serving institutions (as defined in that section), institutions in eligible jurisdictions (as defined in that section), emerging research institutions, community colleges, and scientific societies in those disciplines.

''(b) PLAN.—Not later than 1 year after the date of enactment of the Research and Development, Competition, and Innovation Act, the Secretary shall submit to the Committee on Science, Space, and Technology of the House of Representatives and the Committees on Energy and Natural Resources and Commerce, Science, and Transportation of the Senate and make available to the public a plan for broadening participation of underrepresented groups in science, technology, engineering, and mathematics in programs supported by the Department, including—

''(1) a plan for supporting relevant Federal research award grantees and leveraging the National Science Foundation INCLUDES National Network and relevant partnerships, including partnerships maintained by other Federal research agencies;

"(2) metrics for assessing the participation of underrepresented groups in programs supported by the Department;

"(3) experienced and potential barriers to broadening participation of underrepresented groups in programs supported by the Department, including recommended solutions; and

"(4) any other activities the Secretary determines appropriate.

"(c) AUTHORIZATION OF APPROPRIATIONS.—Of the amounts authorized to be appropriated under section 3169, not less than $2,000,000 is authorized to be appropriated each fiscal year for the activities described in this section.

"SEC. 3167B. EXPANDING OPPORTUNITIES FOR HIGHLY SKILLED SCIENCE, TECHNOLOGY, ENGINEERING, AND MATHEMATICS (STEM) PROFESSIONALS.

"(a) IN GENERAL.—The Secretary shall—

"(1) expand opportunities and increase the number of highly skilled science, technology, engineering, and mathematics (STEM) professionals working in disciplines relevant to the mission of the Department; and

"(2) broaden the recruitment pool to increase participation from and expand partnerships with Historically Black Colleges or Universities, Hispanic serving institutions, Tribal Colleges or Universities, minority-serving institutions, institutions in eligible jurisdictions, emerging research institutions, community colleges, and scientific societies in those disciplines.

"(b) PLAN AND OUTREACH STRATEGY.—

"(1) PLAN.—

"(A) IN GENERAL.—Not later than 180 days after the date of enactment of the Research and Development, Competition, and Innovation Act, the Secretary shall submit to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Energy and Natural Resources of the Senate a 10-year educational plan to fund and expand new or existing programs administered by the Office of Science and sited at the National Laboratories and Department user facilities to expand educational and workforce development opportunities for underrepresented individuals, including—

"(i) high school, undergraduate, and graduate students; and

"(ii) recent graduates, teachers, and faculty in STEM fields.

"(B) CONTENTS.—The plan under subparagraph (A) may include paid internships, fellowships, temporary employment, training programs, visiting student and faculty programs, sabbaticals, and research support.

"(2) OUTREACH CAPACITY.—The Secretary shall include in the plan under paragraph (1) an outreach strategy to improve the advertising, recruitment, and promotion of educational and workforce development programs to community colleges, Historically Black Colleges or Universities, Hispanic-serving institutions, Tribal Colleges or Universities, minority-serving institutions, institutions in eligible jurisdictions, and emerging research institutions.

"(c) BUILDING RESEARCH CAPACITY.—

"(1) IN GENERAL.—The Secretary shall develop programs that strengthen the research capacity relevant to Office of Science disciplines at emerging research institutions, including minority-serving institutions, Tribal Colleges or Universities, Historically Black Colleges or Universities, institutions in eligible

jurisdictions (as defined in section 2203(b)(3)(A) of the Energy Policy Act of 1992 (42 U.S.C. 13503(b)(3)(A))), institutions in communities with dislocated workers who were previously employed in manufacturing, energy production, including coal power plants, and mineral and material mining, and other institutions of higher education.

"(2) INCLUSIONS.—The programs developed under paragraph (1) may include—

"(A) enabling mutually beneficial and jointly managed partnerships between research-intensive institutions and emerging research institutions; and

"(B) soliciting research proposals, fellowships, training programs, and research support directly from emerging research institutions.

"(d) TRAINEESHIPS.—

"(1) IN GENERAL.—The Secretary shall establish a university-led Traineeship Program to address workforce development needs in STEM fields relevant to the Department.

"(2) FOCUS.—The focus of the Traineeship Program established under paragraph (1) shall be on—

"(A) supporting workforce development and research experiences for underrepresented undergraduate and graduate students; and

"(B) increasing participation from underrepresented populations.

"(3) INCLUSION.—The traineeships under the Traineeship Program established under paragraph (1) shall include opportunities to build the next-generation workforce in research areas critical to maintaining core competencies across the programs of the Office of Science.

"(e) EVALUATION.—

"(1) IN GENERAL.—The Secretary shall establish key performance indicators to measure and monitor progress of education and workforce programs and expand Departmental activities for data collection and analysis.

"(2) REPORT.—Not later than 2 years after the date of enactment of the Research and Development, Competition, and Innovation Act, and every 2 years thereafter, the Secretary shall submit to the Committee on Science, Space, and Technology and the Committee on Education and Labor of the House of Representatives and the Committee on Energy and Natural Resources and the Committee on Health,

Education, Labor, and Pensions of the Senate a report summarizing progress toward meeting the key performance indicators established under paragraph (1).

''(f) DEFINITIONS.—In this section:

''(1) COMMUNITY COLLEGE.—The term 'community college' means—

''(A) a public institution of higher education, including additional locations, at which the highest awarded degree, or the predominantly awarded degree, is an associate degree; or

''(B) any Tribal college or university.

''(2) DISLOCATED WORKER.—The term 'dislocated worker' has the meaning given the term in section 3 of the Workforce Innovation and Opportunity Act (29 U.S.C. 3102).

''(3) HISPANIC-SERVING INSTITUTION.—The term 'Hispanic-serving institution' has the meaning given the term in section 502(a) of the Higher Education Act of 1965 (20 U.S.C. 1101a(a)).

''(4) HISTORICALLY BLACK COLLEGE OR UNIVERSITY.—The term 'Historically Black College or University' has the meaning given the term 'part B

institution' in section 322 of the Higher Education Act of 1965 (20 U.S.C. 1061).

"(5) INSTITUTION IN AN ELIGIBLE JURISDICTION.—The term 'institution in an eligible jurisdiction' means an institution of higher education (as defined in section 101 of the Higher Education Act of 1965 (20 U.S.C. 1001)) that is located in an eligible jurisdiction (as defined in section 2203(b)(3)(A) of the Energy Policy Act of 1992 (42 U.S.C. 13503(b)(3)(A))).

"(6) MINORITY-SERVING INSTITUTION.—The term 'minority-serving institution' includes the entities described in any of paragraphs (1) through (7) of section 371(a) of the Higher Education Act of 1965 (20 U.S.C. 1067q(a)).

"(7) STEM.—The term 'STEM' means the subjects listed in section 2 of the STEM Education Act of 2015 (42 U.S.C. 6621 note; Public Law 114–59).

"(8) TRIBAL COLLEGE OR UNIVERSITY.—The term 'Tribal College or University' has the meaning given the term in section 316(b) of the Higher Education Act of 1965 (20 U.S.C. 1059c(b)).".

(2) CLERICAL AMENDMENT.—The table of contents in section 2(b) of the National Defense Au-

thorization Act for Fiscal Year 1991 (Public Law 101–510; 104 Stat. 1497) is amended by striking the items relating to sections 3167 and 3168 and inserting the following:

''Sec. 3167. Partnerships with historically Black colleges and universities, Hispanic-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.''.

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.

(a) IN GENERAL.—The Department of Energy Research and Innovation Act (42 U.S.C. 18601 et seq.) (as amended by section 10111(a)) is amended by adding at the end the following:

"SEC. 313. HIGH INTENSITY LASER RESEARCH INITIATIVE.

''(a) IN GENERAL.—The Director shall establish a high intensity laser research initiative consistent with the recommendations of the National Academies report entitled 'Opportunities in Intense Ultrafast Lasers: Reaching for the Brightest Light' and the report from the Brightest Light Initiative workshop entitled 'The Future of Intense

Ultrafast Lasers in the U.S.'. The initiative should include research and development of petawatt-scale and of high average power laser technologies necessary for future facility needs in discovery science and to advance energy technologies, as well as support for a user network of academic and National Laboratory high intensity laser facilities.

''(b) LEVERAGE.—The Director shall leverage new laser technologies for more compact, less complex, and low-cost accelerator systems needed for science applications.

''(c) COORDINATION.—

''(1) DIRECTOR.—The Director shall coordinate the initiative established under subsection (a) among all relevant programs within the Office of Science.

''(2) UNDER SECRETARY.—The Under Secretary for Science shall coordinate the initiative established under subsection (a) with other relevant programs within the Department and other Federal agencies.

''(d) AUTHORIZATION OF APPROPRIATIONS.—Out of funds authorized to be appropriated for the Office of Science in a fiscal year, there are authorized to be appropriated to the Secretary to carry out the activities described in this section—

''(1) $50,000,000 for fiscal year 2023;

"(2) $100,000,000 for fiscal year 2024;

"(3) $150,000,000 for fiscal year 2025;

"(4) $200,000,000 for fiscal year 2026; and

"(5) $250,000,000 for fiscal year 2027.

"SEC. 314. HELIUM CONSERVATION PROGRAM.

"(a) IN GENERAL.—The Secretary shall establish a program to reduce the consumption of helium for Department grant recipients and facilities and encourage helium recycling and reuse. The program shall competitively award grants for—

"(1) the purchase of equipment to capture, reuse, and recycle helium;

"(2) the installation, maintenance, and repair of new and existing helium capture, reuse, and recycling equipment; and

"(3) helium alternatives research and development activities.

"(b) REPORT.—Not later than 2 years after the date of enactment of the Research and Development, Competition, and Innovation Act, and every 3 years thereafter, the Director shall submit to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Energy and Natural Resources of the Senate a report on the purchase of helium as part of research

projects and facilities supported by the Department. The report shall include—

"(1) the quantity of helium purchased for projects and facilities supported by Department grants;

"(2) a cost-analysis for such helium;

"(3) to the maximum extent practicable, information on whether such helium was imported from outside the United States, and if available, the country or region of the world from which the helium was imported;

"(4) expected or experienced impacts of helium supply shortages or prices on the research projects and facilities supported by the Department; and

"(5) recommendations for reducing Department grant recipients' exposure to volatile helium prices and supply shortages.

"(c) COORDINATION.—In carrying out the program under this section, the Director shall coordinate with the National Science Foundation and other relevant Federal agencies on helium conservation activities.

"(d) DURATION.—The program established under this section shall receive support for a period of not more than 5 years, subject to the availability of appropriations.

"(e) RENEWAL.—Upon expiration of any period of support of the program under this section, the Director may renew support for the program for a period of not more than 5 years.

"SEC. 315. OFFICE OF SCIENCE BIOLOGICAL THREAT PREPAREDNESS RESEARCH INITIATIVE.

"(a) IN GENERAL.—The Secretary shall establish within the Office of Science a cross-cutting research initiative, to be known as the 'Biological Threat Preparedness Research Initiative', to leverage the innovative analytical resources and tools, user facilities, and advanced computational and networking capabilities of the Department in order to support efforts that prevent, prepare for, predict, and respond to biological threats to national security, including infectious diseases.

"(b) COMPETITIVE, MERIT-REVIEWED PROCESS.—The Secretary shall carry out the initiative established under subsection (a) through a competitive, merit-reviewed process, and consider applications from National Laboratories, institutions of higher education, multi-institutional collaborations, industry partners and other appropriate entities.

"(c) ACTIVITIES.—In carrying out the initiative established under subsection (a), the Secretary shall—

"(1) determine a comprehensive set of technical milestones for the research activities described in that subsection;

"(2) prioritize the objectives of—

"(A) supporting fundamental research and development in advanced analytics, experimental studies, materials synthesis, and high-performance computing technologies needed in order to more quickly and effectively characterize, model, simulate, and predict complex natural phenomena and biological materials related to emerging biological threats;

"(B) supporting the development of tools that inform epidemiological modeling, and applying artificial intelligence, machine learning, and other computing tools to accelerate such processes;

"(C) supporting research and capabilities that enhance understanding and modeling of the transport of pathogens in indoor and outdoor air and water environments;

"(D) identifying priority research opportunities and capabilities for molecular design and modeling for medical countermeasures;

"(E) ensuring that new experimental and computational tools are accessible to relevant research communities, including private sector entities and other Federal research institutions; and

"(F) supporting activities and projects that combine computational modeling and simulation with experimental research facilities and studies;

"(3) leverage the research infrastructure of the Department, including scientific computing user facilities, x-ray light sources, neutron scattering facilities, nanoscale science research centers, and sequencing and biocharacterization facilities;

"(4) leverage experience from existing modeling and simulation research and work sponsored by the Department and promote collaboration and data sharing between National Laboratories, research entities, and user facilities of the Department by providing necessary access and secure data transfer capabilities; and

"(5) ensure that new experimental and computational tools are accessible to relevant research communities, including private sector entities, to address emerging biological threats.

"(d) COORDINATION.—In carrying out the initiative established under subsection (a), the Secretary shall coordinate activities with—

"(1) other relevant offices of the Department;

"(2) the National Nuclear Security Administration;

"(3) the National Laboratories;

"(4) the Director of the National Science Foundation;

"(5) the Director of the Centers for Disease Control and Prevention;

"(6) the Director of the National Institutes of Health;

"(7) the Assistant Secretary for Preparedness and Response;

"(8) the heads of other relevant Federal agencies;

"(9) institutions of higher education; and

"(10) the private sector.

"(e) INFECTIOUS DISEASES HIGH PERFORMANCE COMPUTING RESEARCH CONSORTIUM.—

"(1) IN GENERAL.—The Secretary, in coordination with the Director of the National Science Foundation and the Director of the Office of Science and Technology Policy, shall establish and operate an

Emerging Infectious Diseases High Performance Computing Research Consortium (referred to in this section as the 'Consortium'), to support the initiative established under subsection (a) by providing, to the extent practicable, a centralized entity for multidisciplinary, collaborative, emerging infectious disease and biosecurity research and development through high performance computing and advanced data analytics technologies and processes, in conjunction with the experimental research facilities and studies supported by the Department.

''(2) MEMBERSHIP.—The members of the Consortium may include representatives from relevant Federal agencies, the National Laboratories, the private sector, and institutions of higher education, which can each contribute relevant compute time, capabilities, or other resources.

''(3) ACTIVITIES.—The Consortium shall—

''(A) match applicants with available Federal and private sector computing resources;

''(B) consider supplemental awards for computing partnerships with Consortium members to qualifying entities on a competitive merit-review basis;

"(C) encourage collaboration and communication among member representatives of the Consortium and awardees;

"(D) provide access to the high-performance computing capabilities, expertise, and user facilities of the Department and the National Laboratories; and

"(E) submit an annual report to the Secretary summarizing the activities of the Consortium, including—

"(i) describing each project undertaken by the Consortium;

"(ii) detailing organizational expenditures; and

"(iii) evaluating contributions to the achievement of technical milestones as determined in subsection (a).

"(4) COORDINATION.—The Secretary shall ensure the coordination of, and avoid unnecessary duplication of, the activities of the Consortium with the activities of other research entities of the Department, other Federal research institutions, institutions of higher education, and the private sector.

"(f) REPORT.—Not later than 2 years after the date of enactment of the Research and Development, Competi-

tion, and Innovation Act, the Secretary shall submit to the Committee on Science, Space, and Technology and the Committee on Energy and Commerce of the House of Representatives, and the Committee on Energy and Natural Resources, the Committee on Commerce, Science, and Transportation, and the Committee on Health, Education, Labor, and Pensions of the Senate, a report detailing the effectiveness of—

"(1) the interagency coordination among each Federal agency involved in the initiative established under subsection (a);

"(2) the collaborative research achievements of that initiative, including the achievement of the technical milestones determined under that subsection; and

"(3) potential opportunities to expand the technical capabilities of the Department.

"(g) FUNDING.—Out of funds authorized to be appropriated for the Office of Science in a fiscal year, there is authorized to be appropriated to the Secretary to carry out the activities under this section $50,000,000 for each of fiscal years 2023 through 2027.

"SEC. 316. MIDSCALE INSTRUMENTATION AND RESEARCH EQUIPMENT PROGRAM.

"(a) IN GENERAL.—The Director shall establish a midscale instrumentation and research equipment program to develop, acquire, and commercialize research instrumentation and equipment needed to meet the missions of the Department and to provide platform technologies for the broader scientific community.

"(b) ACTIVITIES.—Under the program established under subsection (a), the Director shall—

"(1) enable the development and acquisition of novel, state-of-the-art instruments that—

"(A) range in cost from $1,000,000 to $20,000,000 each; and

"(B) would significantly accelerate scientific breakthroughs at user facilities; and

"(2) strongly encourage partnerships among—

"(A) National Laboratories;

"(B) user facilities; and

"(C)(i) institutions in a State receiving funding under the Established Program to Stimulate Competitive Research established under section 2203(b)(3) of the Energy Policy Act of 1992 (42 U.S.C. 13503(b)(3));

"(ii) historically Black colleges or universities;

"(iii) minority-serving institutions of higher education; or

"(iv) institutions of higher education in a rural area.

"(c) COORDINATION WITH OTHER PROGRAMS.—The Director shall coordinate the program established under subsection (a) with all other programs carried out by the Office of Science of the Department.

"(d) RESEARCH EQUIPMENT AND TECHNOLOGY DEVELOPMENT COORDINATION.—The Director shall encourage coordination among the Office of Science, the National Laboratories, the Office of Technology Transitions, and relevant academic and private sector entities to identify, disseminate, and commercialize research instruments, equipment, and related technologies developed to aid basic science research discoveries that meet the mission of the Department.

"(e) AUTHORIZATION OF APPROPRIATIONS.—Out of funds authorized to be appropriated for the Office of Science in a fiscal year, there is authorized to be appropriated to carry out this section $150,000,000 for each of fiscals years 2023 through 2027.

"SEC. 317. AUTHORIZATION OF APPROPRIATIONS.

"There are authorized to be appropriated to the Secretary to carry out the activities described in this title—

"(1) $8,902,392,400 for fiscal year 2023;

"(2) $9,541,895,744 for fiscal year 2024;

"(3) $10,068,198,994 for fiscal year 2025;

"(4) $10,468,916,520 for fiscal year 2026; and

"(5) $10,831,342,317 for fiscal year 2027.".

(b) TABLE OF CONTENTS.—Section 1(b) of the Department of Energy Research and Innovation Act is amended in the table of contents by inserting after the 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 Initiative.
"Sec. 316. Midscale instrumentation and research equipment program.
"Sec. 317. Authorization of appropriations.".

SEC. 10113. ESTABLISHED PROGRAM TO STIMULATE COMPETITIVE RESEARCH.

(a) RESEARCH AREAS.—Section 2203(b)(3)(E) of the Energy Policy Act of 1992 (42 U.S.C. 13503(b)(3)(E)) is amended—

(1) in the subparagraph heading, by striking "IN AREAS OF APPLIED ENERGY RESEARCH, ENVIRONMENTAL MANAGEMENT, AND BASIC SCIENCE";

(2) in clause (i)—

(A) in subclause (I), by inserting "nuclear energy," before "and"; and

(B) by striking subclause (V) and inserting the following:

"(V) scientific research, including—

"(aa) advanced scientific computing research;

"(bb) basic energy sciences;

"(cc) biological and environmental research;

"(dd) fusion energy sciences;

"(ee) high energy physics;

"(ff) nuclear physics;

"(gg) isotope research, development, and production;

"(hh) accelerator research, development, and production; and

"(ii) other areas of research funded by the Office of Science, as determined by the Secretary."; and

(3) in clause (ii)—

(A) in subclause (II), by striking "graduate" and inserting "undergraduate scholarships, graduate fellowships, and";

(B) in subclause (III), by striking "; and" and inserting "and staff;";

(C) in subclause (IV)—

(i) by striking "biennial" and inserting "annual"; and

(ii) by striking the period at the end and inserting a semicolon; and

(D) by adding at the end the following:

"(V) to develop research clusters for particular areas of expertise; and

"(VI) to diversify the future workforce.".

(b) RESEARCH CAPABILITY ENHANCEMENT.—Section 2203(b)(3) of the Energy Policy Act of 1992 (42 U.S.C. 13503(b)(3)) is amended by striking subparagraph (F) and inserting the following:

"(F) RESEARCH CAPABILITY ENHANCEMENT.—

"(i) SCHOLARSHIPS AND FELLOWSHIPS.—

"(I) IN GENERAL.—Pursuant to subparagraph (E)(ii), the Secretary shall award grants to institutions of higher education in eligible jurisdictions for those institutions of higher

education to provide scholarships and fellowships.

"(II) GRANT.—A scholarship or fellowship awarded by an institution of higher education in an eligible jurisdiction using a grant provided under subclause (I)—

"(aa) in the case of an undergraduate scholarship—

"(AA) shall be for a period of 1 year; and

"(BB) may be competitively renewable on an annual basis; and

"(bb) in the case of a graduate level fellowship, shall be for a period of not more than 5 years.

"(ii) EARLY CAREER CAPACITY DEVELOPMENT.—

"(I) IN GENERAL.—Pursuant to subparagraph (E)(ii), the Secretary shall award grants to early career faculty and staff at institutions of higher education in eligible jurisdictions—

"(aa) to support investigator-initiated research, including associated research equipment and instrumentation;

"(bb) to support activities associated with identifying and responding to funding opportunities;

"(cc) to secure technical assistance for the pursuit of funding opportunities; and

"(dd) to develop and enhance collaboration among National Laboratories, Department of Energy programs, the private sector, and other relevant entities.

"(II) GRANTS.—A grant awarded under subclause (I) shall be—

"(aa) for a period of not more than 5 years; and

"(bb) competitively renewable for an additional 5-year period.

"(iii) RESEARCH CAPACITY DEVELOPMENT.—

"(I) IN GENERAL.—Pursuant to subparagraph (E)(ii), the Secretary shall award competitive grants to institutions of higher education in eligible jurisdictions for research capacity development and implementation, including—

"(aa) developing expertise in key technology areas, including associated equipment and instrumentation;

"(bb) developing and acquiring novel, state-of-the-art instruments and equipment that range in cost from $500,000 to $20,000,000;

"(cc) enhancing collaboration with National Laboratories, the Department of Energy, and the private sector through faculty or staff placement programs; and

"(dd) supporting formal partnership programs with insti-

tutions of higher education and National Laboratories.

"(II) GRANTS.—A grant awarded under subclause (I) shall be—

"(aa) for a period of not more than 5 years; and

"(bb) renewable for an additional 5-year period.

"(III) EQUIPMENT AND INSTRUMENTATION.—To the maximum extent practicable, the Secretary shall ensure that research equipment and instrumentation developed or acquired pursuant to a grant awarded under subclause (I) may sustain continued operation and be maintained without the need for additional or subsequent funding under this section.".

(c) PROGRAM IMPLEMENTATION UPDATE.—Section 2203(b)(3)(G) of the Energy Policy Act of 1992 (42 U.S.C. 13503(b)(3)(G)) is amended by adding at the end the following:

"(iii) UPDATE.—Not later than 270 days after the date of enactment of the Re-

search and Development, Competition, and Innovation Act, the Secretary shall—

"(I) update the plan submitted under clause (i); and

"(II) submit the updated plan to the committees described in that clause.".

(d) PROGRAM EVALUATION REPORT.—Section 2203(b)(3)(H) of the Energy Policy Act of 1992 (42 U.S.C. 13503(b)(3)(H)) is amended by adding at the end the following:

"(iv) ANNUAL REPORT.—At the end of each fiscal year, the Secretary shall submit to the Committee on Energy and Natural Resources and the Committee on Appropriations of the Senate and the Committee on Energy and Commerce and the Committee on Appropriations of the House of Representatives a report that includes—

"(I) the total amount of expenditures made by the Department to carry out EPSCoR in each eligible jurisdiction for each of the 3 most recent fiscal years for which such information is available;

"(II)(aa) the number of EPSCoR awards made to institutions of higher education located in eligible jurisdictions; and

"(bb) the amount and type of each award;

"(III) the number of awards that are not EPSCoR awards made by the Secretary to institutions of higher education located in eligible jurisdictions;

"(IV)(aa) the number of representatives of institutions of higher education in eligible jurisdictions serving on each Office of Science advisory committee; and

"(bb) for each such advisory committee, the percentage of committee membership that those individuals constitute; and

"(V) the number of individuals from institutions of higher education in eligible jurisdictions serving on peer review committees.".

(e) FUNDING.—Section 2203(b)(3) of the Energy Policy Act of 1992 (42 U.S.C. 13503(b)(3)) is amended by adding at the end the following:

"(I) FUNDING.—

"(i) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the Secretary to carry out EPSCoR, to remain available until expended—

"(I) $50,000,000 for fiscal year 2023;

"(II) $50,000,000 for fiscal year 2024;

"(III) $75,000,000 for fiscal year 2025;

"(IV) $100,000,000 for fiscal year 2026; and

"(V) $100,000,000 for fiscal year 2027.

"(ii) GRANTS TO CONSORTIA.—In the case of an EPSCoR grant awarded to a consortium that contains institutions of higher education that are not located in eligible jurisdictions, the Secretary may count—

"(I) the full amount of funds expended to provide the grant towards meeting the funding requirement in clause (iii) if the lead entity of the consortium is an institution of higher education located in an eligible jurisdiction; and

"(II) only the funds provided to institutions of higher education located in eligible jurisdictions towards meeting the funding requirement in clause (iii) if the lead entity of the consortium is an institution of higher education that is not located in an eligible jurisdiction.

"(iii) ADDITIONAL FUNDS FOR ELIGIBLE JURISDICTIONS.—In addition to funds authorized to be appropriated under clause (i), the Secretary, to the maximum extent practicable while maintaining the competitive, merit-based award processes of the Office of Science, shall ensure that, of the research and development funds of the Office of Science that are awarded by the Secretary each year to institutions of high-

er education, not less than 10 percent is awarded to institutions of higher education in eligible jurisdictions pursuant to the evaluation and selection criteria in section 605.10 of title 10, Code of Federal Regulations (or successor regulations).

"(iv) ADDITIONAL FUNDS FOR EQUIPMENT AND INSTRUMENTATION.—In addition to funds authorized to be appropriated under clause (i), there is authorized to be appropriated to the Secretary to award grants under subparagraph (F)(iii)(I) for the purpose described in item (bb) of that subparagraph $25,000,000 for each of fiscal years 2023 through 2027, to remain available until expended.

"(v) ACCOUNTING.—To the maximum extent practicable, the Secretary shall ensure that each program within the Department of Energy that endorses an EPSCoR grant awardee shall contribute funding to the award to acknowledge the research benefits to the mission of that program.".

(f) ADVISORY COMMITTEES TO THE OFFICE OF SCIENCE.—In order to improve the advice and guidance

provided to the Office of Science, the Undersecretary for Science shall seek to ensure, to the maximum extent practicable, the robust participation of institutions of higher education (as defined in section 101 of the Higher Education Act of 1965 (20 U.S.C. 1001)) located in eligible jurisdictions (as defined in section 2203(b)(3)(A) of the Energy Policy Act of 1992 (42 U.S.C. 13503(b)(3)(A))) on the Office of Science Federal Advisory Committee.

(g) TECHNICAL AMENDMENTS.—Section 2203(b) of the Energy Policy Act of 1992 (42 U.S.C. 13503(b)) is amended—

(1) in paragraph (1), by striking ''(1) The Secretary'' and inserting the following:

''(1) UNIVERSITY RESEARCH REACTORS.—The Secretary''; and

(2) in paragraph (2), by striking ''(2) The Secretary'' and inserting the following:

''(2) METHOD TO EVALUATE EFFECTIVENESS OF EDUCATION PROGRAMS.—The Secretary''.

SEC. 10114. RESEARCH SECURITY.

(a) DEFINITIONS.—In this section:

(1) COUNTRY OF RISK.—

(A) IN GENERAL.—The term ''country of risk'' means a foreign country determined by the Secretary, in accordance with subparagraph

(B), to present a risk of theft of United States intellectual property or a threat to the national security of the United States if nationals of the country, or entities owned or controlled by the country or nationals of the country, participate in any research, development, demonstration, or deployment activity authorized under this division or division A or an amendment made by this division or division A.

(B) DETERMINATION.—In making a determination under subparagraph (A), the Secretary, in coordination with the Director of the Office of Intelligence and Counterintelligence, shall take into consideration—

(i) the most recent World Wide Threat Assessment of the United States Intelligence Community, prepared by the Director of National Intelligence; and

(ii) the most recent National Counterintelligence Strategy of the United States.

(2) COVERED SUPPORT.—The term ''covered support'' means any grant, contract, subcontract, award, loan, program, support, or other activity authorized under this division or division A, or an amendment made by this division or division A.

(3) ENTITY OF CONCERN.—The term ''entity of concern'' means any entity, including a national, that is—

(A) identified under section 1237(b) of the Strom Thurmond National Defense Authorization Act for Fiscal Year 1999 (50 U.S.C. 1701 note; Public Law 105–261);

(B) identified under section 1260H of the William M. (Mac) Thornberry National Defense Authorization Act for Fiscal Year 2021 (10 U.S.C. 113 note; Public Law 116–283);

(C) on the Entity List maintained by the Bureau of Industry and Security of the Department of Commerce and set forth in Supplement No. 4 to part 744 of title 15, Code of Federal Regulations;

(D) included in the list required by section 9(b)(3) of the Uyghur Human Rights Policy Act of 2020 (Public Law 116–145; 134 Stat. 656); or

(E) identified by the Secretary, in coordination with the Director of the Office of Intelligence and Counterintelligence and the applicable office that would provide, or is providing,

covered support, as posing an unmanageable threat—

(i) to the national security of the United States; or

(ii) of theft or loss of United States intellectual property.

(4) NATIONAL.—The term ''national'' has the meaning given the term in section 101 of the Immigration and Nationality Act (8 U.S.C. 1101).

(5) SECRETARY.—The term ''Secretary'' means the Secretary of Energy.

(b) SCIENCE AND TECHNOLOGY RISK ASSESSMENT.—

(1) IN GENERAL.—The Secretary shall develop and maintain tools and processes to manage and mitigate research security risks, such as a science and technology risk matrix, informed by threats identified by the Director of the Office of Intelligence and Counterintelligence, to facilitate determinations of the risk of loss of United States intellectual property or threat to the national security of the United States posed by activities carried out under any covered support.

(2) CONTENT AND IMPLEMENTATION.—In developing and using the tools and processes developed under paragraph (1), the Secretary shall—

(A) deploy risk-based approaches to evaluating, awarding, and managing certain research, development, demonstration, and deployment activities, including designations that will indicate the relative risk of activities;

(B) assess, to the extent practicable, ongoing high-risk activities;

(C) designate an officer or employee of the Department of Energy to be responsible for tracking and notifying recipients of any covered support of unmanageable threats to United States national security or of theft or loss of United States intellectual property posed by an entity of concern;

(D) consider requiring recipients of covered support to implement additional research security mitigations for higher-risk activities if appropriate; and

(E) support the development of research security training for recipients of covered support on the risks posed by entities of concern.

(3) ANNUAL UPDATES.—The tools and processes developed under paragraph (1) shall be evaluated annually and updated as needed, with threat-informed input from the Office of Intelligence and Counterintelligence, to reflect changes in the risk designation under paragraph (2)(A) of research, development, demonstration, and deployment activities conducted by the Department.

(c) ENTITY OF CONCERN.—

(1) PROHIBITION.—Except as provided in paragraph (2), no entity of concern, or individual that owns or controls, is owned or controlled by, or is under common ownership or control with an entity of concern, may receive, or perform work under, any covered support.

(2) WAIVER OF PROHIBITION.—

(A) IN GENERAL.—The Secretary may waive the prohibition under paragraph (1) if determined by the Secretary to be in the national interest.

(B) NOTIFICATION TO CONGRESS.—Not less than 2 weeks prior to issuing a waiver under subparagraph (A), the Secretary shall notify the Committee on Energy and Natural Resources of the Senate and the Committee on

Science, Space, and Technology of the House of Representatives of the intent to issue the waiver, including a justification for the waiver.

(3) PENALTY.—

(A) TERMINATION OF SUPPORT.—On finding that any entity of concern or individual described in paragraph (1) has received covered support and has not received a waiver under paragraph (2), the Secretary shall terminate all covered support to that entity of concern or individual, as applicable.

(B) PENALTIES.—An entity of concern or individual identified under subparagraph (A) shall be—

(i) prohibited from receiving or participating in covered support for a period of not less than 1 year but not more than 10 years, as determined by the Secretary; or

(ii) instead of the penalty described in clause (i), subject to any other penalties authorized under applicable law or regulations that the Secretary determines to be in the national interest.

(C) NOTIFICATION TO CONGRESS.—Prior to imposing a penalty under subparagraph (B), the Secretary shall notify the Committee on Energy and Natural Resources of the Senate and the Committee on Science, Space, and Technology of the House of Representatives of the intent to impose the penalty, including a description of and justification for the penalty.

(4) COORDINATION.—The Secretary shall—

(A) share information about the unmanageable threats described in subsection (a)(3)(E) with other Federal agencies; and

(B) develop consistent approaches to identifying entities of concern.

(d) INTERNATIONAL AGREEMENTS.—This section shall be applied in a manner consistent with the obligations of the United States under international agreements.

(e) REPORT REQUIRED.—Not later than 240 days after the date of enactment of this Act, the Secretary shall submit to Congress a report that—

(1) describes—

(A) the tools and processes developed under subsection (b)(1) and any updates to those tools and processes; and

(B) if applicable, the science and technology risk matrix developed under that subsection and how that matrix has been applied;

(2) includes a mitigation plan for managing risks posed by countries of risk with respect to future or ongoing research and development activities of the Department of Energy; and

(3) defines critical research areas, designated by risk, as determined by the Secretary.

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

SEC. 10201. DEFINITIONS.

In this title:

(1) DIRECTOR.—The term ''Director'' means the Director of the National Institute of Standards and Technology.

(2) ENROLLMENT OF NEEDY STUDENTS.—The term ''enrollment of needy students'' has the meaning given the term in section 312(d) of the Higher Education Act of 1965 (20 U.S.C. 1058(d)).

(3) FRAMEWORK.—The term ''Framework'' means the Framework for Improving Critical Infrastructure Cybersecurity developed by the National Institute of Standards and Technology and referred

to in Executive Order No. 13800 issued on May 11, 2017 (82 Fed. Reg. 22391 et seq.).

(4) INSTITUTE.—The term ''Institute'' means the National Institute of Standards and Technology.

(5) INTERNATIONAL STANDARDS ORGANIZATION.—The term ''international standards organization'' has the meaning given such term in section 451 of the Trade Agreements Act of 1979 (19 U.S.C. 2571).

(6) SECRETARY.—The term ''Secretary'' means the Secretary of Commerce.

Subtitle A—Authorization of Appropriations

SEC. 10211. AUTHORIZATION OF APPROPRIATIONS.

(a) FISCAL YEAR 2023.—

(1) IN GENERAL.—There are authorized to be appropriated to the Secretary of Commerce $1,551,450,000 for the National Institute of Standards and Technology for fiscal year 2023.

(2) SPECIFIC ALLOCATIONS.—Of the amount authorized by paragraph (1)—

(A) $979,100,000 is authorized for scientific and technical research and services laboratory activities;

(B) $200,000,000 is authorized for the construction and maintenance of facilities, of which $80,000,000 is authorized to be appropriated for Safety, Capacity, Maintenance, and Major Repairs; and

(C) $372,350,000 is authorized for industrial technology services activities, of which $275,300,000 is authorized to be appropriated for the Manufacturing Extension Partnership program under sections 25, 25A, and 26 of the National Institute of Standards and Technology Act (15 U.S.C. 278k, 278k-1, and 278l) (of which $31,000,000 is authorized to establish the National Supply Chain Database under section 10253) and $97,050,000 is authorized to be appropriated for the Manufacturing USA Program under section 34 of the National Institute of Standards and Technology Act (15 U.S.C. 278s).

(b) FISCAL YEAR 2024.—

(1) IN GENERAL.—There are authorized to be appropriated to the Secretary of Commerce $1,651,600,000 for the National Institute of Standards and Technology for fiscal year 2024.

(2) SPECIFIC ALLOCATIONS.—Of the amount authorized by paragraph (1)—

(A) $1,047,600,000 is authorized for scientific and technical research and services laboratory activities;

(B) $200,000,000 is authorized for the construction and maintenance of facilities, of which $80,000,000 is authorized to be appropriated for Safety, Capacity, Maintenance, and Major Repairs, including $20,000,000 for IT infrastructure; and

(C) $404,000,000 is authorized for industrial technology services activities, of which $300,000,000 is authorized to be appropriated for the Manufacturing Extension Partnership program under sections 25, 25A, and 26 of the National Institute of Standards and Technology Act (15 U.S.C. 278k, 278k-1, and 278l) (of which $26,000,000 is authorized to maintain, update, and support Federal coordination of State supply chain databases maintained by the Centers (as such term is defined in such section 25 of such Act)) and $104,000,000 is authorized to be appropriated for the Manufacturing USA Program under section 34 of the National

Institute of Standards and Technology Act (15 U.S.C. 278s).

(c) FISCAL YEAR 2025.—

(1) IN GENERAL.—There are authorized to be appropriated to the Secretary of Commerce $2,039,900,000 for the National Institute of Standards and Technology for fiscal year 2025.

(2) SPECIFIC ALLOCATIONS.—Of the amount authorized by paragraph (1)—

(A) $1,120,900,000 is authorized for scientific and technical research and services laboratory activities;

(B) $200,000,000 is authorized for the construction and maintenance of facilities, of which $80,000,000 is authorized to be appropriated for Safety, Capacity, Maintenance, and Major Repairs, including $20,000,000 for IT infrastructure; and

(C) $719,000,000 is authorized for industrial technology services activities, of which $550,000,000 is authorized to be appropriated for the Manufacturing Extension Partnership program under sections 25, 25A, and 26 of the National Institute of Standards and Technology Act (15 U.S.C. 278k, 278k-1, and 278l) (of

which $26,000,000 is authorized to maintain, update, and support Federal coordination of State supply chain databases maintained by the Centers (as such term is defined in such section 25 of such Act)) and $169,000,000 is authorized to be appropriated for the Manufacturing USA Program under section 34 of the National Institute of Standards and Technology Act (15 U.S.C. 278s).

(d) FISCAL YEAR 2026.—

(1) IN GENERAL.—There are authorized to be appropriated to the Secretary of Commerce $2,158,400,000 for the National Institute of Standards and Technology for fiscal year 2026.

(2) SPECIFIC ALLOCATIONS.—Of the amount authorized by paragraph (1)—

(A) $1,199,400,000 is authorized for scientific and technical research and services laboratory activities;

(B) $200,000,000 is authorized for the construction and maintenance of facilities, of which $80,000,000 is authorized to be appropriated for Safety, Capacity, Maintenance, and Major Repairs, including $20,000,000 for IT infrastructure; and

(C) $759,000,000 is authorized for industrial technology services activities, of which $550,000,000 is authorized to be appropriated for the Manufacturing Extension Partnership program under sections 25, 25A, and 26 of the National Institute of Standards and Technology Act (15 U.S.C. 278k, 278k-1, and 278l) (of which $26,000,000 is authorized to maintain, update, and support Federal coordination of State supply chain databases maintained by the Centers (as such term is defined in such section 25 of such Act)) and $209,000,000 is authorized to be appropriated for the Manufacturing USA Program under section 34 of the National Institute of Standards and Technology Act (15 U.S.C. 278s).

(e) FISCAL YEAR 2027.—

(1) IN GENERAL.—There are authorized to be appropriated to the Secretary of Commerce $2,283,360,000 for the National Institute of Standards and Technology for fiscal year 2027.

(2) SPECIFIC ALLOCATIONS.—Of the amount authorized by paragraph (1)—

(A) $1,283,360,000 is authorized for scientific and technical research and services laboratory activities;

(B) $200,000,000 is authorized for the construction and maintenance of facilities, of which $80,000,000 is authorized to be appropriated for Safety, Capacity, Maintenance, and Major Repairs, including $20,000,000 for IT infrastructure; and

(C) $800,000,000 is authorized for industrial technology services activities, of which $550,000,000 is authorized to be appropriated for the Manufacturing Extension Partnership program under sections 25, 25A, and 26 of the National Institute of Standards and Technology Act (15 U.S.C. 278k, 278k-1, and 23 278l) (of which $26,000,000 is authorized to maintain, update, and support Federal coordination of State supply chain databases maintained by the Centers (as such term is defined in such section 25 of such Act)) and $250,000,000 is authorized to be appropriated for the Manufacturing USA Program under section 34 of the National Institute of Standards and Technology Act (15 U.S.C. 278s).

Subtitle B—Measurement Research

SEC. 10221. ENGINEERING BIOLOGY AND BIOMETROLOGY.

(a) IN GENERAL.—The Director, in coordination with the National Engineering Biology Research and Development Initiative established pursuant to title IV, shall—

(1) support basic measurement science and technology research for engineering biology, biomanufacturing, and biometrology to advance—

(A) measurement technologies to support foundational understanding of the mechanisms of conversion of DNA information into cellular function;

(B) technologies for measurement of such biomolecular components and related systems;

(C) new data tools, techniques, and processes to improve engineering biology, biomanufacturing, and biometrology research; and

(D) other areas of measurement science and technology research determined by the Director to be critical to the development and deployment of engineering biology, biomanufacturing and biometrology;

(2) support activities to inform and expand the development of measurements infrastructure needed to develop technical standards to establish interoper-

ability and facilitate commercial development of biomolecular measurement technology and engineering biology applications;

(3) convene industry, institutions of higher education, nonprofit organizations, Federal laboratories, and other Federal agencies engaged in engineering biology research and development to develop coordinated technical roadmaps for authoritative measurement of the molecular components of the cell;

(4) provide access to user facilities with advanced or unique equipment, services, materials, and other resources to industry, institutions of higher education, nonprofit organizations, and government agencies to perform research and testing;

(5) establish or expand collaborative partnerships or consortia with other Federal agencies engaged in engineering biology research and development, institutions of higher education, Federal laboratories, and industry to advance engineering biology applications; and

(6) support graduate and postgraduate research and training in biometrology, biomanufacturing, and engineering biology.

(b) RULE OF CONSTRUCTION.—Nothing in this section may be construed to alter the policies, processes, or

practices of individual Federal agencies in effect on the day before the date of the enactment of this Act relating to the conduct or support of biomedical research and advanced development, including the solicitation and review of extramural research proposals.

(c) CONTROLS.—In carrying out activities authorized by this section, the Secretary shall ensure proper security controls are in place to protect sensitive information, as appropriate.

SEC. 10222. GREENHOUSE GAS MEASUREMENT RESEARCH.

(a) IN GENERAL.—The Director, in consultation with the Administrator of the National Oceanic and Atmospheric Administration, the Administrator of the Environmental Protection Agency, the National Aeronautics and Space Administration, the Director of the National Science Foundation, the Secretary of Energy, and the heads of other Federal agencies, as appropriate, shall carry out a measurement research program to inform the development or improvement of best practices, benchmarks, methodologies, procedures, and technical standards for the measurement of greenhouse gas emissions and to assess and improve the performance of greenhouse gas emissions measurement systems placed in situ and on space-based platforms.

(b) ACTIVITIES.—In carrying out such a program, the Director may—

(1) conduct research and testing to improve the accuracy, efficacy, and reliability of the measurement of greenhouse gas emissions at a range of scales that covers direct measurement at the component or process level through atmospheric observations;

(2) conduct research to create novel measurement technologies and techniques for the measurement of greenhouse gas emissions;

(3) convene and engage with relevant Federal agencies and stakeholders to establish common definitions and characterizations for the measurement of greenhouse gas emissions, taking into account any existing United States and international technical standards and guidance;

(4) conduct outreach and coordination to share technical expertise with relevant industry and non-industry stakeholders and standards development organizations to—

(A) assist such entities in the development and adoption of best practices and technical standards for greenhouse gas emissions measurements; and

(B) promote consistency and traceability in international reference standards and central calibration laboratories;

(5) in coordination with the Administrator of the National Oceanic and Atmospheric Administration, the Administrator of the Environmental Protection Agency, and the Secretary of Energy, develop such standard reference materials as the Director determines is necessary to further the development of such technical standards, taking into account any existing United States or international standards;

(6) coordinate with the National Oceanic and Atmospheric Administration to ensure data are managed, stewarded, and archived at all levels and promote full and open exchange at Federal and State levels, and with academia, industry, and other users; and

(7) coordinate with international partners, including international standards organizations, to maintain global greenhouse gas measurement technical standards.

(c) TESTBEDS.—In coordination with the private sector, institutions of higher education, State and local governments, the National Oceanic and Atmospheric Administration, the Environmental Protection Agency, the De-

partment of Energy, and other Federal agencies, as appropriate, the Director may continue to develop and manage testbeds to advance research and standards development for greenhouse gas emissions measurements from in situ and space-based platforms.

(d) CENTER FOR GREENHOUSE GAS MEASUREMENTS, STANDARDS, AND INFORMATION.—

(1) IN GENERAL.—The Director, in collaboration with the Administrator of the National Oceanic and Atmospheric Administration, the Administrator of the Environmental Protection Agency, and the heads of other Federal agencies, as appropriate, shall establish a Center for Greenhouse Gas Measurements, Standards, and Information (in this subsection referred to as the ''Center'').

(2) COLLABORATIONS.—The Director shall require that the activities of the Center include collaboration among public and private organizations, including institutions of higher education, nonprofit organizations, private sector entities, and State, Tribal, territorial, and local officials.

(3) PURPOSE.—The purpose of the Center shall be to—

(A) advance measurement science, data analytics, and modeling at a range of scales

that covers direct measurement and estimation at the component or process level through atmospheric observations and at the analysis level to improve the accuracy of spatially and temporally resolved greenhouse gas emissions measurement, validation, and attribution to specific underlying activities and processes;

(B) test and evaluate the performance of existing capabilities, and inform and improve best practices, benchmarks, methodologies, procedures, and technical standards, for the measurement and validation of greenhouse gas emissions at scales noted in subparagraph (A);

(C) educate and train students in measurement science, computational science, and systems engineering research relevant to greenhouse gas emissions measurements;

(D) foster collaboration among academic researchers, private sector stakeholders, and State, Tribal, territorial, and local officials in the use of Institute testbeds as described in subsection (c);

(E) conduct activities with research institutions, industry partners, and State and local officials to identify research, testing, and tech-

nical standards needs relevant to greenhouse gas emissions; and

(F) collaborate with other Federal agencies to conduct outreach and coordination to share and promote technical data, tools, and expertise with relevant public and private sector stakeholders, including State, Tribal, territorial, and local officials, to assist such in the accurate measurement of greenhouse gas emissions.

SEC. 10223. NIST AUTHORITY FOR CYBERSECURITY AND PRIVACY ACTIVITIES.

Subsection (c) of section 2 of the National Institute of Standards and Technology Act (15 U.S.C. 272) is amended—

(1) in paragraph (16), by striking the period at the end and inserting a semicolon;

(2) by redesignating paragraphs (16) through (27) as paragraphs (21) through (32), respectively; and

(3) by inserting after paragraph (15) the following:

''(16) support information security measures for the development and lifecycle of software and the software supply chain, including development of voluntary, consensus-based technical standards, best

practices, frameworks, methodologies, procedures, processes, and software engineering toolkits and configurations;

''(17) support information security measures, including voluntary, consensus-based technical standards, best practices, and guidelines, for the design, adoption, and deployment of cloud computing services;

''(18) support research, development, and practical application to improve the usability of cybersecurity processes and technologies;

''(19) facilitate and support the development of a voluntary, consensus-based set of technical standards, guidelines, best practices, methodologies, procedures, and processes to improve privacy protections in systems, technologies, and processes used by both the public and private sector;

''(20) support privacy measures, including voluntary, consensus-based technical standards, best practices, guidelines, metrology, and testbeds for the design, adoption, and deployment of privacy enhancing technologies;''.

SEC. 10224. SOFTWARE SECURITY AND AUTHENTICATION.

(a) VULNERABILITIES IN OPEN SOURCE SOFTWARE.—The Director shall assign severity metrics to iden-

tified vulnerabilities with open source software and produce voluntary guidance to assist the entities that maintain open source software repositories to discover and mitigate vulnerabilities.

(b) ARTIFICIAL INTELLIGENCE-ENABLED DEFENSES.—The Director shall carry out research and testing to improve the effectiveness of artificial intelligence-enabled cybersecurity, including by generating optimized data sets to train artificial intelligence defense systems and evaluating the performance of varying network architectures at strengthening network security.

(c) AUTHENTICATION OF INSTITUTE SOFTWARE.—The Director shall ensure all software released by the Institute is digitally signed and maintained to enable stakeholders to verify its authenticity and integrity upon installation and execution.

(d) ASSISTANCE TO INSPECTORS GENERAL.—Subject to available funding, the Director shall provide technical assistance to improve the education and training of individual Federal agency Inspectors General and staff who are responsible for the annual independent evaluation they are required to perform of the information security program and practices of Federal agencies under section 3555 of title 44, United States Code.

(e) SOFTWARE SUPPLY CHAIN SECURITY PRACTICES.—

(1) IN GENERAL.—The Director shall, in coordination with industry, academia, and other Federal agencies, as appropriate, develop a set of security outcomes and practices, including security controls, control enhancements, supplemental guidance, or other supporting information to enable software developers and operators to identify, assess, and manage cybersecurity risks over the full lifecycle of software products.

(2) OUTREACH.—The Director shall conduct outreach and coordination activities to share technical expertise with Federal agencies, relevant industry stakeholders, and standards development organizations, as appropriate, to encourage the voluntary adoption of the software lifecycle security practices by Federal agencies and industry stakeholders.

SEC. 10225. DIGITAL IDENTITY MANAGEMENT RESEARCH.

Section 504 of the Cybersecurity Enhancement Act of 2014 (15 U.S.C. 7464) is amended to read as follows:

"SEC. 504. IDENTITY MANAGEMENT RESEARCH AND DEVELOPMENT.

"(a) IN GENERAL.—The Director shall carry out a program of research to support the development of vol-

untary, consensus-based technical standards, best practices, benchmarks, methodologies, metrology, testbeds, and conformance criteria for identity management, taking into account appropriate user concerns to—

"(1) improve interoperability and portability among identity management technologies;

"(2) strengthen identity proofing and verification methods used in identity management systems commensurate with the level of risk, including identity and attribute validation services provided by Federal, State, and local governments;

"(3) improve privacy protection in identity management systems; and

"(4) improve the accuracy, usability, and inclusivity of identity management systems.

"(b) DIGITAL IDENTITY TECHNICAL ROADMAP.—The Director, in consultation with other relevant Federal agencies and stakeholders from the private sector, shall develop and maintain a technical roadmap for digital identity management research and development focused on enabling the voluntary use and adoption of modern digital identity solutions that align with the four criteria in subsection (a).

"(c) DIGITAL IDENTITY MANAGEMENT GUIDANCE.—

"(1) IN GENERAL.—The Director shall develop, and periodically update, in collaboration with other public and private sector organizations, common definitions and voluntary guidance for digital identity management systems, including identity and attribute validation services provided by Federal, State, and local governments.

"(2) GUIDANCE.—The Guidance shall—

"(A) align with the four criteria in subsection (a), as practicable;

"(B) provide case studies of implementation of guidance;

"(C) incorporate voluntary technical standards and industry best practices; and

"(D) not prescribe or otherwise require the use of specific technology products or services.

"(3) CONSULTATION.—In carrying out this subsection, the Director shall consult with—

"(A) Federal and State agencies;

"(B) industry;

"(C) potential end-users and individuals that will use services related to digital identity verification; and

"(D) experts with relevant experience in the systems that enable digital identity verification, as determined by the Director.".

SEC. 10226. BIOMETRICS RESEARCH AND TESTING.

(a) IN GENERAL.—The Secretary, acting through the Director, shall establish a program to support measurement research to inform the development of best practices, benchmarks, methodologies, procedures, and voluntary, consensus-based technical standards for biometric identification systems, including facial recognition systems, to assess and improve the performance of such systems. In carrying out such program, the Director may—

(1) conduct measurement research to support efforts to improve the performance of biometric identification systems, including in areas related to conformity assessment, image quality and interoperability, contactless biometric capture technologies, and human-in-the-loop biometric identification systems and processes;

(2) convene and engage with relevant stakeholders to establish common definitions and characterizations for biometric identification systems, which may include accuracy, fairness, bias, privacy, consent, and other properties, taking into account

definitions in relevant international technical standards and other publications;

(3) carry out measurement research and testing on a range of biometric modalities, such as fingerprints, voice, iris, face, vein, behavioral biometrics, genetics, multimodal biometrics, and emerging applications of biometric identification technology;

(4) study the use of privacy-enhancing technologies and other technical protective controls to facilitate access, as appropriate, to public data sets for biometric research;

(5) conduct outreach and coordination to share technical expertise with relevant industry and non-industry stakeholders and standards development organizations to assist such entities in the development of best practices and voluntary technical standards; and

(6) develop such standard reference artifacts as the Director determines is necessary to further the development of such voluntary technical standards.

(b) BIOMETRICS TEST PROGRAM.—

(1) IN GENERAL.—The Secretary, acting through the Director, shall carry out a test program to provide biometrics vendors the opportunity to test

biometric identification technologies across a range of modalities.

(2) ACTIVITIES.—In carrying out the program under this subsection, the Director shall—

(A) conduct research and regular testing to improve and benchmark the accuracy, efficacy, and bias of biometric identification technologies, which may include research and testing on demographic variations, capture devices, presentation attack detection, partially occluded or computer generated images, privacy and security designs and controls, template protection, de-identification, and comparison of algorithm, human, and combined algorithm-human recognition capability;

(B) develop an approach for testing software and cloud-based biometrics applications, including remote systems, in Institute test facilities;

(C) establish reference use cases for biometric identification technologies and performance criteria for assessing each use case, including accuracy, efficacy, and bias metrics;

(D) produce public-facing reports of the findings from such testing for a general audience;

(E) develop policies and procedures accounting for the legal and social implications of activities under this paragraph when working with a foreign entity of concern (as such term is defined in section 10612);

(F) establish procedures to prioritize testing of biometrics identification technologies developed by entities headquartered in the United States; and

(G) conduct such other activities as determined necessary by the Director.

(c) GAO REPORT TO CONGRESS.—Not later than 18 months after the date of the enactment of this Act, the Comptroller General of the United States shall submit a detailed report to Congress on the impact of biometric identification technologies on historically marginalized communities, including low-income communities and minority religious, racial, and ethnic groups. Such report should be made publicly available on an internet website.

SEC. 10227. FEDERAL BIOMETRIC PERFORMANCE STANDARDS.

Subsection (b) of section 20 of the National Institute of Standards and Technology Act (15 U.S.C. 278g–3) is amended—

(1) in paragraph (2), by striking ''and'' after the semicolon;

(2) in paragraph (3), by striking the period and inserting ''; and''; and

(3) by adding at the end the following:

''(4) performance standards and guidelines for high risk biometric identification systems, including facial recognition systems, accounting for various use cases, types of biometric identification systems, and relevant operational conditions.''.

SEC. 10228. PROTECTING RESEARCH FROM CYBERSECURITY THEFT.

Subparagraph (A) of section 2(e)(1) of the National Institute of Standards and Technology Act (15 U.S.C. 272(e)(1)) is amended—

(1) in clause (viii), by striking ''and'' after the semicolon;

(2) by redesignating clause (ix) as clause (x); and

(3) by inserting after clause (viii) the following:

"(ix) consider institutions of higher education (as such term is defined in section 101 of the Higher Education Act of 1965 (20 U.S.C. 1001)); and".

SEC. 10229. DISSEMINATION OF RESOURCES FOR RESEARCH INSTITUTIONS.

(a) DISSEMINATION OF RESOURCES FOR RESEARCH INSTITUTIONS.—

(1) IN GENERAL.—Not later than one year after the date of the enactment of this Act, the Director shall, using the authorities of the Director under subsections (c)(15) and (e)(1)(A)(ix) of section 2 of the National Institute of Standards and Technology Act (15 U.S.C. 272), disseminate and make publicly available tailored resources to help qualifying institutions identify, assess, manage, and reduce their cybersecurity risk related to conducting research.

(2) REQUIREMENTS.—The Director shall ensure that the resources disseminated pursuant to paragraph (1)—

(A) are generally applicable and usable by a wide range of qualifying institutions;

(B) vary with the nature and size of the qualifying institutions, and the nature and sen-

sitivity of the data collected or stored on the information systems or devices of the qualifying institutions;

(C) include elements that promote awareness of simple, basic controls, a workplace cybersecurity culture, and third-party stakeholder relationships, to assist qualifying institutions in mitigating common cybersecurity risks;

(D) include case studies, examples, and scenarios of practical application;

(E) are outcomes-based and can be implemented using a variety of technologies that are commercial and off-the-shelf; and

(F) to the extent practicable, are based on international technical standards.

(3) NATIONAL CYBERSECURITY AWARENESS AND EDUCATION PROGRAM.—The Director shall ensure that the resources disseminated under paragraph (1) are consistent with the efforts of the Director under section 303 of the Cybersecurity Enhancement Act of 2014 (15 U.S.C. 7443).

(4) UPDATES.—The Director shall review periodically and update the resources under paragraph (1) as the Director determines appropriate.

(5) VOLUNTARY RESOURCES.—The use of the resources disseminated under paragraph (1) shall be considered voluntary.

(b) OTHER FEDERAL CYBERSECURITY REQUIREMENTS.—Nothing in this section may be construed to supersede, alter, or otherwise affect any cybersecurity requirements applicable to Federal agencies.

(c) DEFINITIONS.—In this section:

(1) QUALIFYING INSTITUTIONS.—The term ''qualifying institutions'' means institutions of higher education that are awarded in excess of $50,000,000 per year in total Federal research funding.

(2) RESOURCES.—The term ''resources'' means guidelines, tools, best practices, technical standards, methodologies, and other ways of providing information.

SEC. 10230. ADVANCED COMMUNICATIONS RESEARCH.

The National Institute of Standards and Technology Act (15 U.S.C. 271 et seq.) is amended—

(1) by redesignating section 35 as section 36; and

(2) by inserting after section 34 the following:

"SEC. 35. ADVANCED COMMUNICATIONS RESEARCH ACTIVITIES.

"(a) ADVANCED COMMUNICATIONS RESEARCH.—

"(1) IN GENERAL.—The Director, in consultation with the Assistant Secretary for Communications and Information, the Director of the National Science Foundation, and heads of other Federal agencies, as appropriate, shall carry out a program of measurement research for advanced communications technologies.

"(2) RESEARCH AREAS.—Research areas may include—

"(A) radio frequency emissions and interference, including technologies and techniques to mitigate such emissions and interference;

"(B) advanced antenna arrays and artificial intelligence systems capable of operating advanced antenna arrays;

"(C) artificial intelligence systems to enable internet of things networks, immersive technology, and other advanced communications technologies;

"(D) network sensing and monitoring technologies;

"(E) technologies to enable spectrum flexibility and agility;

"(F) optical and quantum communications technologies;

"(G) security of advanced communications systems;

"(H) public safety communications;

"(I) resilient internet of things applications for advanced manufacturing; and

"(J) other research areas determined necessary by the Director.

"(3) TESTBEDS.—In coordination with the Assistant Secretary for Communications and Information, the private sector, and other Federal agencies as appropriate, the Director may develop and manage testbeds for research and development of advanced communications technologies, avoiding duplication of existing testbeds run by other agencies or the private sector.

"(4) OUTREACH.—In carrying out the activities under this subsection, the Director shall seek input from other Federal agencies and from private sector stakeholders, on an ongoing basis, to help inform research and development priorities, including through workshops and other multistakeholder activities.

"(5) TECHNICAL ROADMAPS.—In carrying out the activities under this subsection, the Director

shall convene industry, institutions of higher education, nonprofit organizations, Federal laboratories, and other Federal agencies engaged in advanced communications research and development to develop, and periodically update, coordinated technical roadmaps for advanced communications research in priority areas, such as those described in paragraph (2).

''(b) NATIONAL ADVANCED SPECTRUM AND COMMUNICATIONS TEST NETWORK.—

''(1) IN GENERAL.—The Director, in coordination with the Administrator of the National Telecommunications and Information Administration and heads of other Federal agencies, as appropriate, shall operate a national network of government, academic, and commercial test capabilities and facilities to be known as the National Advanced Spectrum and Communications Test Network (referred to in this section as 'NASCTN').

''(2) PURPOSES.—NASCTN shall be for the purposes of facilitating and coordinating the use of intellectual capacity, modeling and simulation, laboratory facilities, and test facilities to meet national spectrum interests and challenges, including—

"(A) measurements and analyses of electromagnetic propagation, radio systems characteristics, and operating techniques affecting the utilization of the electromagnetic spectrum in coordination with specialized, related research and analysis performed by other Federal agencies in their areas of responsibility;

"(B) conducting research and analysis in the general field of telecommunications sciences in support of the Institute's mission and in support of other Government agencies;

"(C) developing methodologies for testing, measuring, and setting guidelines for interference;

"(D) conducting interference tests to better understand the impact of current and proposed Federal and commercial spectrum activities;

"(E) conducting research and testing to improve spectrum interference tolerance, flexibility, agility, and interference mitigation methods; and

"(F) other activities as determined necessary by the Director.".

SEC. 10231. NEUTRON SCATTERING.

(a) STRATEGIC PLAN FOR THE INSTITUTE NEUTRON REACTOR.—The Director shall develop a strategic plan for the future of the NIST Center for Neutron Research after the current neutron reactor is decommissioned, including—

(1) a succession plan for the reactor, including a roadmap with timeline and milestones;

(2) conceptual design of a new reactor and accompanying facilities, as appropriate; and

(3) a plan to minimize disruptions to the user community during the transition.

(b) COORDINATION WITH THE DEPARTMENT OF ENERGY.—The Secretary, acting through the Director, shall coordinate with the Secretary of Energy on issues related to Federal support for neutron science, including estimation of long-term needs for research using neutron sources, and planning efforts for future facilities to meet such needs.

(c) REPORT TO CONGRESS.—Not later than 30 months after the date of enactment of this Act, the Director shall submit to Congress the plan required under subsection (a), and shall notify Congress of any substantial updates to such plan in subsequent years.

SEC. 10232. ARTIFICIAL INTELLIGENCE.

(a) IN GENERAL.—The Director shall continue to support the development of artificial intelligence and data science, and carry out the activities of the National Artificial Intelligence Initiative Act of 2020 authorized in division E of the National Defense Authorization Act for Fiscal Year 2021 (Public Law 116–283), including through—

(1) expanding the Institute's capabilities, including scientific staff and research infrastructure;

(2) supporting measurement research and development for advanced computer chips and hardware designed for artificial intelligence systems;

(3) supporting the development of technical standards and guidelines that promote safe and trustworthy artificial intelligence systems, such as enhancing the accuracy, explainability, privacy, reliability, robustness, safety, security, and mitigation of harmful bias in artificial intelligence systems;

(4) creating a framework for managing risks associated with artificial intelligence systems; and

(5) developing and publishing cybersecurity tools, encryption methods, and best practices for artificial intelligence and data science.

(b) AI TESTBEDS.—Section 22A of the National Institute of Standards and Technology Act (15 U.S.C. 278h–1) is amended—

(1) by redesignating subsection (g) as subsection (h); and

(2) by inserting after subsection (f) the following:

''(g) TESTBEDS.—In coordination with other Federal agencies as appropriate, the private sector, and institutions of higher education (as such term is defined in section 101 of the Higher Education Act of 1965 (20 U.S.C. 1001)), the Director may establish testbeds, including in virtual environments, to support the development of robust and trustworthy artificial intelligence and machine learning systems, including testbeds that examine the vulnerabilities and conditions that may lead to failure in, malfunction of, or attacks on such systems.''.

SEC. 10233. SUSTAINABLE CHEMISTRY RESEARCH AND EDUCATION.

In accordance with section 263 of the National Defense Authorization Act for Fiscal Year 2021 (15 U.S.C. 9303), the Director shall carry out activities in support of sustainable chemistry, including coordinating and partnering with academia, industry, nonprofit organizations, and other entities in activities to support clean, safe,

and economic alternatives, technologies, and methodologies to traditional chemical products and processes.

SEC. 10234. PREMISE PLUMBING RESEARCH.

(a) IN GENERAL.—The Secretary, acting through the Director, shall create a program, in consultation with the Environmental Protection Agency, for premise plumbing research, including to—

(1) conduct metrology research on premise plumbing in relation to water safety, security, efficiency, sustainability, and resilience; and

(2) coordinate research activities with academia, the private sector, nonprofit organizations, and other Federal agencies.

(b) DEFINITIONS.—For purposes of this section, the term ''premise plumbing'' means the water distribution system located within the property lines of a property, including all buildings and permanent structures on such property. Such term includes building supply and distribution pipes, fixtures, fittings, water heaters, water-treating and water-using equipment, and all respective joints, connections, devices, and appurtenances.

SEC. 10235. DR. DAVID SATCHER CYBERSECURITY EDUCATION GRANT PROGRAM.

(a) AUTHORIZATION OF GRANTS.—

(1) IN GENERAL.—Subject to the availability of appropriations, the Director shall carry out the Dr. David Satcher Cybersecurity Education Grant Program by—

(A) awarding grants to assist institutions of higher education that have an enrollment of needy students, historically Black colleges and universities, Tribal Colleges and Universities, and minority-serving institutions, to establish or expand cybersecurity programs, to build and upgrade institutional capacity to better support new or existing cybersecurity programs, including cybersecurity partnerships with public and private entities, and to support such institutions on the path to producing qualified entrants in the cybersecurity workforce or becoming a National Center of Academic Excellence in Cybersecurity; and

(B) awarding grants to build capacity at institutions of higher education that have an enrollment of needy students, historically Black colleges and universities, Tribal Colleges and Universities, and minority-serving institutions, to expand cybersecurity education opportunities, cybersecurity programs, cybersecurity research,

and cybersecurity partnerships with public and private entities.

(2) RESERVATION.—The Director shall award not less than 50 percent of the amount available for grants under this section to historically Black colleges and universities, Tribal Colleges and Universities, and minority-serving institutions.

(3) COORDINATION.—The Director shall carry out this section in coordination with appropriate Federal agencies, including the Departments of Homeland Security, Education, and Labor.

(4) SUNSET.—The Director's authority to award grants under paragraph (1) shall terminate on the date that is 5 years after the date the Director first awards a grant under paragraph (1).

(b) APPLICATIONS.—An eligible institution seeking a grant under subsection (a) shall submit an application to the Director at such time, in such manner, and containing such information as the Director may reasonably require, including a statement of how the institution will use the funds awarded through the grant to expand cybersecurity education opportunities at the eligible institution.

(c) ACTIVITIES.—An eligible institution that receives a grant under this section may use the funds awarded through such grant for increasing research, education,

technical, partnership, and innovation capacity, including for—

(1) building and upgrading institutional capacity to better support new or existing cybersecurity programs, including cybersecurity partnerships with public and private entities;

(2) building and upgrading institutional capacity to provide hands-on research and training experiences for undergraduate and graduate students; and

(3) outreach and recruitment to ensure students are aware of such new or existing cybersecurity programs, including cybersecurity partnerships with public and private entities.

(d) REPORTING REQUIREMENTS.—Not later than—

(1) one year after the effective date of this section, as provided in subsection (f), and annually thereafter until the Director submits the report under paragraph (2), the Director shall prepare and submit to Congress a report on the status and progress of implementation of the grant program under this section, including on the number and demographics of institutions participating, the number and nature of students served by cybersecurity programs at institutions receiving grants, as well as the number of certificates or degrees awarded through

such cybersecurity programs, the level of funding provided to grant recipients, the types of activities being funded by the grants program, and plans for future implementation and development; and

(2) five years after the effective date of this section, as provided in subsection (f), the Director shall prepare and submit to Congress a report on the status of cybersecurity education programming and capacity-building at institutions receiving grants under this section, including changes in the scale and scope of these programs, associated facilities, or in accreditation status, and on the educational and employment outcomes of students participating in cybersecurity programs that have received support under this section.

(e) PERFORMANCE METRICS.—The Director shall establish performance metrics for grants awarded under this section.

(f) EFFECTIVE DATE.—This section shall take effect 1 year after the date of enactment of this Act.

Subtitle C—General Activities

SEC. 10241. EDUCATIONAL OUTREACH AND SUPPORT FOR UNDERREPRESENTED COMMUNITIES.

Section 18 of the National Institute of Standards and Technology Act (15 U.S.C. 278g–1) is amended—

(1) in subsection (a), in the second sentence—

(A) by striking ''may'' and inserting ''shall''; and

(B) by striking ''academia'' and inserting ''diverse types of institutions of higher education, including historically Black colleges and universities, Tribal Colleges and Universities, and minority-serving institutions, and community colleges''; and

(2) in subsection (e)—

(A) in paragraph (4), by striking ''and'' at the end;

(B) in paragraph (5), by striking the period at the end and inserting ''; and''; and

(C) by inserting after paragraph (5) the following:

''(6) conduct outreach to and develop research collaborations with historically Black colleges and universities, Tribal Colleges or Universities, and minority serving institutions, including through the recruitment of students and faculty at such institutions to participate in programs developed under paragraph (3);

''(7) conduct outreach to and develop research collaborations with community colleges, including

through the recruitment of students and faculty at such institutions to participate in programs developed under paragraph (3);

''(8) carry out other activities to increase the participation of persons historically underrepresented in STEM in the Institute's programs; and

''(9) conduct outreach to and develop collaborations with nontraditional educational organizations, including those that offer training through nonprofit associations and professional associations or professional societies, to engage persons historically underrepresented in STEM through programs developed under this subsection.''.

SEC. 10242. OTHER TRANSACTIONS AUTHORITY.

(a) IN GENERAL.—Paragraph (4) of section 2(b) of the National Institute of Standards and Technology Act (15 U.S.C. 272(b)) is amended to read as follows:

''(4) to enter into and perform such contracts, including cooperative research and development arrangements and grants and cooperative agreements or other transactions, as may be necessary in the conduct of its work and on such terms as it may determine appropriate, in furtherance of the purposes of this Act;''.

(b) REPORTING.—Not later than one year after the date of the enactment of this Act and not less than annually thereafter, the Secretary shall submit to the Committee on Science, Space, and Technology and the Committee on Appropriations of the House of Representatives and the Committee on Commerce, Science, and Transportation and the Committee on Appropriations of the Senate a report on the use of agreements, activities, and associated funding for transactions (other than contracts, cooperative agreements, and grants) described in paragraph (4) of section 2(b) of the National Institute of Standards and Technology Act (as amended by subsection (a)), including the following elements:

(1) A description of when the other transactions authority described in such amended paragraph was used and for what purpose.

(2) A description of why such other transactions authority was required.

(3) Steps taken to ensure necessary and sufficient oversight of Federal Government requirements implemented using such other transactions authority.

SEC. 10243. REPORT TO CONGRESS ON COLLABORATIONS WITH GOVERNMENT AGENCIES.

Not later than 6 months after the date of the enactment of this Act, the Director shall submit a report to the Committee on Science, Space, and Technology and the Committee on Appropriations of the House of Representatives and the Committee on Commerce, Science, and Transportation and the Committee on Appropriations of the Senate describing the Institute's challenges with respect to collaboration between the Institute and other Federal agencies. The report shall include, at a minimum—

(1) an assessment of the challenges that arise with interagency collaboration, including transfer of funds with a limited period of availability to the Institute and issues with sharing personnel, associates, facilities, and property with collaborating agencies; and

(2) descriptions of projects that were disrupted due to the challenges outlined in paragraph (1).

SEC. 10244. HIRING CRITICAL TECHNICAL EXPERTS.

Section 6 of the National Institute of Standards and Technology Act (15 U.S.C. 275) is amended to read as follows:

"SEC. 6. HIRING CRITICAL TECHNICAL EXPERTS.

"(a) IN GENERAL.—The officers and employees of the Institute, except the director, shall be appointed by

the Secretary at such time as their respective services may become necessary.

"(b) HIRING CRITICAL TECHNICAL EXPERTS.—Notwithstanding section 3104 of title 5 or the provisions of any other law relating to the appointment, number, classification, or compensation of employees, the Secretary shall have the authority to make appointments of scientific, engineering, and professional personnel, and to fix the basic pay of such personnel at a rate to be determined by the Secretary at rates not in excess of the highest total annual compensation payable at the rate determined under section 104 of title 3, United States Code. The Director shall appoint not more than 15 personnel under this section.

"(c) SUNSET.—The authority under section (b) shall expire on the date that is 5 years after the date of the enactment of this section.".

SEC. 10245. INTERNATIONAL STANDARDS DEVELOPMENT.

(a) SENSE OF CONGRESS.—It is the sense of Congress that—

(1) the principles of openness, transparency, due process, balance of interests, appeals, and consensus in the development of international standards are critical;

(2) voluntary consensus standards, developed through an industry-led process, serve as the corner-

stone of the United States standardization system and have become the basis of a sound national economy and the key to global market access;

(3) strengthening the unique United States public-private partnerships approach to standards development is critical to United States economic competitiveness; and

(4) the United States Government should ensure cooperation and coordination across Federal agencies to partner with and support private sector stakeholders to continue to shape international dialogues in regard to standards development for emerging technologies.

(b) INTERNATIONAL STANDARDS ENGAGEMENT.—

(1) IN GENERAL.—The Director shall lead information exchange and coordination among Federal agencies and communication from Federal agencies to the private sector of the United States to ensure effective Federal engagement in the development and use of international technical standards.

(2) REQUIREMENTS.—To support private sector-led engagement and ensure effective Federal engagement in the development and use of international technical standards, the Director shall consider—

(A) the role and needs of the Federal Government with respect to international technical standards;

(B) organizations developing international technical standards of interest to the United States, United States representation and influence in these organizations, and key contributors for technical and leadership expertise in these organizations;

(C) support for persons with domain subject matter expertise, especially from small businesses located in the United States, to influence and engage in technical standards leadership positions, working groups and meetings;

(D) opportunities for partnerships for supporting international technical standards from across the Federal Government, Federally funded research and development centers, university-affiliated research centers, institutions of higher education, industry, industry associations, nonprofit organizations, and other key contributors;

(E) support for activities to encourage the adoption of technical standards developed in the

United States to be adopted by international standards organizations; and

(F) other activities determined by the Director to be necessary to support United States participation in international standards development, economic competitiveness, and national security in the development and use of international technical standards.

(c) CAPACITY BUILDING GUIDANCE.—The Director shall support education and workforce development efforts to promote United States participation in international standards organizations. The Director shall—

(1) identify and create, as appropriate, technical standards education and training resources for interested businesses, industry associations, academia, nonprofit organizations, Federal agencies, and other relevant standards contributors, including activities targeted at integrating standards content into undergraduate and graduate curricula in science, engineering, business, public policy, and law;

(2) conduct outreach, including to private sector leaders, to support engagement by more United States stakeholders in international technical standards development; and

(3) other activities determined necessary by the Director to support increased engagement, influence, and leadership of United States organizations in the development of international technical standards.

(d) CAPACITY BUILDING PILOT PROGRAM.—

(1) IN GENERAL.—The Director, in coordination with the Director of the National Science Foundation, and the heads of other relevant Federal agencies, as appropriate, shall establish or enter into cooperative agreements with appropriate nongovernmental organizations to establish a 5-year pilot program to award grants, on a merit-reviewed, competitive basis, to private sector entities, institutions of higher education, or nonprofit institutions based in the United States to support increased participation and leadership by small business and academic interests in international standards organizations.

(2) USE OF FUNDS.—Grants awarded to eligible entities under this subsection may be used to cover reasonable costs, up to a specified ceiling set by the Director, of activities to support increased engagement and leadership of eligible entity employees in international standards organizations, which may include costs associated with—

(A) travel;

(B) education and training;

(C) dues or fees related to participation in technical standards development activities; and

(D) other such costs that the Director determines may reasonably support participation of the eligible entity in international standards organizations.

(3) AWARD CRITERIA.—The Director shall ensure that award decisions made under this subsection take into account the extent to which the eligible entity—

(A) employs full-time an individual or individuals who demonstrate deep technical standards expertise;

(B) employs full-time an individual or individuals who demonstrate knowledge with the processes of the standards development organization in which the eligible entity intends to engage using grant funds;

(C) proposes a feasible set of standard deliverables to be completed over the period of the grant;

(D) explains how the eligible entity will fund additional standards-related activities necessary to achieve the deliverables referred to in

subparagraph (C) if the grant funds are insufficient to cover all costs of such activities;

(E) commits personnel with appropriate expertise to regularly engage in relevant international organizations responsible for developing technical standards over the period of the grant; and

(F) identifies a clearly defined current or anticipated market need or gap that would be addressed by their standards development proposal.

(4) ELIGIBILITY.—A small business concern (as such term is defined in section 3 of the Small Business Act (15 U.S.C. 632) based in the United States, an institution of higher education, or a nonprofit institution (as such term is defined in section 4 of the Stevenson-Wydler Technology Innovation Act of 1980 (15 U.S.C. 3703)) shall be eligible to receive grants under this program.

(5) GUIDANCE ON APPLICATION AND AWARD PROCESS.—The Director shall develop, and periodically update, guidance, including eligibility, applicant disclosure requirements, grant amount and duration, the merit review process, priority areas for stand-

ards development, and any additional requirements for how grants are awarded under this subsection.

(6) MERIT REVIEW PROCESS.—The Director shall ensure that grants under this subsection are awarded based on a competitive, merit review process including the use of merit review panels that may include experts from both government, the private sector, and, as appropriate, academic, nonprofit, or other organizations as the Director determines appropriate.

(7) CONSULTATION.—In carrying out the pilot program established under this subsection, the Director shall consult with other Federal agencies, private sector organizations, institutions of higher education, and nonprofit organizations to help inform the pilot program, including the guidance developed under paragraph (5).

(8) REPORT TO CONGRESS.—The Director shall brief Congress after the second year of the pilot program and each year following that includes the following:

(A) An assessment of the effectiveness of the pilot program for improving the participation of United States small businesses, United States institutions of higher education, or other

nonprofit research institutions in international standards organizations, including—

(i) the type of activities supported, including leadership roles;

(ii) the international standards organizations participated in; and

(iii) the technical areas covered by the activities.

(B) If determined effective, a plan for permanent implementation of the pilot program.

SEC. 10246. STANDARD TECHNICAL UPDATE.

(a) NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY ACT UPDATES.—The National Institute of Standards and Technology Act (15 U.S.C. 271) is amended—

(1) by amending subsection (a) of section 17 (15 U.S.C. 278g) to read as follows:

"(a) The Secretary is authorized, notwithstanding any other provision of law, to expend such sums, within the limit of appropriated funds, as the Secretary may determine desirable through direct support for activities of international organizations and foreign national metrology institutes with which the Institute cooperates to advance measurement methods, technical standards, and related basic technologies, for official representation, to host offi-

cial receptions, dinners, and similar events, and to otherwise extend official courtesies, including transportation of foreign dignitaries and representatives of foreign national metrology institutes to and from the Institute, for the purpose of maintaining the standing and prestige of the Department of Commerce and the Institute, through the grant of fellowships or other appropriate form of financial or logistical assistance or support to foreign nationals not in service to the Government of the United States while they are performing scientific or engineering work at the Institute or participating in the exchange of scientific or technical information at the Institute.''; and

(2) in section 20 (15 U.S.C. 278g–3)—

(A) in subsection (c), by amending paragraph (3) to read as follows:

''(3) submit such standards and guidelines to the Secretary of Commerce for promulgation under section 11331 of title 40;''; and

(B) in subsection (d)—

(i) in paragraph (1), by striking ''Director of the Office of Management and Budget'' and inserting ''Secretary of Commerce''; and

(ii) in paragraph (8), by striking ''Director of Management and Budget with

such standards submitted to the Director'' and inserting ''Secretary of Commerce with such standards submitted to the Secretary''.

(b) STEVENSON-WYDLER UPDATES.—The Stevenson-Wydler Technology Innovation Act of 1980 (15 U.S.C. 3701 et seq.) is amended—

(1) in paragraph (1) of section 17(c) (15 U.S.C. 3711a(c))—

(A) by moving each of subparagraphs (D) and (E) two ems to the left; and

(B) by adding at the end the following:

''(G) Community.''; and

(2) in subsection (m) of section 26 (15 U.S.C. 3721)—

(A) by striking paragraph (2);

(B) by redesignating paragraph (3) as paragraph (2); and

(C) in paragraph (2), as so redesignated, by striking ''and the Comptroller General's review under paragraph (2)''.

(c) AMERICAN INNOVATION AND COMPETITIVENESS ACT UPDATE.—Section 113 of the American Innovation and Competitiveness Act (15 U.S.C. 278e note) is repealed.

(d) CLERICAL AMENDMENT.—The item relating to section 113 in the table of contents in section 1(b) of the American Innovation and Competitiveness Act is repealed.

(e) FEDERAL ENERGY MANAGEMENT IMPROVEMENT ACT UPDATE.—Section 4 of the Federal Energy Management Improvement Act of 1988 (15 U.S.C. 5001) is amended—

(1) by striking ''Secretary of Commerce'' and ''Secretary'' each place either such term appears and inserting ''Consumer Product Safety Commission'';

(2) by redesignating the second subsection (c) as subsection (e); and

(3) in subsection (g), by redesignating clauses (i) and (ii) as paragraphs (1) and (2), respectively.

(f) TITLE 40, UNITED STATES CODE.—Section 11331 of title 40, United States Code, is amended by striking subsections (a) through (d) and inserting the following:

''(a) STANDARDS AND GUIDELINES.—

''(1) AUTHORITY TO PRESCRIBE.—Except as provided under paragraph (2), the Secretary of Commerce shall, on the basis of standards and guidelines developed by the National Institute of Standards and Technology pursuant to paragraphs (2) and (3) of section 20(a) of the National Institute

of Standards and Technology Act (15 U.S.C. 278g–3(a)), prescribe standards and guidelines pertaining to Federal information systems.

"(2) NATIONAL SECURITY SYSTEMS.—Standards and guidelines for national security systems shall be developed, prescribed, enforced, and overseen as otherwise authorized by law and as directed by the President.

"(b) MANDATORY REQUIREMENTS.—

"(1) AUTHORITY TO MAKE MANDATORY.—Except as provided under paragraph (2), the Secretary of Commerce shall make standards prescribed under subsection (a)(1) compulsory and binding to the extent determined necessary by the Secretary to improve the efficiency of operation or security of Federal information systems.

"(2) REQUIRED MANDATORY STANDARDS.—

"(A) IN GENERAL.—Standards prescribed under subsection (a)(1) shall include information security standards that—

"(i) provide minimum information security requirements as determined under section 20(b) of the National Institute of Standards and Technology Act (15 U.S.C. 278g–3(b)); and

"(ii) are otherwise necessary to improve the security of Federal information and information systems.

"(B) REQUIREMENT.—Information security standards described in subparagraph (A) shall be compulsory and binding.

"(c) AUTHORITY TO DISAPPROVE OR MODIFY.—The President may disapprove or modify the standards and guidelines referred to in subsection (a)(1) if the President determines such action to be in the public interest. The President's authority to disapprove or modify such standards and guidelines may not be delegated. Notice of such disapproval or modification shall be published promptly in the Federal Register. Upon receiving notice of such disapproval or modification, the Secretary of Commerce shall immediately rescind or modify such standards or guidelines as directed by the President.

"(d) EXERCISE OF AUTHORITY.—To ensure fiscal and policy consistency, the Secretary of Commerce shall exercise the authority conferred by this section subject to direction by the President and in coordination with the Director of the Office of Management and Budget.

"(e) APPLICATION OF MORE STRINGENT STANDARDS.—The head of an executive agency may employ standards for the cost-effective information security for

Federal information systems within or under the supervision of that agency that are more stringent than the standards the Secretary prescribes under this section if the more stringent standards—

"(1) contain at least the applicable standards made compulsory and binding by the Secretary of Commerce; and

"(2) are otherwise consistent with policies and guidelines issued under section 3553 of title 44.

"(f) DECISIONS ON PROMULGATION OF STANDARDS.—The decision by the Secretary of Commerce regarding the promulgation of any standard under this section shall occur not later than 6 months after the submission of the proposed standard to the Secretary by the National Institute of Standards and Technology, as provided under section 20 of the National Institute of Standards and Technology Act (15 U.S.C. 278g–3).

"(g) DEFINITIONS.—In this section:

"(1) FEDERAL INFORMATION SYSTEM.—The term 'Federal information system' means an information system used or operated by an executive agency, by a contractor of an executive agency, or by another organization on behalf of an executive agency.

"(2) INFORMATION SECURITY.—The term 'information security' has the meaning given that term in section 3552(b)(3) of title 44.

"(3) NATIONAL SECURITY SYSTEM.—The term 'national security system' has the meaning given that term in section 3552(b)(6) of title 44.".

(g) TECHNICAL AND CONFORMING AMENDMENT.—Paragraph (2) of section 20(a) of the National Institute of Standards and Technology Act (15 U.S.C. 278g–3(a)) is amended by striking "section 3552(b)(5) of title 44, United States Code" and inserting "section 3552(b)(6) of title 44, United States Code".

(h) NATIONAL CONSTRUCTION SAFETY TEAM ACT UPDATES.—Section 4 of the National Construction Safety Team Act (15 U.S.C. 7303) is amended—

(1) in subsection (c), by adding at the end the following:

"(5) CIVIL SUITS.—Where practicable, a Team shall cooperate with civil litigants without compromising a Team's investigation or the evidence preservation activities as described in this section."; and

(2) in subsection (d)—

(A) in the subsection heading, by striking "INTERAGENCY" and inserting "INVESTIGATION"; and

(B) in paragraph (1), by inserting ''or any civil suit or civil action'' after ''Federal agency''.

SEC. 10247. GAO STUDY OF NIST RESEARCH SECURITY POLICIES AND PROTOCOLS.

(a) EVALUATION.—Not later than 1 year after the date of enactment of this Act, the Comptroller General of the United States shall conduct a study of the Institute's policies and protocols to protect its research and combat undue foreign influence.

(b) MATTERS TO BE INCLUDED.—The study conducted under subsection (a) shall include, to the extent practicable, the following:

(1) An analysis of steps taken by the Institute to address foreign threats to Institute-funded research over the previous 5 years.

(2) An analysis of the coordination and engagement between the Department of Commerce's Office of Inspector General, the Department of Commerce's Office of Intelligence, the National Counterintelligence and Security Center of the Office of the Director of National Intelligence, and the Institute in identifying and addressing concerning findings.

(3) An assessment of the Institute's review process for foreign national associates.

(4) An assessment of the Institute's policies as it relates to employees and associates participating in foreign talent recruitment programs.

(5) An assessment of the Institute's implementation of conflict of interest and disclosure policies and requirements, including the disclosure requirements authorized in section 223 of the National Defense Authorization Act for Fiscal Year 2021 (Public Law 116–283).

(6) An assessment of the Institute's, the Department of Commerce's Office of Security, the Department of Commerce's Office of Intelligence, and the Department of Commerce's Office of Inspector General's ability to monitor and enforce conflict of interest and disclosure policies and requirements, including the disclosure requirements authorized in section 223 of the National Defense Authorization Act for Fiscal Year 2021 (Public Law 116–283).

(7) An assessment of the Institute's, the Department of Commerce's, and the Department of Commerce's Office of Inspector General's ability to conduct risk assessments of research and development award applications and disclosures to the Institute.

(8) An assessment of the Institute's research security training programs for both internal and externally-supported researchers and associates, including training focused on international collaboration, and international travel, foreign interference, and rules for proper use of funds, disclosure, conflict of commitment, and conflict of interest.

(9) An analysis and summary of incidents of undue foreign influence at Institute-supported research facilities and programs over the past 10 years.

(10) Recommendations for the Institute to bolster its research security policies and protocols.

(11) Other matters the Comptroller General determines appropriate.

(c) CONGRESSIONAL BRIEFING.—Not later than 180 days after the date of enactment of this Act, the Comptroller General shall brief the Committee on Science, Space, and Technology and the Permanent Select Committee on Intelligence of the House of Representatives and the Committee of Commerce, Science, and Transportation and the Select Committee on Intelligence of the Senate on the findings available from the evaluation conducted under subsection (a).

(d) REPORT.—Not later than 18 months after the date of enactment of this Act, the Comptroller General shall submit to the congressional committees specified in subsection (c) a report on the findings and recommendations of the evaluation conducted under subsection (a).

SEC. 10248. STANDARDS DEVELOPMENT ORGANIZATION GRANTS.

(a) NONGOVERNMENTAL STANDARDS DEVELOPMENT ORGANIZATION DEFINED.—In this section, the term ''nongovernmental standards development organization'' means a nongovernmental standards development organization (as defined in section 2(e) of the Office of Management and Budget Circular A–119 (relating to Federal participation in the development and use of voluntary consensus standards in conformity assessment activities), or any successor document) that adheres to the American National Standards Institute (ANSI) Essential Requirements for Due Process for American National Standards.

(b) GRANT AUTHORITY.—The Secretary of Commerce, acting through the Director, shall establish a competitive program of grants for nongovernmental standards development organizations for the purposes described in subsection (c).

(c) PURPOSES.—A grant awarded under subsection (b) shall be used to develop, approve, disseminate, main-

tain, and review forensic science voluntary consensus standards and best practices that shall be available to the public free of charge.

(d) ADDITIONAL REQUIREMENTS.—The Director may promulgate such requirements, guidelines, and procedures as may be necessary to carry out this section.

(e) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to carry out this section $2,000,000 for each of fiscal years 2022 through 2026.

Subtitle D—Hollings Manufacturing Extension Partnership

SEC. 10251. ESTABLISHMENT OF EXPANSION AWARDS PILOT PROGRAM AS A PART OF THE HOLLINGS MANUFACTURING EXTENSION PARTNERSHIP.

(a) ESTABLISHMENT OF EXPANSION AWARDS PROGRAM.—The National Institute of Standards and Technology Act (15 U.S.C. 271 et seq.) is amended by inserting after section 25A (15 U.S.C. 278k–1) the following:

"SEC. 25B. EXPANSION AWARDS PILOT PROGRAM.

"(a) DEFINITIONS.—The terms used in this section have the meanings given the terms in section 25.

"(b) ESTABLISHMENT.—The Director shall establish, subject to the availability of appropriations, as a part of the Hollings Manufacturing Extension Partnership under

sections 25 and 25A, a pilot program of expansion awards among participants described in subsection (c) for the purposes described in subsection (e).

"(c) PARTICIPANTS.—Participants receiving awards under this section shall be Centers, or a consortium of Centers (as such term is defined in section 25).

"(d) AWARD AMOUNTS.—Subject to the availability of appropriations, an award for a recipient under this section shall be in an amount equal to the sum of the following:

"(1) Such amount as the Director considers appropriate as a minimum base funding level for each award under this section.

"(2) Such additional amount as the Director considers in proportion to the manufacturing density of the region of the recipient.

"(3) Such supplemental amounts as the Director considers appropriate.

"(e) PURPOSE OF AWARDS.—An award under this section shall be made for one or more of the following purposes:

"(1) To provide worker education, training, development, and entrepreneurship training and to connect individuals or business with such services offered in their community, which may include em-

ployee ownership and workforce training, including connecting manufacturers with career and technical education entities, institutions of higher education (including community colleges), workforce development boards, labor organizations, and nonprofit job training providers to develop and support training and job placement services, including apprenticeship and online learning platforms, for new and incumbent workers, programming to prevent job losses when adopting new technologies and processes, and development of employee ownership practices.

''(2) To provide services to improve the resiliency of domestic supply chains.

''(3) To mitigate vulnerabilities to cyberattacks, including helping to offset the cost of cybersecurity projects for small manufacturers.

''(4) To expand advanced technology services to United States-based small- and medium-sized manufacturers, which may include—

''(A) developing technology demonstration laboratories;

''(B) training and demonstration in areas of supply chain and critical technology needs, including a focus on the demonstration of tech-

nologies developed by companies based in the United States;

"(C) services for the adoption of advanced technologies, including smart manufacturing technologies and practices; and

"(D) establishing partnerships, for the development, demonstration, and deployment of advanced technologies, with—

"(i) national laboratories (as defined in section 2 of the Energy Policy Act of 2005 (42 U.S.C. 15801));

"(ii) Federal laboratories;

"(iii) Manufacturing USA institutes (as described in section 34(d)); and

"(iv) institutions of higher education.

"(5) To build capabilities across the Hollings Manufacturing Extension Partnership for domestic supply chain resiliency and optimization, including—

"(A) assessment of domestic manufacturing capabilities, expanded capacity for researching and deploying information on supply chain risk, hidden costs of reliance on offshore suppliers, redesigning products and processes to encourage reshoring, and other relevant topics; and

"(B) expanded services to provide industrywide support that assists United States manufacturers with reshoring manufacturing to strengthen the resiliency of domestic supply chains, including in critical technology areas and foundational manufacturing capabilities that are key to domestic manufacturing competitiveness and resiliency, including forming, casting, machining, joining, surface treatment, tooling, and metal or chemical refining.

"(f) REIMBURSEMENT.—The Director may reimburse Centers for costs incurred by the Centers under this section.

"(g) APPLICATIONS.—Applications for awards under this section shall be submitted in such manner, at such time, and containing such information as the Director shall require in consultation with the Manufacturing Extension Partnership Advisory Board.

"(h) SELECTION.—

"(1) REVIEWED AND MERIT-BASED.—The Director shall ensure that awards under this section are reviewed and merit-based.

"(2) GEOGRAPHIC DIVERSITY.—The Director shall endeavor to have broad geographic diversity among selected proposals.

"(3) CRITERIA.—The Director shall select applications consistent with the purposes identified pursuant to subsection (e) to receive awards that the Director determines will achieve one or more of the following:

"(A) Improvement of the competitiveness of industries in the region in which the Center or Centers are located.

"(B) Creation of jobs or training of newly hired employees.

"(C) Promotion of the transfer and commercialization of research and technology from institutions of higher education, national laboratories, or other federally funded research programs, and nonprofit research institutes.

"(D) Recruitment of a diverse manufacturing workforce, including through outreach to underrepresented populations, including individuals identified in section 33 or section 34 of the Science and Engineering Equal Opportunities Act (42 U.S.C. 1885a, 1885b).

"(E) Any other result the Director determines will advance the objective set forth in section 25(c) or 25A.

"(i) PROGRAM CONTRIBUTION.—Recipients of awards under this section shall not be required to provide a matching contribution.

"(j) GLOBAL MARKETPLACE PROJECTS.—In making an award under this section, the Director, in consultation with the Manufacturing Extension Partnership Advisory Board and the Secretary, may take into consideration whether an application has significant potential for enhancing the competitiveness of small and medium-sized United States manufacturers in the global marketplace.

"(k) DURATION.—The Director shall ensure that the duration of an award under this section is aligned and consistent with a Center's cooperative agreement established in section 25(e).

"(l) REPORT.—Not later than October 1, 2025, the Director shall submit to Congress a report that includes—

"(1) a summary description of what activities were funded and the measurable outcomes of such activities;

"(2) a description of which types of activities under paragraph (1) could remain as part of a permanent expansion awards program;

"(3) a description of which types of activities under paragraph (1) could be integrated into, and supported under, the program under section 25;

"(4) a description of which types of activities under paragraph (1) could be integrated into, and supported under, the competitive awards program under section 25A; and

"(5) a recommendation, supported by a clear explanation, as to whether the pilot program should be continued.".

(b) RESOURCE OPTIMIZATION.—Of amounts authorized for the Hollings Manufacturing Extension Partnership program under section 25 of the National Institute of Standards and Technology Act (15 U.S.C. 278k), the Secretary shall optimize funding across sections 25 and 25A of such Act, as well as the program established under section 25B of such Act (as added by subsection (a)), to the extent practicable and subject to the availability of appropriations, in order to maximize Center (as such term is defined in such section 25) participation as well as competitiveness, productivity, and technological performance in United States manufacturing.

SEC. 10252. UPDATE TO HOLLINGS MANUFACTURING EXTENSION PARTNERSHIP.

(a) ACCEPTANCE OF FUNDS.—Subsection (l) of section 25 of the National Institute of Standards and Technology Act (15 U.S.C. 278k) is amended to read as follows:

"(l) ACCEPTANCE OF FUNDS.—

"(1) IN GENERAL.—To the extent provided in advance in appropriations Acts, other Federal departments and agencies may transfer amounts to the Institute, and the Secretary and Director may accept and make available cash donations from the private sector pursuant to section 2(c)(7), to be used for strengthening United States manufacturing under this section.

"(2) COMPETITIVE AWARDS.—Funds accepted from other Federal departments and agencies and from the private sector under paragraph (1) shall be awarded competitively by the Secretary and Director to Centers, provided that the Secretary and Director may make noncompetitive awards, pursuant to this section or section 25A, or as a non-competitive contract, as appropriate, if the Secretary and Director determine that—

"(A) the manufacturing market or sector targeted is limited geographically or in scope;

"(B) the number of States (or territory, in the case of Puerto Rico) with Centers serving manufacturers of such market or sector is five or fewer; and

"(C) such Center has or Centers have received a positive evaluation in the most recent evaluation conducted pursuant to subsection (g).".

(b) SUPPORTING AMERICAN MANUFACTURING.—Section 25 of the National Institute of Standards and Technology Act (15 U.S.C. 278k) is amended—

(1) in subsection (a)(5)—

(A) by striking "or consortium thereof,"; and

(B) by inserting "or a consortium thereof" before the period at the end of the sentence;

(2) in subsection (c)(4), by inserting "United States-based" before "industrial";

(3) in subsection (d)—

(A) in paragraph (1), by inserting "at United States-based industrial facilities, including small and medium manufacturing companies" before "based";

(B) in paragraph (2), by inserting "United States-based" before "companies"; and

(C) in paragraph (3), by inserting "United States-based" before "small";

(4) in subsection (f)(5)(B)(i), by inserting ''in the United States'' before the semicolon at the end of the clause; and

(5) in subsection (n)(1)(A), by inserting ''United States-based'' before ''small''.

(c) AMENDING THE MEP COMPETITIVE AWARDS PROGRAM.—Section 25A(c)(2) of the National Institute of Standards and Technology Act (15 U.S.C. 278k-1(c)(2)) is amended by inserting ''United States'' before ''manufacturers''.

(d) MEP OUTREACH.—Section 25 of the National Institute of Standards and Technology Act (15 U.S.C. 278k) is amended—

(1) in subsection (c)—

(A) in paragraph (6), by striking ''community colleges and area career and technical education schools'' and inserting the following: ''secondary schools, community colleges, and area career and technical education schools, including those in underserved and rural communities,''; and

(B) in paragraph (7)—

(i) by striking ''and local colleges'' and inserting ''local secondary schools and local colleges, including historically Black

colleges and universities, Tribal Colleges or Universities, minority-serving institutions, community colleges, and secondary schools and colleges in underserved and rural communities,''; and

(ii) by inserting ''or other applied learning opportunities'' after ''apprenticeships''; and

(2) in subsection (d)(3), by striking '', community colleges, and area career and technical education schools,'' and inserting the following: ''and local high schools, community colleges, and area career and technical education schools, including those in underserved and rural communities,''.

SEC. 10253. NATIONAL SUPPLY CHAIN DATABASE.

(a) ESTABLISHMENT OF NATIONAL SUPPLY CHAIN DATABASE.—The Director shall establish a voluntary National Supply Chain Database, subject to the availability of appropriations.

(b) PURPOSE.—The purpose of the voluntary National Supply Chain Database shall be to assist the Federal Government and industry sectors in minimizing disruptions to the United States supply chain by having an assessment of United States manufacturers' capabilities.

(c) STUDY ON NATIONAL SUPPLY CHAIN DATABASE.—In establishing the National Supply Chain Database, the Director shall consider the findings and recommendations from the study authorized pursuant to section 9413 of the National Defense Authorization Act for Fiscal Year 2021 (Public Law 116–283), including measures to secure and protect the Database from adversarial attacks and vulnerabilities.

(d) DATABASE AND MANUFACTURING EXTENSION PARTNERSHIP.—

(1) IN GENERAL.—The Director shall establish the infrastructure for the National Supply Chain Database through the Hollings Manufacturing Extension Partnership, established pursuant to section 25 of the National Institute of Standards and Technology Act (15 U.S.C. 278k), by connecting information from the Centers (as such term is defined in such section) through the Database.

(2) NATIONAL VIEW.—The Director shall ensure that connections under paragraph (1)—

(A) provide a national overview of the networks of supply chains of the United States; and

(B) support understanding of whether there is a need for some manufacturers to re-

tool in some critical areas to meet the urgent need for key products.

(3) INDIVIDUAL HOLLINGS MANUFACTURING EXTENSION PARTNERSHIP CENTER DATABASES.—

(A) IN GENERAL.—The Director shall ensure that—

(i) each Center is connected to the National Supply Chain Database; and

(ii) each supply chain database maintained by a Center is interoperable with the Database.

(B) RULE OF CONSTRUCTION.—Nothing in this section may be construed to require a State or territory of the United States to establish a new supply chain database through the Hollings Manufacturing Extension Partnership program.

(e) MAINTENANCE OF NATIONAL SUPPLY CHAIN DATABASE.—The Director, acting through the Hollings Manufacturing Extension Partnership program or a designee of the program—

(1) shall maintain the National Supply Chain Database as an integration of State-level databases from the Center of each State or territory of the United States;

(2) may populate the Database with information from past or current clients of Centers; and

(3) may include in the Database information voluntarily provided by non-client private sector entities based and operating in the United States, as applicable and appropriate.

(f) DATABASE CONTENT.—The National Supply Chain Database may include the following:

(1) Basic private sector entity information.

(2) An overview of capabilities, accreditations, and products.

(3) Proprietary information.

(g) STANDARD CLASSIFICATION SYSTEM.—The National Supply Chain Database may, where applicable, use the North American Industry Classification System (NAICS) Codes as follows:

(1) Sector 31-33 – Manufacturing.

(2) Sector 54 – Professional, Scientific, and Technical Services.

(3) Sector 48-49 – Transportation and Warehousing.

(h) LEVELS.—The National Supply Chain Database shall be multi-leveled as agreed to under terms of mutual disclosure as follows:

(1) Level 1 shall have the capability to provide basic private sector entity information and shall be available to the public.

(2) Level 2 shall have the capability to provide a deeper, nonproprietary overview into capabilities, products, and accreditations and shall be available to all companies that contribute to the Database.

(3) Level 3 shall have the capability to hold proprietary information.

(i) MATTERS RELATING TO DISCLOSURE AND ACCESS.—

(1) FOIA EXEMPTION.—The National Supply Chain Database, and any information contained therein that is not publicly released by the Institute, shall be exempt from public disclosure under section 552(b)(3) of title 5, United States Code.

(2) LIMITATION ON ACCESS TO CONTENT.—Access to a contributing private sector entity's nonpublic content in the National Supply Chain Database shall be limited to—

(A) the contributing private sector entity, the Institute, and staff from a Center who sign a nondisclosure agreement, and

(B) other Federal departments and agencies,

as the Director considers appropriate.

(3) AGGREGATED INFORMATION.—The Director may make aggregated, de-identified information available to contributing companies, Centers, or the public, as the Director considers appropriate, in support of the purposes of this section.

(j) COORDINATION WITH NATIONAL TECHNOLOGY AND INDUSTRIAL BASE COUNCIL.—The Director, acting through the Hollings Manufacturing Extension Partnership program, may work with the National Defense Technology and Industrial Base Council established under section 4812 of title 10, United States Code, as the Director considers appropriate, to include in the National Supply Chain Database information regarding the defense manufacturing supply chain.

(k) PROTECTIONS.—

(1) IN GENERAL.—Supply chain information that is voluntarily and lawfully submitted to the National Supply Chain Database by a private sector entity and accompanied by an express statement described in paragraph (2)—

(A) shall be exempt from disclosure under section 552(b)(3) of title 5, United States Code;

(B) may not be made available pursuant to any Federal, State, local, or Tribal authority

pursuant to any Federal, State, local, or Tribal law requiring public disclosure of information or records; and

(C) may not, without the written consent of the private sector entity submitting such information, be used directly by the Director, or any other Federal, State, or local authority in any civil enforcement action brought by a Federal, State, Tribal, or local authority.

(2) EXPRESS STATEMENT.—The express statement described in this paragraph, with respect to information or records, is—

(A) in the case of written information or records, a written marking on the information or records substantially similar to the following: ''This information is voluntarily submitted to the Federal Government in expectation of protection from disclosure as provided by the provisions of section 10253(k) of the Research and Development, Competition, and Innovation Act.''; or

(B) in the case of oral information, a written statement similar to the statement described in subparagraph (A) submitted within a

reasonable period following the oral communication.

(l) RULES OF CONSTRUCTION.—

(1) PRIVATE ENTITIES.—Nothing in this section may be construed to require any private sector entity to share data, including proprietary information, with the Director or the National Supply Chain Database.

(2) PROHIBITION ON NEW REGULATORY AUTHORITY.—Nothing in this section may be construed to grant the Director, or the head of any other Federal agency, any authority to promulgate regulations or set standards on manufacturers, based on data within the National Supply Chain Database, that was not in effect on the day before the date of the enactment of this section.

SEC. 10254. HOLLINGS MANUFACTURING EXTENSION PARTNERSHIP ACTIVITIES.

Section 70924(b) of the Infrastructure Investment and Jobs Act (Public Law 117–58) is amended to read as follows:

''(b) AUTOMATIC ENROLLMENT IN GSA ADVANTAGE.—The Administrator of the General Services Administration and the Secretary of Commerce, acting through the Under Secretary of Commerce for Standards

and Technology, shall jointly ensure that businesses that participate in the Hollings Manufacturing Extension Partnership, and so desire, are automatically enrolled in General Services Administration Advantage.''.

SEC. 10255. AMENDMENT TO THE HOLLINGS MANUFACTURING EXTENSION PARTNERSHIP RELATING TO INSTITUTIONS OF HIGHER EDUCATION.

Subsection (a) of section 25 of the National Institute of Standards and Technology Act (15 U.S.C. 278k) is amended—

(1) by redesignating paragraph (6) (relating to the definition of ''Hollings Manufacturing Extension Partnership or Program'') as paragraph (7);

(2) by inserting after paragraph (5) the following new paragraph:

''(6) HISTORICALLY BLACK COLLEGE AND UNIVERSITY.—The term 'historically Black college and university' has the meaning given the term 'part B institution' in section 322 of the Higher Education Act of 1965 (20 U.S.C. 1061).'';

(3) by redesignating the second paragraph (7) (relating to the definition of ''MEP Advisory Board'') as paragraph (8);

(4) by inserting after paragraph (6) (as inserted by paragraph (2), relating to the definition of ''historically Black college and university'') the following new paragraph:

''(7) INSTITUTION OF HIGHER EDUCATION.—The term 'institution of higher education' has the meaning given such term in section 101 of the Higher Education Act of 1965 (20 U.S.C. 1001).''; and

(5) by adding at the end the following new paragraphs:

''(9) MINORITY-SERVING INSTITUTION.—The term 'minority-serving institution' means a Hispanic-serving institution as defined in section 502(a) of the Higher Education Act of 1965 (20 U.S.C. 1101a(a)); an Alaska Native-serving institution or Native Hawaiian-serving institution as defined in section 317(b) of such Act (20 U.S.C. 1059d(b)); or a Predominantly Black institution, Asian American and Native American Pacific Islander-serving institution, or Native American-serving nontribal institution as defined in section 371(c) of such Act (20 U.S.C. 1067q(c)).

''(10) SECONDARY SCHOOL.—The term 'secondary school' has the meaning given such term in

section 8101 of the Elementary and Secondary Education Act of 1965 (20 U.S.C. 7801).

"(11) TRIBAL COLLEGE OR UNIVERSITY.—The term 'Tribal College or University' has the meaning given the term 'Tribal College or University' in section 316 of the Higher Education Act of 1965 (20 U.S.C. 1059c).".

Subtitle E—Manufacturing USA Program

SEC. 10261. SUPPORTING GEOGRAPHIC DIVERSITY.

Section 34(e) of the National Institute of Standards and Technology Act (15 U.S.C. 278s(e)) is amended by adding at the end the following:

"(8) DIVERSITY PREFERENCES.—In awarding financial assistance under paragraph (1) for planning or establishing a Manufacturing USA institute, an agency head shall give special consideration to Manufacturing USA institutes that—

"(A) contribute to the geographic diversity of the Manufacturing USA Program;

"(B) are located in an area with a low per capita income;

"(C) are located in an area with a high proportion of socially disadvantaged residents; or

"(D) are located in small and rural communities.".

SEC. 10262. EXPANDING OPPORTUNITIES THROUGH THE MANUFACTURING USA PROGRAM.

(a) IN GENERAL.—The Secretary of Commerce, in consultation with the Secretary of Energy, the Secretary of Defense, and the heads of such other Federal agencies as the Secretary of Commerce considers relevant, shall coordinate with existing and new Manufacturing USA institutes to integrate covered entities as active members of the Manufacturing USA institutes, including through the development of preferences in selection criteria for proposals to create new Manufacturing USA institutes or renew existing Manufacturing USA institutes that include one or more covered entities.

(b) COVERED ENTITIES.—For purposes of this subsection, a covered entity is—

(1) an historically Black college and university;

(2) a Tribal College or University;

(3) a minority-serving institution;

(4) a minority business enterprise (as such term is defined in section 1400.2 of title 15, Code of Federal Regulations, or successor regulation); or

(5) a rural-serving institution of higher education (as such term is defined in section 861 of the Higher Education Act of 1965 (20 U.S.C. 1161q)).

SEC. 10263. PROMOTING DOMESTIC PRODUCTION OF TECHNOLOGIES DEVELOPED UNDER MANUFACTURING USA PROGRAM.

(a) DEPARTMENT OF COMMERCE POLICIES TO PROMOTE DOMESTIC PRODUCTION OF TECHNOLOGIES DEVELOPED UNDER MANUFACTURING USA NETWORK.—

(1) POLICIES.—

(A) IN GENERAL.—Each agency head (as such term is defined in section 34(a) of the National Institute of Standards and Technology Act (15 U.S.C. 278s(a))) and the Secretary of Defense shall, in consultation with the Secretary of Commerce, establish policies to promote the domestic production of technologies developed by the Manufacturing USA Network.

(B) ELEMENTS.—The policies established under subparagraph (A) shall include the following:

(i) Measures to partner domestic developers of goods, services, or technologies by Manufacturing USA Network activities

with domestic manufacturers and sources of financing.

(ii) Measures to develop and provide incentives to promote transfer of intellectual property and goods, services, or technologies developed by Manufacturing USA Network activities to domestic manufacturers.

(iii) Measures to assist with supplier scouting and other supply chain development, including the use of the Hollings Manufacturing Extension Partnership under section 25 of the National Institute of Standards and Technology Act (15 U.S.C. 278k) to carry out such measures.

(iv) A process to review and approve or deny membership in a Manufacturing USA institute by foreign-owned entities, especially from countries of concern, including the People's Republic of China.

(v) Measures to prioritize Federal procurement of goods, services, or technologies developed by the Manufacturing USA Network activities from domestic sources, as appropriate.

(C) PROCESSES FOR WAIVERS.—The policies established under this paragraph shall include processes to permit waivers, on a case by case basis, for policies that promote domestic production based on cost, availability, severity of technical and mission requirements, emergency requirements, operational needs, other legal or international treaty obligations, or other factors determined important to the success of the Manufacturing USA Program.

(2) PROHIBITION.—

(A) IN GENERAL.—A company of the People's Republic of China may not participate in the Manufacturing USA Program without a waiver, as described in paragraph (1)(C).

(B) COMPANY DEFINED.—In this paragraph, the term ''company'' has the meaning given such term in section 847(a) of the National Defense Authorization Act for Fiscal Year 2020 (Public Law 116–92; 10 U.S.C. 4819 note).

(b) COORDINATION OF MANUFACTURING USA INSTITUTES.—Subsection (h) of section 34 of the National Institute of Standards and Technology Act (15 U.S.C. 278s) is amended by adding at the end the following:

"(7) COUNCIL FOR COORDINATION OF INSTITUTES.—

"(A) COUNCIL.—The National Program Office shall establish or designate a council of heads of any Manufacturing USA institute receiving Federal funding at any time to foster collaboration between Manufacturing USA institutes.

"(B) MEETINGS.—The council established or designated pursuant to subparagraph (A) shall meet not less frequently than twice each year.

"(C) DUTIES OF THE COUNCIL.—The council established pursuant to subparagraph (A) shall assist the National Program Office in carrying out the functions of the National Program Office under paragraph (2).".

(c) REQUIREMENT FOR NATIONAL PROGRAM OFFICE TO DEVELOP STRATEGIES FOR RETAINING DOMESTIC PUBLIC BENEFIT AFTER CESSATION OF FEDERAL FUNDING.—Subparagraph (C) of section 34(h)(2) of the National Institute of Standards and Technology Act (15 U.S.C. 278s(h)(2)) is amended by inserting ", including a strategy for retaining domestic public benefits from

Manufacturing USA institutes once Federal funding has been discontinued'' after ''Program''.

(d) MODIFICATION OF FUNCTIONS OF NATIONAL PROGRAM OFFICE TO INCLUDE DEVELOPMENT OF INDUSTRY CREDENTIALS.—Subparagraph (J) of section 34(h)(2) of the National Institute of Standards and Technology Act (15 U.S.C. 278s(h)(2)) is amended by inserting '', including the development of industry credentials'' after ''activities''.

(e) ADVICE FROM THE UNITED STATES MANUFACTURING COUNCIL.—The Secretary shall seek advice from the United States Manufacturing Council of the International Trade Administration of the Department of Commerce on matters concerning investment in and support of the manufacturing workforce within the Manufacturing USA Program.

TITLE III—NATIONAL SCIENCE FOUNDATION FOR THE FUTURE

Subtitle A—Preliminary Matters

SEC. 10301. SENSE OF CONGRESS.

It is the sense of Congress that—

(1) the National Science Foundation, the Department of Energy and its National Laboratories, and other key Federal agencies have carried out vital work supporting basic and applied research to

create knowledge that is a key driver of the economy of the United States and a critical component of national security;

(2) openness to diverse perspectives and a focus on freedom from censorship and political bias will continue to make educational and research institutions in the United States beacons to thousands of students from across the world;

(3) increasing research and technology transfer investments, building regional capacity and reducing geographic disparity, strengthening supply chains, and increasing capabilities in key technology focus areas will enhance the competitive advantage and leadership of the United States in the global economy;

(4) the Federal Government must utilize the full talent and potential of the entire Nation by avoiding undue geographic concentration of research and STEM education funding, encouraging broader participation of populations underrepresented in STEM, and collaborating with nongovernment partners to ensure the leadership of the United States in technological innovation; and

(5) authorization and funding for investments in research, education, technology transfer, intellec-

tual property, manufacturing, and other core strengths of the United States innovation ecosystem, including at the National Science Foundation and the Department of Energy, should be done on a bipartisan basis.

SEC. 10302. DEFINITIONS.

In this title:

(1) BOARD.—The term ''Board'' means the National Science Board.

(2) DIRECTOR.—The term ''Director'' means the Director of the National Science Foundation.

(3) NSF INCLUDES.—The term ''NSF INCLUDES'' means the initiative carried out under section 10323.

(4) STEM ECOSYSTEM.—The term ''STEM ecosystem'' means a local, regional, or statewide network, consortium, or multi-sector partnership, which may be led or co-led by a nonprofit organizational entity, that is operating in the United States with the goal of supporting participation in STEM study, activities, and career pathways as defined in the CoSTEM Annual Progress Report of 2020 with a broad range of non-Federal partners.

SEC. 10303. AUTHORIZATION OF APPROPRIATIONS.

(a) FISCAL YEAR 2023.—

(1) IN GENERAL.—There are authorized to be appropriated to the Foundation $11,897,480,000 for fiscal year 2023.

(2) SPECIFIC ALLOCATIONS.—Of the amount authorized under paragraph (1)—

(A) $9,050,000,000 is authorized to be appropriated to carry out research and related activities, of which—

(i) $55,000,000 is authorized to be appropriated for the Mid-Scale Research Infrastructure Program; and

(ii) $1,500,000,000 is authorized to be appropriated for the Directorate for Technology, Innovation, and Partnerships;

(B) $1,950,000,000 is authorized to be appropriated for STEM education, of which—

(i) $73,700,000 is authorized to be appropriated for the Robert Noyce Teacher Scholarship Program;

(ii) $59,500,000 is authorized to be appropriated for the NSF Research Traineeship Program;

(iii) $416,300,000 is authorized to be appropriated for the Graduate Research Fellowship Program;

(iv) $70,000,000 is authorized to be appropriated for the Cybercorps Scholarship for Service Program; and

(v) $350,000,000 is authorized to be appropriated for fellowships, traineeships, and scholarships described in section 10393;

(C) $249,000,000 is authorized to be appropriated for major research equipment and facilities construction, of which $76,250,000 is authorized to be appropriated for the Mid-Scale Research Infrastructure Program;

(D) $620,000,000 is authorized to be appropriated for agency operations and award management;

(E) $5,090,000 is authorized to be appropriated for the Office of the National Science Board; and

(F) $23,390,000 is authorized to be appropriated for the Office of the Inspector General.

(b) FISCAL YEAR 2024.—

(1) IN GENERAL.—There are authorized to be appropriated to the Foundation $15,646,930,000 for fiscal year 2024.

(2) SPECIFIC ALLOCATIONS.—Of the amount authorized under paragraph (1)—

(A) $12,050,000,000 is authorized to be appropriated to carry out research and related activities, of which—

(i) $60,000,000 is authorized to be appropriated for the Mid-Scale Research Infrastructure Program; and

(ii) $3,350,000,000 is authorized to be appropriated for the Directorate for Technology, Innovation, and Partnerships;

(B) $2,500,000,000 is authorized to be appropriated for STEM education, of which—

(i) $80,400,000 is authorized to be appropriated for the Robert Noyce Teacher Scholarship Program;

(ii) $64,910,000 is authorized to be appropriated for the NSF Research Traineeship Program;

(iii) $454,140,000 is authorized to be appropriated for the Graduate Research Fellowship Program;

(iv) $72,000,000 is authorized to be appropriated for the Cybercorps Scholarship for Service Program; and

(v) $800,000,000 is authorized to be appropriated for fellowships, traineeships, and scholarships described in section 10393;

(C) $355,000,000 is authorized to be appropriated for major research equipment and facilities construction, of which $80,000,000 is authorized to be appropriated for the Mid-Scale Research Infrastructure Program;

(D) $710,000,000 is authorized to be appropriated for agency operations and award management;

(E) $5,320,000 is authorized to be appropriated for the Office of the National Science Board; and

(F) $26,610,000 is authorized to be appropriated for the Office of the Inspector General.

(c) FISCAL YEAR 2025.—

(1) IN GENERAL.—There are authorized to be appropriated to the Foundation $16,706,670,000 for fiscal year 2025.

(2) SPECIFIC ALLOCATIONS.—Of the amount authorized under paragraph (1)—

(A) $12,850,000,000 is authorized to be appropriated to carry out research and related activities, of which—

(i) $70,000,000 is authorized to be appropriated for the Mid-Scale Research Infrastructure Program; and

(ii) $3,550,000,000 is authorized to be appropriated for the Directorate for Technology, Innovation, and Partnerships;

(B) $2,700,000,000 is authorized to be appropriated for STEM education, of which—

(i) $87,100,000 is authorized to be appropriated for the Robert Noyce Teacher Scholarship Program;

(ii) $70,320,000 is authorized to be appropriated for the NSF Research Traineeship Program;

(iii) $491,990,000 is authorized to be appropriated for the Graduate Research Fellowship Program;

(iv) $78,000,000 is authorized to be appropriated for the Cybercorps Scholarship for Service Program; and

(v) $900,000,000 is authorized to be appropriated for fellowships, traineeships,

and scholarships described in section 10393;

(C) $370,000,000 is authorized to be appropriated for major research equipment and facilities construction, of which $85,000,000 is authorized to be appropriated for the Mid-Scale Research Infrastructure Program;

(D) $750,000,000 is authorized to be appropriated for agency operations and award management;

(E) $5,560,000 is authorized to be appropriated for the Office of the National Science Board; and

(F) $31,110,000 is authorized to be appropriated for the Office of the Inspector General.

(d) FISCAL YEAR 2026.—

(1) IN GENERAL.—There are authorized to be appropriated to the Foundation $17,832,420,000 for fiscal year 2026.

(2) SPECIFIC ALLOCATIONS.—Of the amount authorized under paragraph (1)—

(A) $13,800,000,000 is authorized to be appropriated to carry out research and related activities, of which—

(i) $75,000,000 is authorized to be appropriated for the Mid-Scale Research Infrastructure Program; and

(ii) $3,800,000,000 is authorized to be appropriated for the Directorate for Technology, Innovation, and Partnerships;

(B) $2,850,000,000 is authorized to be appropriated for STEM education, of which—

(i) $93,800,000 is authorized to be appropriated for the Robert Noyce Teacher Scholarship Program;

(ii) $75,730,000 is authorized to be appropriated for the NSF Research Traineeship Program;

(iii) $529,830,000 is authorized to be appropriated for the Graduate Research Fellowship Program;

(iv) $84,000,000 is authorized to be appropriated for the Cybercorps Scholarship for Service Program; and

(v) $950,000,000 is authorized to be appropriated for fellowships, traineeships, and scholarships described in section 10393;

(C) $372,000,000 is authorized to be appropriated for major research equipment and facilities construction, of which $90,000,000 is authorized to be appropriated for the Mid-Scale Research Infrastructure Program;

(D) $770,000,000 is authorized to be appropriated for agency operations and award management;

(E) $5,810,000 is authorized to be appropriated for the Office of the National Science Board; and

(F) $34,610,000 is authorized to be appropriated for the Office of the Inspector General.

(e) FISCAL YEAR 2027.—

(1) IN GENERAL.—There are authorized to be appropriated to the Foundation $18,919,180,000 for fiscal year 2027.

(2) SPECIFIC ALLOCATIONS.—Of the amount authorized under paragraph (1)—

(A) $14,700,000,000 is authorized to be appropriated to carry out research and related activities, of which—

(i) $80,000,000 is authorized to be appropriated for the Mid-Scale Research Infrastructure Program; and

(ii) $4,100,000,000 is authorized to be appropriated for the Directorate for Technology, Innovation, and Partnerships;

(B) $3,000,000,000 is authorized to be appropriated for STEM education, of which—

(i) $100,500,000 is authorized to be appropriated for the Robert Noyce Teacher Scholarship Program;

(ii) $81,140,000 is authorized to be appropriated for the NSF Research Traineeship Program;

(iii) $567,680,000 is authorized to be appropriated for the Graduate Research Fellowship Program;

(iv) $90,000,000 is authorized to be appropriated for the Cybercorps Scholarship for Service Program; and

(v) $1,000,000,000 is authorized to be appropriated for fellowships, traineeships, and scholarships described in section 10393;

(C) $375,000,000 is authorized to be appropriated for major research equipment and facilities construction, of which $100,000,000 is

authorized to be appropriated for the Mid-Scale Research Infrastructure Program;

(D) $800,000,000 is authorized to be appropriated for agency operations and award management;

(E) $6,070,000 is authorized to be appropriated for the Office of the National Science Board; and

(F) $38,110,000 is authorized to be appropriated for the Office of the Inspector General.

Subtitle B—STEM Education

SEC. 10311. PREK–12 STEM EDUCATION.

(a) NATIONAL ACADEMIES STUDY.—Not later than 120 days after the date of enactment of this Act, the Director shall enter into an agreement with the National Academies to conduct a study to—

(1) review the research literature and identify research gaps regarding the interconnected factors that foster and hinder successful implementation of promising, evidence-based PreK–12 STEM education innovations at the local, regional, and national level;

(2) present a compendium of promising, evidence-based PreK–12 STEM education practices, models, programs, and technologies;

(3) identify barriers to widespread and sustained implementation of such innovations; and

(4) make recommendations to the Foundation, the Department of Education, the National Science and Technology Council's Committee on Science, Technology, Engineering, and Mathematics Education, State and local educational agencies, and other relevant stakeholders on measures to address such barriers.

(b) SUPPORTING PREK–12 INFORMAL STEM OPPORTUNITIES.—Section 3 of the STEM Education Act of 2015 (42 U.S.C. 1862q) is amended by adding at the end the following:

''(c) PREK–12 INFORMAL STEM.—

''(1) IN GENERAL.—The Director of the National Science Foundation shall make awards, through existing programs where appropriate to institutions of higher education and nonprofit organizations (or consortia of such intuitions or organizations) on a merit-reviewed, competitive basis for research on effective approaches to engaging students in PreK–12, including students from groups historically underrepresented in STEM and rural students.

''(2) PURPOSES.—The purposes of this subsection are to—

"(A) provide effective, compelling, and engaging means for teaching and reinforcing fundamental STEM concepts to PreK–12 students;

"(B) expand the STEM workforce pipeline by increasing the number of youth in the United States exposed to STEM from an early age and encourage them to pursue careers in STEM-related fields; and

"(C) broaden participation of groups historically underrepresented in STEM and rural students, in the STEM workforce.

"(3) USE OF FUNDS.—

"(A) IN GENERAL.—Awards made under this subsection shall support research and development on innovative before-school, after-school, out-of-school, or summer activities that are designed to encourage interest, engagement, and skills development in STEM, including for students from groups historically underrepresented in STEM and rural students.

"(B) PERMITTED ACTIVITIES.—The research and development activities described in subparagraph (A) may include—

"(i) the provision of programming described in such subparagraph for the pur-

pose of research described in such subparagraph;

"(ii) the use of a variety of engagement methods, including cooperative and hands-on learning;

"(iii) exposure of students to role models in the fields of STEM and near-peer mentors;

"(iv) training of informal learning educators, youth-serving professionals, and volunteers who lead informal STEM programs in using evidence-based methods consistent with the target student population being served;

"(v) education of students on the relevance and significance of STEM careers, provision of academic advice and assistance, and activities designed to help students make real-world connections to STEM content;

"(vi) the preparation of students to attend events, competitions, and academic programs that provide content expertise and encourage career exposure in STEM, which may include the purchase of parts

and supplies needed to prepare for participation in such competitions;

"(vii) activities designed to engage parents and families of students in PreK–12 in STEM;

"(viii) innovative strategies to engage students, such as using leadership skills and outcome measures to impart youth with the confidence to pursue STEM coursework and academic study;

"(ix) coordination with STEM-rich environments, including other nonprofit, nongovernmental organizations, out-of-classroom settings, institutions of higher education, vocational facilities, corporations, museums, or science centers; and

"(x) the acquisition of instructional materials or technology-based tools to conduct applicable award activity.

"(4) APPLICATION.—An applicant seeking funding under this subsection shall submit an application at such time, in such manner, and containing such information as may be required by the Director. Applications that include or partner with a nonprofit, nongovernmental organization that has exten-

sive experience and expertise in increasing the participation of students in PreK–12 in STEM are encouraged. At a minimum, the application shall include the following:

"(A) A description of the target audience to be served by the research activity or activities for which such funding is sought.

"(B) A description of the process for recruitment and selection of students to participate in such activities.

"(C) A description of how such activity or activities may inform programming that engages students in PreK–12 in STEM.

"(D) A description of how such activity or activities may inform programming that promotes student academic achievement in STEM.

"(E) An evaluation plan that includes, at a minimum, the use of outcome-oriented measures to determine the impact and efficacy of programming being researched.

"(5) EVALUATIONS.—Each recipient of an award under this subsection shall provide, at the conclusion of every year during which the award funds are received, a report in a form prescribed by the Director.

"(6) ENCOURAGE APPLICATIONS.—In making awards under this subsection, the Director shall encourage applications which, for the purpose of the activity or activities funded through the award, are from or include eligible nonprofit programs serving students that attend elementary schools or secondary schools (including high schools) that—

"(A) are implementing comprehensive support and improvement activities or targeted support and improvement activities under paragraph (1) or (2) of section 1111(d) of the Elementary and Secondary Education Act of 1965 (20 U.S.C. 6311(d)); or

"(B) serve high percentages of students who are eligible for a free or reduced-price lunch under the Richard B. Russell National School Lunch Act (42 U.S.C. 1751 et seq.) (which, in the case of a high school, may be calculated using comparable data from the schools that feed into the high school).

"(7) ACCOUNTABILITY AND DISSEMINATION.—

"(A) EVALUATION REQUIRED.—The Director shall evaluate the activities established under this subsection. Such evaluation shall—

"(i) use a common set of benchmarks and tools to assess the results of research conducted under such awards; and

"(ii) to the extent practicable, integrate the findings of the research resulting from the activity or activities funded through the award with the current research on serving students with respect to the pursuit of degrees or careers in STEM, including underrepresented and rural students, in PreK–12.

"(B) REPORT ON EVALUATIONS.—Not later than 180 days after the completion of the evaluation under subparagraph (A), the Director shall submit to Congress and make widely available to the public a report that includes—

"(i) the results of the evaluation; and

"(ii) any recommendations for administrative and legislative action that could optimize the effectiveness of the program under this subsection.

"(8) COORDINATION.—In carrying out this subsection, the Director shall, for purposes of enhancing program effectiveness and avoiding duplication of ac-

tivities, consult, and coordinate with other relevant Federal agencies.''.

(c) [LOG 907 S2522] NATIONAL STEM TEACHER CORPS PILOT.—

(1) PURPOSE.—It is the purpose of this subsection to elevate the profession of STEM teaching by establishing a National STEM Teacher Corps pilot program to recognize outstanding STEM teachers in our Nation's classrooms, rewards them for their accomplishments, elevates their public profile, and creates rewarding career paths to which all STEM teachers can aspire, both to prepare future STEM researchers and to create a scientifically literate public.

(2) DEFINITIONS.—In this subsection:

(A) ADMINISTRATOR.—The term ''Administrator'' means the Administrator of the National STEM Teacher Corps.

(B) ELIGIBLE ENTITY.—The term ''eligible entity'' means—

(i) an institution of higher education; or

(ii) a consortium consisting of an institution of higher education and one or more of the following:

(I) A State educational agency (as defined in section 8101 of the Elementary and Secondary Education Act of 1965 (20 U.S.C. 7801)).

(II) A local educational agency (as defined in section 8101 of the Elementary and Secondary Education Act of 1965 (20 U.S.C. 7801)).

(III) An education nonprofit Association.

(IV) A cross sector STEM organization.

(V) A private entity, including a STEM-related business.

(C) HIGH-NEED SCHOOL.—The term ''high-need school'' has the meaning given the term in section 2211(b) of the Elementary and Secondary Education Act of 1965 (20 U.S.C. 6631(b)).

(D) PROFESSIONAL DEVELOPMENT.—The term ''professional Development'' has the meaning given the term in section 8101 of the Elementary and Secondary Education Act of 1965 (20 U.S.C. 7801).

(E) CORPS ALLIANCE.—The term ''Corps Alliance'' means a regionally or topically based award under this subsection.

(F) NATIONAL STEM TEACHER CORPS ADVISORY BOARD.—The term ''National STEM Teacher Corps Advisory Board'' means the Advisory Board for the National STEM Teacher Corps established under paragraph (5).

(3) ESTABLISHMENT OF NATIONAL STEM TEACHER CORPS.—The Director may, subject to the availability of appropriations, establish within the Foundation, a National STEM Teacher Corps 10-year pilot program to be administered by the Administrator, who shall be appointed by the Director. As appropriate, the Director may use existing NSF programs to establish and execute this program.

(4) DUTIES OF THE ADMINISTRATOR.—The Administrator shall—

(A) create a process and standards for selection of eligible applicants to become members of the National STEM Teacher Corps, including—

(i) uniform selection criteria that includes—

(I) deep knowledge of STEM content and pedagogy;

(II) a passion for STEM subjects and dedication to teaching, evidence of leadership skills, and potential for continued career growth as an educator; and

(III) demonstrated experience increasing STEM student achievement and STEM participation rates for all students, particularly those from rural and high-need schools; and

(ii) a uniform selection process, including a comprehensive application that includes recommendations and other relevant professional information;

(B) promote the National STEM Teacher Corps and elevate best practices that emerge from the National STEM Teacher Corps to a national audience;

(C) evaluate the operation and effectiveness of the Corps alliances; and

(D) evaluate the overall and long-term impact of the National STEM Teacher Corps by—

(i) documenting, monitoring, and assessing the program outcomes or impact on the STEM careers of participants; and

(ii) documenting, monitoring, and assessing the program outcomes for the STEM education profession nationwide, particularly for rural and high-need schools.

(5) NATIONAL STEM TEACHER CORPS ADVISORY BOARD.—

(A) ESTABLISHMENT.—There is established a National STEM Teacher Corps Advisory Board to advise the Director on matters pertaining to the National STEM Teacher Corps for the length of the pilot program.

(B) COMPOSITION.—

(i) IN GENERAL.—The membership of the National STEM Teacher Corps Advisory Board shall—

(I) be appointed by the Director;

(II) include a representative from each of the following: School leaders, STEM researchers, STEM education researchers, Business leaders, PreK–12 STEM educators, and Students

pursuing a postsecondary STEM degree; and

(III) be geographically diverse.

(ii) EXISTING COMMITTEE.—The Director may assign the duties of the National STEM Teacher Corps Advisory Board to another advisory committee of the Foundation.

(6) DUTIES OF THE CORPS ALLIANCES.—Subject to the availability of appropriated funds, the Administrator may make awards on a competitive, merit-review basis, to establish Corps alliances at eligible entities. Activities carried out by such alliances shall include—

(A) engaging local partners, which may include local educational agencies, institutions of higher education, STEM organizations, or education nonprofit organizations, to—

(i) develop and serve the community of National STEM Teacher Corps members within the region or topic area, in coordination with local partners to carry out day-to-day activities;

(ii) coordinate professional development activities, including activities led by National STEM Teacher Corps members;

(iii) connect National STEM Teacher Corps members with existing educator professional development programs and coordinate members' involvement as cooperating teachers or mentors;

(iv) seek opportunities to involve teachers who are not members of the National STEM Teacher Corps to participate in National STEM Teacher Corps activities; and

(v) build partnerships with existing education organizations and other efforts by State educational agencies and local educational agencies that operate programs relevant to the National STEM Teacher Corps and its activities;

(B) recruiting eligible applicants, with a focus on recruiting diverse STEM educators to advance equity based on race, ethnicity, sex, socioeconomic status, age, disability status, geography, and language ability;

(C) screening, interviewing, and selecting members of the National STEM Teacher Corps using procedures and standards provided by the Administrator;

(D) coordinating the online network that supports all National STEM Teacher Corps members in the region or topic area;

(E) convening occasional meetings of National STEM Teacher Corps members in a region or topic area;

(F) creating opportunities for the professional growth of National STEM Teacher Corps members, with a focus on increasing STEM student achievement and STEM participation rates for all students, particularly those from rural and high-need schools; and

(G) supporting the retention and success of National STEM Teacher Corps members in the region or topic area.

(7) DUTIES OF MEMBERS OF THE NATIONAL STEM TEACHER CORPS.—An applicant that is selected by a Corps alliance to be a member of the National STEM Teacher Corps shall—

(A) serve a 4-year term with a possibility of reappointment;

(B) receive an annual stipend in an amount not less than $10,000; and

(C) have substantial responsibilities, including—

(i) working with other members of the National STEM Teacher Corps to develop and improve innovative teaching practices, including practices such as inquiry-based learning;

(ii) participating in professional development in innovative teaching methodology and mentorship; and

(iii) continuing to excel in teaching the member's own students, with a focus on advancing equity by spending additional time teaching and coaching underserved students to increase STEM student achievement and STEM participation rates for students from rural and high-need schools.

(8) EVALUATION.—The Director, acting through the Administrator, shall submit a report to Congress after the third year of the pilot program that includes—

(A) an assessment, drawing on the evaluations the Administrator shall conduct under subparagraphs (C) and (D) of paragraph (4), and other sources of information, of the effectiveness of the pilot program in recruiting and retaining high-quality STEM teachers in the selected regions or topic areas, particularly in high-need and rural schools; and

(B) if deemed effective, a proposal to Congress for permanent implementation of the pilot program.

(9) SUNSET.—The authority to carry out this subsection shall terminate on the date that is 15 years after the date of enactment of this Act.

(10) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated $60,000,000 for each of fiscal years 2023 through 2032 to carry out this subsection.

SEC. 10312. UNDERGRADUATE STEM EDUCATION.

(a) RESEARCH ON STEM EDUCATION AND WORKFORCE NEEDS.—The Director shall make awards, on a competitive basis, to four-year institutions of higher education or nonprofit organizations (or consortia of such institutions or organizations) to support research and development activities to—

(1) encourage greater collaboration and coordination between institutions of higher education and industry to enhance education, foster hands-on learn experiences, and improve alignment with workforce needs;

(2) understand the current composition of the STEM workforce and the factors that influence growth, retention, and development of that workforce;

(3) increase the size, diversity, capability, and flexibility of the STEM workforce; and

(4) increase dissemination and widespread adoption of effective practices in undergraduate education and workforce development.

(b) ADVANCED TECHNOLOGICAL EDUCATION PROGRAM UPDATE.—Section 3(b) of the Scientific and Advanced-Technology Act of 1992 (42 U.S.C. 1862i(b)) is amended to read as follows:

"(b) CENTERS OF SCIENTIFIC AND TECHNICAL EDUCATION.—

"(1) IN GENERAL.—The Director shall make awards for the establishment of centers of excellence, in advanced-technology fields, among associate-degree-granting colleges. Centers shall meet one or both of the following criteria:

"(A) Exceptional instructional programs in advanced-technology fields.

"(B) Excellence in undergraduate STEM education.

"(2) PURPOSES.—The centers shall serve as national and regional clearinghouses and models for the benefit of both colleges and secondary schools, and shall provide seminars and programs to disseminate model curricula and model teaching methods and instructional materials to other associate-degree-granting colleges.

"(3) NETWORKS.—The centers may enter into partnerships with other institutions of higher education, nonprofit organizations, and stakeholder groups, or a consortium thereof, to develop networks to—

"(A) coordinate research, training, and education activities funded by awards under subsection (a);

"(B) share information and best practices; or

"(C) promote collaboration between academic institutions, workforce development programs, labor organizations, and industry to

communicate and meet workforce education and training needs.''.

(c) INNOVATIONS IN STEM EDUCATION AT COMMUNITY COLLEGES.—

(1) IN GENERAL.—The Director shall make awards on a merit-reviewed, competitive basis to institutions of higher education or nonprofit organizations (or consortia of such institutions or organizations) to advance research on the nature of learning and teaching at community colleges and to improve outcomes for students who enter the workforce upon completion of their STEM degree or credential or transfer to 4-year institutions, including by—

(A) examining how to scale up successful programs at community colleges that are improving student outcomes in foundational STEM courses;

(B) supporting research on effective STEM teaching practices in community college settings;

(C) designing and developing new STEM curricula;

(D) providing STEM students with hands-on training and research experiences, intern-

ships, and other experiential learning opportunities;

(E) increasing access to high quality STEM education through new technologies;

(F) re-skilling or up-skilling incumbent workers for new STEM jobs;

(G) building STEM career and seamless transfer pathways; and

(H) developing novel mechanisms to identify and recruit talent into STEM programs, in particular talent from groups historically underrepresented in STEM.

(2) PARTNERSHIPS.—In carrying out activities under this subsection, the Director shall encourage applications to develop, enhance, or expand cooperative STEM education and training partnerships between institutions of higher education, industry, and labor organizations.

(d) IMPROVING ACCESS TO STEM EDUCATION AT CAREER AND TECHNICAL EDUCATION INSTITUTIONS.—

(1) IN GENERAL.—The Director shall make awards, on a competitive basis, to institutions of higher education (including postsecondary vocational institutions) to support career and technical education in STEM and computer science related fields.

(2) PRIORITY.—In making awards under this subsection, the Director shall give priority to institutions that demonstrate effective strategies to recruit and provide career and technical education to veterans and members of the Armed Forces transitioning to the private sector workforce.

(3) CAREER AND TECHNICAL EDUCATION DEFINED.—In this subsection, the term ''career and technical education'' has the meaning given that term in section 3 of the Carl D. Perkins Career and Technical Education Act of 2006 (20 U.S.C. 2302).

(e) COURSE-BASED UNDERGRADUATE RESEARCH EXPERIENCES.—

(1) IN GENERAL.—The Director shall carry out a 4-year pilot program under which the Director shall make awards, on a competitive basis, to institutions of higher education and nonprofit organizations (or consortia of such institutions or organizations) to establish a total of not fewer than five Centers to develop and scale up successful models for providing undergraduate students with hands-on, course-based research experiences.

(2) USE OF FUNDS.—Awards made under this paragraph shall be used to—

(A) develop, assess, and disseminate models for providing undergraduate students with course-based research experiences across STEM disciplines and education levels;

(B) identify and address opportunities and challenges in facilitating implementation across a broad range of institution types, including historically Black colleges and universities, Tribal Colleges or Universities, minority serving institutions and community colleges;

(C) identify and develop best practices to address barriers for faculty, including institutional culture, resources, and incentive structures;

(D) identify and address factors that may facilitate or discourage participation by students from all backgrounds;

(E) provide faculty with curriculum, professional development, training, networking opportunities, and other support to enable the development, adaptation, or expansion of a course-based research experience; and

(F) collect data and carry out research to evaluate the impacts of course- based under-

graduate research experiences on the STEM workforce.

(3) PARTNERSHIPS.—In making awards under this paragraph, the Director shall consider the extent to which the proposed Center will establish partnerships among multiple types of academic institutions, including community colleges, emerging research institutions, EPSCoR institutions, historically Black colleges and universities, Tribal Colleges or Universities, and minority-serving institutions, the private sector, and other relevant stakeholders in supporting programs and activities to facilitate faculty training and the widespread and sustained implementation of promising, evidence-based practices, models, programs, and curriculum.

(4) REPORT.—Not later than 180 days after the date on which the pilot program is completed, the Director shall submit to Congress a report that includes—

(A) an assessment, that includes feedback from the research community, of the effectiveness of the pilot program in increasing the number, diversity, and workforce readiness of STEM graduates; and

(B) if determined to be effective, a plan for permanent implementation of the pilot program.

(f) ADVANCED TECHNOLOGICAL MANUFACTURING ACT.—

(1) FINDINGS AND PURPOSE.—Section 2 of the Scientific and Advanced-Technology Act of 1992 (42 U.S.C. 1862h) is amended—

(A) in subsection (a)—

(i) in paragraph (3), by striking ''science, mathematics, and technology'' and inserting ''science, technology, engineering, and mathematics or STEM'';

(ii) in paragraph (4), by inserting ''educated'' and before ''trained''; and

(iii) in paragraph (5), by striking ''scientific and technical education and training'' and inserting ''STEM education and training''; and

(B) in subsection (b)—

(i) in paragraph (2), by striking ''mathematics and science'' and inserting ''STEM fields''; and

(ii) in paragraph (4), by striking ''mathematics and science instruction'' and inserting ''STEM instruction''.

(2) MODERNIZING REFERENCES TO STEM.—Section 3 of the Scientific and Advanced-Technology Act of 1992 (42 U.S.C. 1862i) is amended—

(A) in the section heading, by striking "**SCIENTIFIC AND TECHNICAL EDUCATION**" and inserting "**STEM EDUCATION**";

(B) in subsection (a)—

(i) in the subsection heading, by striking "SCIENTIFIC AND TECHNICAL EDUCATION" and inserting "STEM EDUCATION";

(ii) in the matter preceding paragraph (1)—

(I) by inserting "and education to prepare the skilled technical workforce to meet workforce demands" before ", and to improve";

(II) by striking "core education courses in science and mathematics" and inserting "core education courses in STEM fields";

(III) by inserting "veterans and individuals engaged in" before "work in the home"; and

(IV) by inserting ''and on building a pathway from secondary schools to associate-degree-granting institutions, to careers that require technical training'' before '', and shall be designed'';

(iii) in paragraph (1)—

(I) by inserting ''and study'' after ''development''; and

(II) by striking ''core science and mathematics courses'' and inserting ''core STEM courses'';

(iv) in paragraph (2), by striking ''science, mathematics, and advanced-technology fields'' and inserting ''STEM and advanced- technology fields'';

(v) in paragraph (3)(A), by inserting ''to support the advanced- technology industries that drive the competitiveness of the United States in the global economy'' before the semicolon at the end;

(vi) in paragraph (4), by striking ''scientific and advanced- technology fields'' and inserting ''STEM and advanced-technology fields''; and

(vii) in paragraph (5), by striking ''advanced scientific and technical education'' and inserting ''advanced STEM and advanced- technology'';

(C) in subsection (c)—

(i) in paragraph (1)—

(I) in subparagraph (A)—

(aa) in the matter preceding clause (i), by striking ''to encourage'' and all that follows through ''such means as—'' and inserting ''to encourage the development of career and educational pathways with multiple entry and exit points leading to credentials and degrees, and to assist students pursuing pathways in STEM fields to transition from associate-degree-granting colleges to bachelor- degree-granting institutions, through such means as—'';

(bb) in clause (i), by striking ''to ensure'' and inserting ''to develop articulation agreements that ensure''; and

(cc) in clause (ii), by striking ''courses at the bachelor-degree-granting institution'' and inserting ''the career and educational pathways supported by the articulation agreements'';

(II) in subparagraph (B)—

(aa) in clause (i), by inserting ''veterans and individuals engaged in'' before ''work in the home'';

(bb) in clause (iii)—

(AA) by striking ''bachelor's-degree- granting institutions'' and inserting ''institutions or work sites''; and

(BB) by inserting ''or industry internships'' after ''summer programs''; and

(cc) by striking the flush text following clause (iv); and

(III) by striking subparagraph (C);

(ii) in paragraph (2)—

(I) by striking ''mathematics and science programs'' and inserting ''STEM programs'';

(II) by inserting ''and, as appropriate, elementary schools,'' after ''with secondary schools'';

(III) by striking ''mathematics and science education'' and inserting ''STEM education'';

(IV) by striking ''secondary school students'' and inserting ''students at these schools'';

(V) by striking ''science and advanced-technology fields'' and inserting ''STEM and advanced-technology fields''; and

(VI) by striking ''agreements with local educational agencies'' and inserting ''articulation agreements or dual credit courses with local secondary schools, or other means as the Director determines appropriate,''; and

(iii) in paragraph (3)—

(I) by striking subparagraph (B);

(II) by striking ''shall—''and all that follows through ''establish a'' and inserting ''shall establish a'';

(III) by striking ''the fields of science, technology, engineering, and mathematics'' and inserting ''STEM fields''; and

(IV) by striking ''; and'' and inserting '', including jobs at Federal and academic laboratories.'';

(D) in subsection (d)(2)—

(i) in subparagraph (D), by striking ''and'' after the semicolon;

(ii) in subparagraph (E), by striking the period at the end and inserting a ''; and''; and

(iii) by adding at the end the following:

''(F) as appropriate, applications that apply the best practices for STEM education and technical skills education through distance learning or in a simulated work environment, as determined by research described in subsection (f); and'';

(E) in subsection (g), by striking the second sentence;

(F) in subsection (h)(1)—

(i) in subparagraph (A), by striking ''2022'' and inserting ''2026'';

(ii) in subparagraph (B), by striking ''2022'' and inserting ''2026''; and

(iii) in subparagraph (C)—

(I) by striking ''up to $2,500,000'' and inserting ''not less than $3,000,000''; and

(II) by striking ''2022'' and inserting ''2026'';

(G) in subsection (i)—

(i) by striking paragraph (3); and

(ii) by redesignating paragraphs (4) and (5) as paragraphs (3) and (4), respectively; and

(H) in subsection (j)—

(i) by striking paragraph (1) and inserting the following:

''(1) the term advanced-technology includes technological fields such as advanced manufacturing, agricultural-, biological- and chemical-technologies, energy and environmental technologies, engineering

technologies, information technologies, micro and nano-technologies, cybersecurity technologies, geospatial technologies, and new, emerging technology areas;'';

(ii) in paragraph (4), by striking ''separate bachelor-degree- granting institutions'' and inserting ''other entities'';

(iii) by striking paragraph (7);

(iv) by redesignating paragraphs (8) and (9) as paragraphs (7) and (8), respectively;

(v) in paragraph (7), as redesignated by clause (iv), by striking ''and'' after the semicolon;

(vi) in paragraph (8), as redesignated by clause (iv)—

(I) by striking ''mathematics, science, engineering, or technology'' and inserting ''science, technology, engineering, or mathematics''; and

(II) by striking the period at the end and inserting ''; and''; and

(vii) by adding at the end the following:

"(9) the term skilled technical workforce has the meaning given such term in section 4(b) of the Innovations in Mentoring, Training, and Apprenticeships Act (42 U.S.C. 1862p).".

(3) AUTHORIZATION OF APPROPRIATIONS.—Section 5 of the Scientific and Advanced-Technology Act of 1992 (42 U.S.C. 1862j) is amended to read as follows:

"SEC. 5. AUTHORIZATION OF APPROPRIATIONS.

"There are authorized to be appropriated to the Director for carrying out sections 2 through 4 $150,000,000 for each of fiscal years 2023 through 2027.".

SEC. 10313. GRADUATE STEM EDUCATION.

(a) MENTORING AND PROFESSIONAL DEVELOPMENT.—

(1) MENTORING PLANS.—

(A) UPDATE.—Section 7008(a) of the America Creating Opportunities to Meaningfully Promote Excellence in Technology, Education, and Science Act (42 U.S.C. 1862o(a)) is amended by—

(i) inserting "and graduate student" after "postdoctoral"; and

(ii) inserting "The requirement may be satisfied by providing such individuals

with access to mentors, including individuals not listed on the award.'' after ''review criterion.''.

(B) EVALUATION.—Not later than 120 days after the date of enactment of this Act, the Director shall enter into an agreement with a qualified independent organization to evaluate the effectiveness of the postdoctoral mentoring plan requirement for improving mentoring for Foundation-supported postdoctoral researchers.

(2) CAREER EXPLORATION.—

(A) IN GENERAL.—The Director shall make awards, on a competitive basis, to institutions of higher education and nonprofit organizations (or consortia of such institutions or organizations) to develop innovative approaches for facilitating career exploration of academic and nonacademic career options and for providing opportunity-broadening experiences, including work-integrated opportunities, for graduate students and postdoctoral scholars that can then be considered, adopted, or adapted by other institutions and to carry out research on the impact and outcomes of such activities.

(B) REVIEW OF PROPOSALS.—In selecting award recipients under this subparagraph, the Director shall consider, at a minimum—

(i) the extent to which the administrators of the institution are committed to making the proposed activity a priority; and

(ii) the likelihood that the institution or organization will sustain or expand the proposed activity effort beyond the period of the award.

(3) DEVELOPMENT PLANS.—The Director shall require that annual project reports for awards that support graduate students and postdoctoral scholars include certification by the principal investigator that each graduate student and postdoctoral scholar receiving substantial support from such award, as determined by has developed and annually updated an individual development plan to map educational goals, career exploration, and professional development.

(4) PROFESSIONAL DEVELOPMENT SUPPLEMENT.—The Director shall carry out a five-year pilot initiative to award up to 2,500 administrative supplements of up to $2,000 to existing research

awards annually, on a competitive basis, to support professional development experiences for graduate students and postdoctoral researchers who receive a substantial portion of their support under such award, as determined by the Director. Not more than 10 percent of supplements awarded under this subparagraph may be used to support professional development experiences for postdoctoral researchers.

(5) GRADUATE EDUCATION RESEARCH.—The Director shall make awards, on a competitive basis, to institutions of higher education or nonprofit organizations (or consortia of such institutions or organizations) to support research on the graduate education system and outcomes of various interventions and policies, including—

(A) the effects of traineeships, fellowships, internships, and teaching and research assistantships on outcomes for graduate students;

(B) the effects of graduate education and mentoring policies and procedures on degree completion, including differences by—

(i) sex, race and ethnicity, and citizenship; and

(ii) student debt load;

(C) the development and assessment of new or adapted interventions, including approaches that improve mentoring relationships, develop conflict management skills, and promote healthy research teams; and

(D) research, data collection, and assessment of the state of graduate student mental health and wellbeing, factors contributing to and consequences of poor graduate student mental health, and the development, adaptation, and assessment of evidence-based strategies and policies to support emotional wellbeing and mental health.

(b) GRADUATE RESEARCH FELLOWSHIP PROGRAM UPDATE.—

(1) SENSE OF CONGRESS.—It is the sense of Congress that the Foundation should increase the number of new graduate research fellows supported annually over the next 5 years to no fewer than 3,000 fellows.

(2) PROGRAM UPDATE.—Section 10 of the National Science Foundation Act of 1950 (42 U.S.C. 1869) is amended—

(A) in subsection (a), by inserting ''and as will address national workforce demand in critical STEM fields'' after ''throughout the United States'';

(B) in subsection (b), by striking ''of $12,000'' and inserting ''of at least $16,000''; and

(C) by adding at the end the following:

''(c) OUTREACH.—The Director shall ensure program outreach to recruit fellowship applicants from fields of study that are in areas of critical national need from all regions of the country, and from historically underrepresented populations in STEM.''.

(3) CYBERSECURITY SCHOLARSHIPS AND GRADUATE FELLOWSHIPS.—The Director shall ensure that students pursuing master's degrees and doctoral degrees in fields relating to cybersecurity are eligible to apply for scholarships and graduate fellowships under the Graduate Research Fellowship Program under section 10 of the National Science Foundation Act of 1950 (42 U.S.C. 1869).

(c) STUDY ON GRADUATE STUDENT FUNDING.—

(1) IN GENERAL.—Not later than 120 days after the date of enactment of this Act, the Director

shall enter into an agreement with a qualified independent organization to evaluate—

(A) the role of the Foundation in supporting graduate student education and training through fellowships, traineeships, and other funding models; and

(B) the impact of different funding mechanisms on graduate student experiences and outcomes, including whether such mechanisms have differential impacts on subsets of the student population.

(2) REPORT.—Not later than 1 year after the date of enactment of this Act, the Director shall publish the results of the evaluation carried out under paragraph (1), including a recommendation for the appropriate balance between fellowships, traineeships, and other funding models.

(d) [LOG 165 H10304(G)/S2208] AI SCHOLARSHIP-FOR-SERVICE.—

(1) DEFINITION OF EXECUTIVE AGENCY.—In this subsection, the term ''executive agency'' has the meaning given the term ''Executive agency'' in section 105 of title 5, United States Code.

(2) AI SCHOLARSHIP-FOR-SERVICE INITIATIVE REPORT.—Not later than 1 year after the date of

enactment of this Act, the Director, in coordination with the Office of Personnel Management, shall submit to the Committee on Commerce, Science, and Transportation of the Senate, the Committee on Science, Space, and Technology of the House of Representatives, the Committee on Homeland Security and Governmental Affairs of the Senate, and the Committee on Oversight and Reform of the House of Representatives a report on the need and feasibility, and if appropriate, plans to implement a program to recruit and train the next generation of artificial intelligence professionals to meet the needs of Federal, State, local, and Tribal governments. The report shall include—

(A) recent statistical data on the size, composition, and educational requirements of the Federal AI workforce, including an assessment of current and future demand for additional AI professionals across the Federal Government;

(B) an assessment of the capacity of institutions of higher education to produce graduates with degrees, certifications, and relevant skills related to artificial intelligence that meet the current and future needs of the Federal workforce; and

(C) an evaluation of the need for and feasibility of establishing a scholarship-for-service program to recruit and train the next generation of artificial intelligence professionals to meet the needs of Federal, State, local, and Tribal governments, including opportunities for leveraging existing processes and resources for administering the Federal Cyber Scholarship-for-Service Program established under section 302 of the Cybersecurity Enhancement Act of 2014 (15 U.S.C. 7442) in standing up such a program.

(3) PROGRAM ESTABLISHMENT.—Upon submitting the report required in paragraph (2), the Director, in coordination with the Director of the Office of Personnel Management, the Director of the National Institute of Standards and Technology, and the heads of other agencies with appropriate scientific knowledge, is authorized to establish a Federal artificial intelligence scholarship-for-service program (referred to in this section as the Federal AI Scholarship-for-Service Program) to recruit and train artificial intelligence professionals to lead and support the application of artificial intelligence to

the missions of Federal, State, local, and Tribal governments.

(4) QUALIFIED INSTITUTION OF HIGHER EDUCATION.—The Director, in coordination with the heads of other agencies with appropriate scientific knowledge, shall establish criteria to designate qualified institutions of higher education that shall be eligible to participate in the Federal AI Scholarship-for-Service program. Such criteria shall include—

(A) measures of the institution's demonstrated excellence in the education of students in the field of artificial intelligence; and

(B) measures of the institution's ability to attract and retain a diverse and nontraditional student population in the fields of science, technology, engineering, and mathematics, which may include the ability to attract women, minorities, and individuals with disabilities.

(5) PROGRAM DESCRIPTION AND COMPONENTS.—The Federal AI Scholarship-for-Service Program shall—

(A) provide scholarships through qualified institutions of higher education to students who are enrolled in programs of study at institutions of higher education leading to degrees or con-

centrations in or related to the artificial intelligence field;

(B) provide the scholarship recipients with summer internship opportunities or other meaningful temporary appointments in the Federal workforce focusing on AI projects or research;

(C) prioritize the employment placement of scholarship recipients in executive agencies;

(D) identify opportunities to promote multi-disciplinary programs of study that integrate basic or advanced AI training with other fields of study, including those that address the social, economic, legal, and ethical implications of human interaction with AI systems;

(E) support capacity-building education research programs that will enable postsecondary educational institutions to expand their ability to train the next-generation AI workforce, including AI researchers and practitioners;

(F) create courses or training programs in technology ethics for students receiving scholarships; and

(G) award fellowships to masters and doctoral students who are pursuing degrees or research in artificial intelligence and related

fields, including in the field of technology ethics.

(6) SCHOLARSHIP AMOUNTS.—Each scholarship under paragraph (5) shall be in an amount that covers the student's tuition and fees at the institution for not more than 3 years and provides the student with an additional stipend.

(7) POST-AWARD EMPLOYMENT OBLIGATIONS.—Each scholarship recipient, as a condition of receiving a scholarship under the program, shall enter into an agreement under which the recipient agrees to work for a period equal to the length of the scholarship, following receipt of the student's degree, in the AI mission of—

(A) an executive agency;

(B) Congress, including any agency, entity, office, or commission established in the legislative branch;

(C) an interstate agency;

(D) a State, local, or Tribal government, which may include instruction in AI-related skill sets in a public school system; or

(E) a State, local, or Tribal government-affiliated nonprofit entity that is considered to be critical infrastructure (as defined in section

1016(e) of the USA Patriot Act (42 U.S.C. 5195c(e))).

(8) HIRING AUTHORITY.—

(A) APPOINTMENT IN EXCEPTED SERVICE.—Notwithstanding any provision of chapter 33 of title 5, United States Code, governing appointments in the competitive service, an executive agency may appoint an individual who has completed the eligible degree program for which a scholarship was awarded to a position in the excepted service in the executive agency.

(B) NONCOMPETITIVE CONVERSION.—Except as provided in subparagraph (D), upon fulfillment of the service term, an employee appointed under subparagraph (A) may be converted noncompetitively to term, career-conditional, or career appointment.

(C) TIMING OF CONVERSION.—An executive agency may noncompetitively convert a term employee appointed under subparagraph (B) to a career-conditional or career appointment before the term appointment expires.

(D) AUTHORITY TO DECLINE CONVERSION.—An executive agency may decline to

make the noncompetitive conversion or appointment under subparagraph (B) for cause.

(9) ELIGIBILITY.—To be eligible to receive a scholarship under this section, an individual shall—

(A) be a citizen or lawful permanent resident of the United States;

(B) demonstrate a commitment to a career in advancing the field of AI;

(C) be—

(i) a full-time student in an eligible degree program at a qualified institution of higher education, as determined by the Director;

(ii) a student pursuing a degree on a less than full-time basis, but not less than half-time basis; or

(iii) an AI faculty member on sabbatical to advance knowledge in the field; and

(D) accept the terms of a scholarship under this section.

(10) CONDITIONS OF SUPPORT.—

(A) IN GENERAL.—As a condition of receiving a scholarship under this section, a recipient shall agree to provide the qualified insti-

tution of higher education with annual verifiable documentation of post-award employment and up-to-date contact information.

(B) TERMS.—A scholarship recipient under this section shall be liable to the United States as provided in paragraph (12) if the individual—

(i) fails to maintain an acceptable level of academic standing at the applicable institution of higher education, as determined by the Director;

(ii) is dismissed from the applicable institution of higher education for disciplinary reasons;

(iii) withdraws from the eligible degree program before completing the program;

(iv) declares that the individual does not intend to fulfill the post- award employment obligation under this section; or

(v) fails to fulfill the post-award employment obligation of the individual under this section.

(11) MONITORING COMPLIANCE.—As a condition of participating in the program, a qualified institution of higher education shall—

(A) enter into an agreement with the Director to monitor the compliance of scholarship recipients with respect to their post-award employment obligations; and

(B) provide to the Director, on an annual basis, the post-award employment documentation required under paragraph (10) for scholarship recipients through the completion of their post-award employment obligations.

(12) AMOUNT OF REPAYMENT.—

(A) LESS THAN 1 YEAR OF SERVICE.—If a circumstance described in paragraph (10) occurs before the completion of 1 year of a post-award employment obligation under this section, the total amount of scholarship awards received by the individual under this section shall—

(i) be repaid; or

(ii) be treated as a loan to be repaid in accordance with paragraph (13).

(B) 1 OR MORE YEARS OF SERVICE.—If a circumstance described in clause (iv) or (v) of

paragraph (10)(B) occurs after the completion of 1 or more years of a post-award employment obligation under this section, the total amount of scholarship awards received by the individual under this section, reduced by the ratio of the number of years of service completed divided by the number of years of service required, shall—

(i) be repaid; or

(ii) be treated as a loan to be repaid in accordance with paragraph (13).

(13) REPAYMENTS.—A loan described in paragraph (12) shall—

(A) be treated as a Federal Direct Unsubsidized Stafford Loan under part D of title IV of the Higher Education Act of 1965 (20 U.S.C. 1087a et seq.); and

(B) be subject to repayment, together with interest thereon accruing from the date of the scholarship award, in accordance with terms and conditions specified by the Director (in consultation with the Secretary of Education).

(14) COLLECTION OF REPAYMENT.—

(A) IN GENERAL.—In the event that a scholarship recipient is required to repay the scholarship award under this section, the quali-

fied institution of higher education providing the scholarship shall—

(i) determine the repayment amounts and notify the recipient and the Director of the amounts owed; and

(ii) collect the repayment amounts within a period of time as determined by the Director, or the repayment amounts shall be treated as a loan in accordance with paragraph (13).

(B) RETURNED TO TREASURY.—Except as provided in subparagraph (C), any repayment under this subsection shall be returned to the Treasury of the United States.

(C) RETAIN PERCENTAGE.—A qualified institution of higher education may retain a percentage of any repayment the institution collects under this subsection to defray administrative costs associated with the collection. The Director shall establish a fixed percentage that will apply to all eligible entities, and may update this percentage as needed, in the determination of the Director.

(15) EXCEPTIONS.—The Director may provide for the partial or total waiver or suspension of any

service or payment obligation by an individual under this section whenever compliance by the individual with the obligation is impossible or would involve extreme hardship to the individual, or if enforcement of such obligation with respect to the individual would be unconscionable.

(16) PUBLIC INFORMATION.—

(A) EVALUATION.—The Director, in coordination with the Director of the Office of Personnel Management, shall annually evaluate and make public, in a manner that protects the personally identifiable information of scholarship recipients, information on the success of recruiting individuals for scholarships under this section and on hiring and retaining those individuals in the public sector AI workforce, including information on—

(i) placement rates;

(ii) where students are placed, including job titles and descriptions;

(iii) salary ranges for students not released from obligations under this section;

(iv) how long after graduation students are placed;

(v) how long students stay in the positions they enter upon graduation;

(vi) how many students are released from obligations; and

(vii) what, if any, remedial training is required.

(B) REPORTS.—The Director, in coordination with the Office of Personnel Management, shall submit, not less frequently than once every 3 years, to the Committee on Homeland Security and Governmental Affairs of the Senate, the Committee on Commerce, Science, and Transportation of the Senate, the Committee on Science, Space, and Technology of the House of Representatives, and the Committee on Oversight and Reform of the House of Representatives a report, including the results of the evaluation under subparagraph (A) and any recent statistics regarding the size, composition, and educational requirements of the Federal AI workforce.

(C) RESOURCES.—The Director, in coordination with the Director of the Office of Personnel Management, shall provide consolidated and user-friendly online resources for prospec-

tive scholarship recipients, including, to the extent practicable—

(i) searchable, up-to-date, and accurate information about participating institutions of higher education and job opportunities related to the AI field; and

(ii) a modernized description of AI careers.

(17) REFRESH.—Not less than once every 2 years, the Director, in coordination with the Director of the Office of Personnel Management, shall review and update the Federal AI Scholarship-for-Service Program to reflect advances in technology.

SEC. 10314. STEM WORKFORCE DATA.

(a) SKILLED TECHNICAL WORKFORCE PORTFOLIO REVIEW.—

(1) IN GENERAL.—Not later than 1 year after the date of enactment of this Act, the Director shall conduct a full portfolio analysis of the Foundation's skilled technical workforce investments across all Directorates in the areas of education, research, infrastructure, data collection, and analysis.

(2) REPORT.—Not later than 180 days after the date of the review under paragraph (1) is complete, the Director shall submit to Congress and

make widely available to the public a summary report of the portfolio review.

(b) SURVEY DATA.—

(1) ROTATING TOPIC MODULES.—To meet evolving needs for data on the state of the science and engineering workforce, the Director shall assess, through coordination with other Federal statistical agencies and drawing on input from relevant stakeholders, the feasibility and benefits of incorporating questions or topic modules to existing National Center for Science and Engineering Statistics surveys that would vary from cycle to cycle.

(2) NEW DATA.—Not later than 1 year after the date of enactment of this Act, the Director shall submit to Congress and the Board the results of an assessment, carried out in coordination with other Federal agencies and with input from relevant stakeholders, of the feasibility and benefits of incorporating new questions or topic modules to existing National Center for Science and Engineering Statistics surveys on—

(A) the skilled technical workforce;

(B) working conditions and work-life balance;

(C) harassment and discrimination;

(D) immigration and emigration; and

(E) any other topics at the discretion of the Director.

(3) LONGITUDINAL DESIGN.—The Director shall continue and accelerate efforts to enhance the usefulness of National Center for Science and Engineering Statistics survey data for longitudinal research and analysis.

(4) GOVERNMENT ACCOUNTABILITY OFFICE REVIEW.—Not later than 1 year after the date of enactment of this Act, the Comptroller General of the United States shall submit a report to Congress that—

(A) evaluates Foundation processes for ensuring the data and analysis produced by the National Center for Science and Engineering Statistics meets current and future needs; and

(B) includes such recommendations as the Comptroller General determines are appropriate to improve such processes.

SEC. 10315. CYBER WORKFORCE DEVELOPMENT RESEARCH AND DEVELOPMENT.

(a) IN GENERAL.—The Director shall make awards on a merit-reviewed, competitive basis to institutions of higher education or nonprofit organizations (or consortia

of such institutions or organizations) to carry out research on the cyber workforce.

(b) RESEARCH.—In carrying out research pursuant to subsection (a), the Director shall support research and development activities to—

(1) understand the current state of the cyber workforce, including factors that influence growth, retention, and development of that workforce;

(2) examine paths to entry and re-entry into the cyber workforce;

(3) understand trends of the cyber workforce, including demographic representation, educational and professional backgrounds present, competencies available, and factors that shape employee recruitment, development, and retention and how to increase the size, diversity, and capability of the cyber workforce;

(4) examine and evaluate training practices, models, programs, and technologies; and

(5) other closely related topics as the Director determines appropriate.

(c) REQUIREMENTS.—In carrying out the activities described in subsection (b), the Director shall—

(1) collaborate with the National Institute of Standards and Technology, including the National

Initiative for Cybersecurity Education, the Department of Homeland Security, the Department of Defense, the Office of Personnel Management, and other Federal departments and agencies, as appropriate;

(2) align with or build on the National Initiative on Cybersecurity Education Cybersecurity Workforce Framework wherever practicable and applicable;

(3) leverage the collective body of knowledge from existing cyber workforce development research and education activities; and

(4) engage with other Federal departments and agencies, research communities, and potential users of information produced under this subsection.

SEC. 10316. FEDERAL CYBER SCHOLARSHIP-FOR-SERVICE PROGRAM.

(a) SENSE OF CONGRESS.—It is the sense of Congress that—

(1) since cybersecurity risks are constant in the growing digital world, it is critical that the United States stay ahead of malicious cyber activity with a workforce that can safeguard our innovation, research, and work environments; and

(2) Federal investments in the Federal Cyber Scholarship-for-Service Program at the National Science Foundation play a critical role in preparing and sustaining a strong, talented, and much-needed national cybersecurity workforce and should be strengthened.

(b) IN GENERAL.—Section 302(b)(1) of the Cybersecurity Enhancement Act of 2014 (15 U.S.C. 7442(b)(1)) is amended by striking the semicolon at the end and inserting the following ''and cybersecurity-related aspects of other related fields as appropriate, including artificial intelligence, quantum computing and aerospace;''.

SEC. 10317. CYBERSECURITY WORKFORCE DATA INITIATIVE.

The Director, acting through the National Center for Science and Engineering Statistics established in section 505 of the America COMPETES Reauthorization Act of 2010 (42 U.S.C. 1862p) and in coordination with the Director of the National Institute of Standards and Technology and other appropriate Federal statistical agencies, shall establish a cybersecurity workforce data initiative that—

(1) assesses the feasibility of providing nationally representative estimates and statistical information on the cybersecurity workforce;

(2) utilizes the National Initiative for Cybersecurity Education (NICE) Cybersecurity Workforce Framework (NIST Special Publication 800–181), or other frameworks, as appropriate, to enable a consistent measurement of the cybersecurity workforce;

(3) utilizes and complements existing data on employer requirements and unfilled positions in the cybersecurity workforce;

(4) consults key stakeholders and the broader community of practice in cybersecurity workforce development to determine data requirements needed to strengthen the cybersecurity workforce;

(5) evaluates existing Federal survey data for information pertinent to developing national estimates of the cybersecurity workforce;

(6) evaluates administrative data and other supplementary data sources, as available, to describe and measure the cybersecurity workforce; and

(7) collects statistical data, to the greatest extent practicable, on credential attainment and employment outcomes information for the cybersecurity workforce.

SEC. 10318. MICROELECTRONICS WORKFORCE DEVELOPMENT ACTIVITIES.

(a) CREATING HELPFUL INITIATIVES TO PRODUCE PERSONNEL IN NEEDED GROWTH INDUSTRIES.—

(1) IN GENERAL.—The Director shall make awards to institutions of higher education, non-profit organizations, or consortia thereof, for research, development, and related activities to advance innovative approaches to developing, improving, and expanding evidence-based education and workforce development activities and learning experiences at all levels of education in fields and disciplines related to microelectronics.

(2) PURPOSES.—Activities carried out under this section shall be for the purpose of supporting the growth, retention, and development of a diverse and sustainable microelectronics workforce to meet the requirements of the programs established in section 9906(c)(2)(C) of the William M. (Mac) Thornberry National Defense Authorization Act for Fiscal Year 2021 in support of the evolving needs of industry, academia, government, and Federal laboratories.

(3) USES OF FUNDS.—Awards made under this section shall be used to support activities, such as—

(A) development of industry-oriented curricula and teaching modules for topics relevant

to microelectronics, including those that provide meaningful hands-on learning experiences;

(B) dissemination of materials developed in subparagraph (A), including through the creation and maintenance of a publicly-accessible database and online portal;

(C) development and implementation of training, research, and professional development programs for teachers, including innovative pre-service and in-service programs, in microelectronics and related fields;

(D) support for learning activities and experiences that provide physical, simulated, or remote access to training facilities and industry-standard processes and tools, including equipment and software for the design, development, manufacturing, and testing of microelectronics;

(E) increasing the integration of microelectronics content into STEM curricula at all education levels;

(F) Growing academic research capacity in microelectronics by incentivizing the hiring of faculty in fields critical to microelectronics;

(G) support for innovative industry pathway programs that connect high school, vocational, military, college, and graduate programs; and

(H) providing informal hands-on microelectronics learning opportunities for PreK-12 students in different learning environments, including competitions.

(4) ADVANCED MICROELECTRONICS TRAINEESHIPS.—

(A) IN GENERAL.—The Director shall make awards to institutions of higher education or nonprofit organizations (or consortia of such institutions and organizations) to establish traineeship programs for graduate students who pursue microelectronics research leading to a masters or doctorate degree by providing funding and other assistance, and by providing graduate students with opportunities for research experiences in government or industry related to the students' microelectronics studies.

(B) USE OF FUNDS.—Institutions of higher education or non-profit organizations (or consortia of such institutions and organizations)

shall use award funds provided under subparagraph (A) for the purposes of—

(i) paying tuition and fees, and providing stipends, for students receiving traineeships who are citizens, nationals, or aliens lawfully admitted for permanent residence;

(ii) facilitating opportunities for scientific internship programs for students receiving traineeships in microelectronics at private industry, nonprofit research institutions, or Federal laboratories; and

(iii) such other costs associated with the administration of the program.

(5) MICROELECTRONICS SKILLED TECHNICAL WORKFORCE PROGRAMS.—The Director shall make awards under the Scientific and Advanced-Technology Act of 1992 (42 U.S.C. 1862h-j) to support programs for skilled technical workers in STEM disciplines that are aligned with skilled workforce needs of the microelectronics industry and lead to an associate's degree, or equivalent certification, by providing funding and other assistance, including opportunities for internships and other hands-on expe-

riences in industry related to the students' microelectronics studies.

(6) MICROELECTRONICS RESEARCH EXPERIENCES THROUGH EXISTING PROGRAMS.—The Director shall seek to increase opportunities for microelectronics research for students and trainees at all levels by encouraging proposals in microelectronics through existing programs including—

(A) research experiences for undergraduates pursuant to section 514 of the America COMPETES Reauthorization Act of 2010 (42 U.S.C. 1862p–6);

(B) postdoctoral fellowship programs established pursuant to section 522 of the America COMPETES Act of 2010 (42 U.S.C. 1862p–11);

(C) graduate fellowships established pursuant to section 10 of the National Science Foundation Act of 1950 (42 U.S.C. 1869);

(D) informal STEM education programs established pursuant to section 3 of the STEM Education Act of 2015 (42 U.S.C. 1862q);

(E) the Robert Noyce Teacher Scholarship Program established pursuant to section 10 of

the National Science Foundation Authorization Act of 2002 (42 U.S.C. 1862n–1);

(F) major research instrumentation programs established pursuant to section 7036 of the America COMPETES Act (42 U.S.C. 1862o–14); and

(G) low-income scholarship program established pursuant to section 414(d) of the American Competitiveness and Workforce Improvement Act of 1998 (42 U.S.C. 1869c).

(7) INDUSTRY PARTNERSHIPS.—In carrying out the activities under this section, the Director shall encourage awardees to partner with industry and other private sector organizations to facilitate the expansion of workforce pipelines and enable access to industry-standard equipment and software for use in undergraduate and graduate microelectronics education programs.

(8) INTERAGENCY COORDINATION.—In carrying out activities under this section, the Director shall collaborate with the Subcommittee on Microelectronics Leadership of the National Science and Technology Council, established in subsection (a) of section 9906 of the William M. (Mac) Thornberry National Defense Authorization Act for Fiscal Year

2021 and the National Semiconductor Technology Center established in subsection (c) of section 9906 of such Act, and other relevant Federal agencies to maintain the effectiveness of microelectronics workforce development activities across the agencies.

(b) NATIONAL NETWORK FOR MICROELECTRONICS EDUCATION.—

(1) IN GENERAL.—The Director, in coordination with the Secretary of Commerce, shall on a competitive, merit-reviewed basis, make awards to institutions of higher education and non-profit organizations (or consortia of such institutions and organizations) to establish partnerships to enhance and broaden participation in microelectronics education.

(2) ACTIVITIES.—Awards made under this subsection shall be used for the following:

(A) To conduct training and education activities funded by awards under paragraph (1) and in coordination with the Network Coordination Hub established in paragraph (3), including curricula design, development, dissemination, and assessment, and the sharing of information and best practices across the network of awardees.

(B) To develop regional partnerships among associate-degree-granting colleges, bachelor-degree-granting institutions, workforce development programs, labor organizations, and industry to create a diverse national technical workforce trained in microelectronics and ensure education and training is meeting the evolving needs of industry.

(C) To develop local workforce pipelines that align with capacity investments made by industry and the Federal government, including vocational and high school training programs, community college degrees and certificates, veteran post service opportunities, and mentoring.

(D) To facilitate partnerships with employers, employer consortia or other private sector organizations that offer apprenticeships, internships, or applied learning experiences in the field of microelectronics.

(E) To develop shared infrastructure available to institutions of higher education, two-year colleges, and private organizations to enable experiential learning activities and provide physical or digital access to training facilities and industry-standard tools and processes.

(F) To create and disseminate public outreach to support awareness of microelectronics education and career opportunities, including through outreach to PreK–12 schools and STEM-related organizations.

(G) To collaborate and coordinate with industry and existing public and private organizations conducting microelectronics education and workforce development activities, as practicable.

(3) NETWORK COORDINATION HUB.—The Director shall make an award on a competitive, merit-reviewed basis to an institution of higher education or nonprofit organization (or a consortium thereof) to establish a national network of partnerships (referred to in this section as the ''National Network for Microelectronics Education'') to coordinate activities, best practice sharing, and access to facilities across the partnerships established in accordance with paragraph (1).

(4) INCENTIVIZING PARTICIPATION.—To the extent practicable, the Director shall encourage participation in the National Network for Microelectronics Education through the coordination of activities and distribution of awards described in subsection (a).

(5) PARTNERSHIPS.—The Director shall encourage the submission of proposals that are led by historically Black colleges and universities, Tribal Colleges or Universities, and minority-serving institutions or that include partnerships with or among such institutions to increase the recruitment of students from groups historically underrepresented in STEM to pursue graduate studies in microelectronics.

(6) OUTREACH.—In addition to any other requirements as determined appropriate by the Director, the Director shall require that proposals for awards under this section shall include a description of how the applicant will develop and implement outreach activities to increase the participation of women and other students from groups historically underrepresented in STEM.

(7) COORDINATION ACROSS FOUNDATION PROGRAMS.—In carrying out the activities under this section, the Director shall ensure awardees coordinate with, and avoid unnecessary duplication of, the activities carried out under this Section with the activities of the 21st Century Nanotechnology Research and Development Act (Public Law 108–153), the National Quantum Initiative Act (Public Law

115-368), and Division E of the William M. (Mac) Thornberry National Defense Authorization Act for Fiscal Year 2021, and other related programs, as appropriate.

(8) INTERAGENCY COORDINATION.—In carrying out activities under this section, the Director shall collaborate with the Subcommittee on Microelectronics Leadership of the National Science and Technology Council, established in subsection (a) of section 9906 of the William M. (Mac) Thornberry National Defense Authorization Act for Fiscal Year 2021 and the National Semiconductor Technology Center established in subsection (c) of section 9906 of such Act.

SEC. 10319. INCORPORATION OF ART AND DESIGN INTO CERTAIN STEM EDUCATION.

(a) NATIONAL SCIENCE FOUNDATION AUTHORIZATION ACT.—Section 9(a) of the National Science Foundation Authorization Act of 2002 (42 U.S.C. 1862n(a)) is amended in paragraph (3)—

(1) in subparagraph (M), by striking ''and'' at the end;

(2) by redesignating subparagraph (N) as subparagraph (O); and

(3) after subparagraph (M), by inserting the following new subparagraph:

"(N) developing science, technology, engineering, and mathematics educational curriculum that incorporates art and design to promote creativity and innovation; and".

(b) STEM EDUCATION ACT [LOG 169 H10304(K)].—Section 3 of the STEM Education Act of 2015 (42 U.S.C. 1862q) is amended—

(1) in subsection (a)—

(A) in paragraph (2), by striking "and" at the end;

(B) in paragraph (3), by striking the period and inserting "; and"; and

(C) by adding at the end the following:

"(4) the integration of art and design in STEM educational programs."; and

(2) in subsection (b)—

(A) in paragraph (3), by striking "and" at the end;

(B) in paragraph (4), by striking the period and inserting "; and"; and

(C) by adding at the end the following:

"(5) design and testing of programming that integrates art and design in STEM education to promote creativity and innovation.".

SEC. 10320. MANDATORY COST-SHARING.

(a) WAIVER.—The cost-sharing requirements under section 7036(c) of the America Creating Opportunities to Meaningfully Promote Excellence in Technology, Education, and Science Act (42 U.S.C. 1862o-14(c)) for the Major Research Instrumentation Program and under section 10A(i) of the National Science Foundation Authorization Act of 2002 (42 U.S.C. 1862n-1a(i)) for teaching fellowships administered within the Robert Noyce Teacher Scholarship Program are waived for a period of 5 years following the date of enactment of this Act.

(b) ASSESSMENT.—Not later than 5 years following the date of enactment of this Act, the Director shall submit to Congress an assessment, that includes feedback from the research community, of the impacts of the waivers provided under subsection (a), including—

(1) programmatic and scientific goals;

(2) institutional commitment and stewardship of Federal resources;

(3) institutional strategic planning and administrative burden;

(4) equity among recipient institutions; and

(5) recommendations for or against extending or making permanent such waivers.

SEC. 10321. PROGRAMS TO ADDRESS THE STEM WORKFORCE.

(a) IN GENERAL.—The Director shall issue undergraduate scholarships, including at community colleges, graduate fellowships and traineeships, postdoctoral awards, and, as appropriate, other awards, to address STEM workforce gaps, including for programs that recruit, retain, and advance students to a bachelor's degree in a STEM discipline concurrent with a secondary school diploma, such as through existing and new partnerships with State educational agencies.

(b) POSTDOCTORAL PROFESSIONAL DEVELOPMENT.—In carrying out this section, the Director shall encourage innovation in postdoctoral professional development, support the development and diversity of the STEM workforce, and study the impacts of such innovation and support. To do so, the Director may use postdoctoral awards established under subsection (a) or leveraged under subsection (d)(1) for fellowships or other temporary rotational postings of not more than 2 years. Such fellowships or temporary rotational postings shall be awarded—

(1) to qualified individuals who have a doctoral degree and received such degree not earlier than 5

years before the date that the fellowship or temporary rotational posting begins; and

(2) to carry out research at Federal, State, local, and Tribal government research facilities.

(c) DIRECT HIRE AUTHORITY.—

(1) IN GENERAL.—The head of any Federal agency may appoint, without regard to the provisions of subchapter I of chapter 33 of title 5, United States Code, other than sections 3303 and 3328 of that title, a qualified candidate described in paragraph (2) directly to a position in the competitive service with the Federal agency for which the candidate meets Office of Personnel Management qualification standards.

(2) FELLOWSHIP OR TEMPORARY ROTATIONAL POSTING.—Paragraph (1) applies with respect to a former recipient of an award under this subsection who—

(A) earned a doctoral degree in a STEM field from an institution of higher education; and

(B) successfully fulfilled the requirements of the fellowship or temporary rotational posting within a Federal agency.

(3) LIMITATION.—The direct hire authority under this subsection shall be exercised with respect to a specific qualified candidate not later than 2 years after the date that the candidate completed the requirements related to the fellowship or temporary rotational posting described under this subsection.

(d) EXISTING PROGRAMS.—In carrying out this section, the Director may leverage existing programs, including programs that issue—

(1) postdoctoral awards;

(2) graduate fellowships and traineeships, inclusive of the NSF Research Traineeships and fellowships awarded under the Graduate Research Fellowship Program;

(3) scholarships, research experiences, and internships, including—

(A) scholarships to attend community colleges; and

(B) research experiences and internships under sections 513, 514, and 515 of the America COMPETES Reauthorization Act of 2010 (42 U.S.C. 1862p–5; 1862p–6; 42 U.S.C. 1862p–7); and

(4) awards to institutions of higher education to enable the institutions to fund innovation in undergraduate and graduate education, increased educational capacity, and the development and establishment of new or specialized programs of study for graduate, undergraduate, or technical college students, and the evaluation of the effectiveness of the programs of study.

Subtitle C—Broadening Participation

SEC. 10321. PRESIDENTIAL AWARDS FOR EXCELLENCE IN MATHEMATICS AND SCIENCE.

(a) IN GENERAL.—Section 117(a) of the National Science Foundation Authorization Act of 1988 (42 U.S.C. 1881b(a)) is amended—

(1) in subparagraph (B)—

(A) by striking ''108'' and inserting ''110'';

(B) by striking clause (iv);

(C) in clause (v), by striking the period at the end and inserting ''; and'';

(D) by redesignating clauses (i), (ii), (iii), and (v) as subclauses (I), (II), (III), and (IV), respectively, and moving the margins of such

subclauses (as so redesignated) two ems to the right; and

(E) by striking ''In selecting teachers'' and all that follows through ''two teachers—'' and inserting the following:

''(C) In selecting teachers for an award authorized by this subsection, the President shall select—

''(i) at least two teachers—''; and

(2) in subparagraph (C), as so designated by paragraph (1)(E) of this subsection, by adding at the end the following:

''(ii) at least one teacher—

''(I) from the Commonwealth of the Northern Mariana Islands;

''(II) from American Samoa;

''(III) from the Virgin Islands of the United States; and

''(IV) from Guam.''.

(b) EFFECTIVE DATE.—The amendments made by subsection (a) shall apply with respect to awards made on or after the date of the enactment of this Act.

SEC. 10322. ROBERT NOYCE TEACHER SCHOLARSHIP PROGRAM UPDATE.

(a) SENSE OF CONGRESS.—It is the sense of Congress that over the next five years the Foundation should increase the number of scholarships awarded under the Robert Noyce Teacher Scholarship program established under section 10 of the National Science Foundation Authorization Act of 2002 (42 U.S.C. 1862n–1) by 50 percent.

(b) OUTREACH.—To increase the diversity of participants, the Director shall support symposia, forums, conferences, and other activities to expand and enhance outreach to—

(1) historically Black colleges and universities;

(2) Tribal Colleges or Universities;

(3) minority-serving institutions;

(4) institutions of higher education that are located near or serve rural communities, including EPSCoR institutions;

(5) labor organizations;

(6) emerging research institutions; and

(7) higher education programs that serve or support veterans.

SEC. 10323. NSF EDDIE BERNICE JOHNSON INCLUDES INITIATIVE.

(a) IN GENERAL.—The Director shall make awards, on a competitive basis, to institutions of higher education or non-profit organizations (or consortia of such institutions or organizations) to carry out a comprehensive national initiative to facilitate the development of networks and partnerships to build on and scale up effective practices in broadening participation in STEM studies and careers of groups historically underrepresented in such studies and careers.

(b) CHANGE OF NAME.—The initiative under subsection (a) shall be known as the ''Eddie Bernice Johnson Inclusion across the Nation of Communities of Learners of Underrepresented Discoverers in Engineering and Science Initiative'' or the ''Eddie Bernice Johnson INCLUDES Initiative''.

SEC. 10324. BROADENING PARTICIPATION ON MAJOR FACILITIES AWARDS.

The Director shall require organizations seeking a cooperative agreement for the management of the operations and maintenance of a Foundation project to demonstrate prior experience and current capabilities in or to have a plan for employing best practices in broadening participation in science and engineering and ensure implementation of such practices is considered in oversight of the award.

SEC. 10325. EXPANDING GEOGRAPHIC AND INSTITUTIONAL DIVERSITY IN RESEARCH.

(a) CONTINUING SUPPORT FOR EPSCoR .—

(1) SENSE OF CONGRESS.—It is the sense of Congress that—

(A) because maintaining the Nation's scientific and economic leadership requires the participation of talented individuals nationwide, EPSCoR investments into State research and education capacities are in the Federal interest and should be sustained;

(B) EPSCoR should maintain its experimental component by supporting innovative methods for improving research capacity and competitiveness; and

(C) the Director should carry out this subsection while maintaining or increasing proposal success rates at emerging research institutions throughout the United States and without precluding access to awards for such institutions.

(2) UPDATE OF EPSCOR.—Section 517(f)(2) of the America COMPETES Reauthorization Act of 2010 (42 U.S.C. 1862p–9(f)(2)) is amended—

(A) in subparagraph (A), by striking ''and'' at the end; and

(B) by adding at the end the following:

"(C) to increase the capacity of rural communities to provide quality STEM education and STEM workforce development programming to students, and teachers; and".

(3) GEOGRAPHIC DIVERSITY AND INCLUSION.—

(A) IN GENERAL.—To the maximum extent practicable, not less than—

(i) 15.5 percent in fiscal year 2023,

(ii) 16 percent in fiscal year 2024,

(iii) 16.5 percent in fiscal year 2025,

(iv) 17 percent in fiscal year 2026,

(v) 18 percent in fiscal year 2027,

(vi) 19 percent in fiscal year 2028, and

(vii) 20 percent in fiscal year 2029,

of the amounts appropriated to the Foundation for research and related activities, and science, mathematics, and engineering education and human resources programs and activities, excluding those amounts made available for polar research and operations support (and operations and maintenance of research facilities), shall be awarded to EPSCoR institutions.

(B) SCHOLARSHIPS.—To the maximum extent practicable, not less than—

(i) 16 percent in fiscal year 2023,

(ii) 18 percent in fiscal year 2024, and

(iii) 20 percent in each of fiscal years 2025 through 2029,

of the amounts appropriated to the Foundation for scholarships (including at community colleges), graduate fellowships and traineeships, and postdoctoral awards shall be used to support EPSCoR institutions.

(C) CONSIDERATIONS.—The Director shall consider prioritizing funding and activities that enable sustainable growth in the competitiveness of EPSCoR jurisdictions, including—

(i) infrastructure investments to build research capacity in EPSCoR jurisdictions;

(ii) scholarships, fellowships, and traineeships within new and existing programs, to promote the development of sustainable research and academic personnel;

(iii) partnerships between eligible organizations in EPSCoR and non-EPSCoR jurisdictions, to develop administrative, grant management, and proposal writing capabilities in EPSCoR jurisdictions;

(iv) capacity building activities for emerging research institutions, historically Black colleges and universities, Tribal Colleges or Universities, and minority serving institutions, consistent with this section and section 10524 of this division; and

(v) leveraging the Partnerships for Innovation program, as well as the Foundation coordination role in the Department of Commerce technology and innovation hub program under section 28 of the Stevenson-Wydler Technology Innovation Act of 1980 as added by section 10621, to build sustainable innovation ecosystems in EPSCoR jurisdictions.

(D) MERIT REVIEW.—The Director shall achieve the percentages specified in this paragraph to the maximum extent practicable, consistent with the National Science Foundation merit review process.

(E) CONSORTIA.—In the case of an award to a consortium, the Director may count the entire award toward meeting the funding requirements of subparagraph (A) if the lead entity of

the consortium is located in an EPSCoR institution

(F) ANNUAL REPORTING.—Beginning with the fiscal year 2023, the Director shall submit to Congress a report describing—

(i) the Foundation's implementation of this paragraph;

(ii) progress in building research capacity, including both infrastructure and personnel, in EPSCoR jurisdictions, including at historically Black colleges and universities, Tribal Colleges or Universities, minority-serving institutions, and emerging research institutions; and

(iii) if the Foundation does not meet the requirement described in subparagraph (A), an explanation relating thereto and a plan for compliance in the following fiscal year and remediation.

(G) ANALYSIS AND SUSTAINABILITY REPORT.—Not later than December 31, 2026, the Director shall submit to Congress a report containing an analysis of the impacts of the requirements under subparagraphs (A) and (B). The report shall include—

(i) an analysis of how the requirements under this paragraph affected the balance of total funding awarded by the Foundation to states and territories across the United States;

(ii) an analysis of any changes in award success and total funding awarded to Historically black colleges and universities, Tribal Colleges or Universities, minority-serving institutions, and emerging research institutions between the date of enactment and December 31, 2026;

(iii) an analysis of the gains in academic research capacity, quality, and competitiveness and in science and technology human resource development in EPSCoR jurisdictions made between the enactment of this Act and December 31, 2026;

(iv) an assessment of EPSCoR eligibility criteria and determination on whether new eligibility criteria should be developed based on the findings from clauses (i), (ii), and (iii); and

(v) a plan to sustain and grow improvements in research capacity and competitiveness in EPSCoR jurisdictions.

(H) EPSCoR ELIGIBILITY.—

(i) IN GENERAL.—The Director shall ensure eligibility for current EPSCoR jurisdictions for five years from the date of enactment of this Act, after which the Director shall determine whether new eligibility criteria should be developed based on the findings in the report required under subparagraph (G).

(ii) REPORT.—Not later than December 31, 2028, the Director shall report to Congress regarding any new eligibility criteria determined under clause (i), any changes to jurisdictional eligibility based on such criteria, and the necessity and practicality of continuing or modifying the requirement under subparagraph (A) given any such changes to eligibility. The report shall include an analysis of options to support regions in non-EPSCoR jurisdictions, adjacent to EPSCoR jurisdictions, that historically receive disproportionately low

levels of funding from the Foundation, including, if appropriate, options to expand the EPSCoR program or to establish new programs.

(b) FOSTERING STEM RESEARCH DIVERSITY AND CAPACITY PROGRAM.—

(1) IN GENERAL.—The Director shall make awards on a competitive, merit-reviewed basis to eligible institutions to implement and study innovative approaches for building research capacity in order to engage and retain students from a range of institutions and diverse backgrounds in STEM.

(2) ELIGIBLE INSTITUTION DEFINED.—In this subsection the term ''eligible institution'' means an institution of higher education that, according to the data published by the National Center for Science and Engineering Statistics, is not, on average, among the top 100 institutions in Federal research and development expenditures during the 3-year period prior to the year of the award.

(3) PURPOSE.—The activities under this subsection shall be focused on achieving simultaneous impacts at the student, faculty, and institutional levels by increasing the research capacity at eligible institutions and the number of undergraduate and

graduate students pursuing STEM degrees from eligible institutions.

(4) REQUIREMENTS.—In carrying out this program, the Director shall—

(A) require eligible institutions seeking funding under this subsection to submit an application to the Director at such time, in such manner, containing such information and assurances as the Director may require. The application shall include, at a minimum a description of how the eligible institution plans to sustain the proposed activities beyond the duration of the award;

(B) require applicants to identify disciplines and focus areas in which the eligible institution can excel, and explain how the applicant will use the award to build capacity to bolster the institutional research competitiveness of eligible entities to support awards made by the Foundation and increase regional and national capacity in STEM;

(C) require the awards funded under this subsection to support research and related activities, which may include—

(i) development or expansion of research programs in disciplines and focus areas in subparagraph (B);

(ii) faculty recruitment and professional development in disciplines and focus areas in subparagraph (B), including for early-career researchers;

(iii) stipends for undergraduate and graduate students participating in research in disciplines and focus areas in subparagraph (B);

(iv) acquisition of instrumentation necessary to build research capacity at an eligible institution in disciplines and focus areas in subparagraph (B);

(v) an assessment of capacity-building and research infrastructure needs;

(vi) administrative research development support; and

(vii) other activities necessary to build research capacity; and

(D) require that no eligible institution should receive more than $10,000,000 in any single year of funds made available under this section.

(5) ADDITIONAL CONSIDERATIONS.—In making awards under this subsection, the Director may also consider—

(A) the extent to which the applicant will support students from diverse backgrounds, including first-generation undergraduate students;

(B) the geographic and institutional diversity of the applying institutions; and

(C) how the applicants can leverage public-private partnerships and existing partnerships with Federal Research Agencies.

(6) DUPLICATION.—The Director shall ensure the awards made under this subsection are complementary and not duplicative of existing programs.

(7) REPORT.—The Director shall submit a report to Congress after the third year of the program that includes—

(A) an assessment of the effectiveness of the program for growing the geographic and institutional diversity of institutions of higher education receiving research awards from the Foundation;

(B) an assessment of the quality, quantity, and geographic and institutional diversity of in-

stitutions of higher education conducting Foundation- sponsored research since the establishment of the program in this subsection;

(C) an assessment of the quantity and diversity of undergraduate and graduate students graduating from eligible institutions with STEM degrees; and

(D) statistical summary data on the program, including the geographic and institutional allocation of award funding, the number and diversity of supported graduate and undergraduate students, and how it contributes to capacity building at eligible entities.

(8) AUTHORIZATION OF APPROPRIATIONS.—There is authorized to be appropriated to the Director $150,000,000 for each of the fiscal years 2023 through 2027 to carry out the activities under this subsection.

(c) PARTNERSHIPS WITH EMERGING RESEARCH INSTITUTIONS.—

(1) IN GENERAL.—The Director shall establish a five-year pilot program for awards to research partnerships that involve emerging research institutions and may involve institutions classified as very high research activity by the Carnegie Classification

of Institutions of Higher Education at the time of application.

(2) REQUIREMENTS.—In carrying out this program, the Director shall—

(A) require that each proposal submitted by a multi-institution collaboration for an award, including those under subtitle G of this title, that exceeds $1,000,000, as appropriate, specify how the applicants will support substantive, meaningful, sustainable, and mutually beneficial partnerships with one or more emerging research institutions;

(B) require recipients funded under this subsection to direct no less than 35 percent of the total award to one or more emerging research institutions;

(C) require recipients funded under this subsection to report on the partnership activities as part of the annual reporting requirements of the Foundation; and

(D) solicit feedback on the partnership directly from partner emerging research institutions, in such form as the Director deems appropriate.

(3) CAPACITY BUILDING.—Funds awarded to emerging research institutions under this subsection may be used to build research capacity, including through support for faculty salaries and training, field and laboratory research experiences for undergraduate and graduate students, and maintenance and repair of research equipment and instrumentation.

(4) REPORT.—The Director shall submit a report to Congress after the third year of the pilot program that includes—

(A) an assessment, drawing on feedback from the research community and other sources of information, of the effectiveness of the pilot program for improving the quality of partnerships with emerging research institutions; and

(B) if deemed effective, a plan for permanent implementation of the pilot program.

SEC. 10326. DIVERSITY IN TECH RESEARCH.

The Director shall make awards, on a competitive basis, to institutions of higher education or nonprofit organizations (or consortia of such institutions or organizations) to support basic, applied, and use-inspired research that yields a scientific evidence base for improving the design and emergence, development and deployment, and

management and ultimate effectiveness of entities involved in technology research, including research related to diversity and inclusion in the technology sector.

SEC. 10327. CHIEF DIVERSITY OFFICER OF THE NSF.

(a) CHIEF DIVERSITY OFFICER.—

(1) APPOINTMENT.—The Director shall appoint a senior agency official within the Office of the Director as a Chief Diversity Officer.

(2) QUALIFICATIONS.—The Chief Diversity Officer shall have significant experience, within the Federal Government and the science community, with diversity- and inclusion-related matters, including—

(A) civil rights compliance;

(B) harassment policy, reviews, and investigations;

(C) equal employment opportunity; and

(D) disability policy.

(b) DUTIES.—The Chief Diversity Officer is responsible for providing advice on policy, oversight, guidance, and coordination with respect to matters of the Foundation related to diversity and inclusion, including ensuring the geographic diversity of the Foundation programs. Other duties may include—

(1) establishing and maintaining a strategic plan that publicly states a diversity definition, vision, and goals for the Foundation;

(2) defining a set of strategic metrics that are—

(A) directly linked to key organizational priorities and goals;

(B) actionable; and

(C) actively used to implement the strategic plan under paragraph (1);

(3) advising in the establishment of a strategic plan for diverse participation by individuals and institutions of higher education, including community colleges, historically Black colleges and universities, Tribal Colleges or Universities, minority serving institutions, institutions of higher education with an established STEM capacity building program focused on Native Hawaiians or Alaska Natives, and EPSCoR institutions);

(4) advising in the establishment of a strategic plan for outreach to, and recruiting from, untapped locations and underrepresented populations;

(5) advising on a diversity and inclusion strategy for the Foundation's portfolio of PreK–12 STEM education focused programs and activities,

including goals for addressing barriers to participation;

(6) advising on the application of the Foundation's broader impacts review criterion; and

(7) performing such additional duties and exercise such powers as the Director may prescribe.

(c) AUTHORIZATION OF APPROPRIATIONS.—To carry out this section, there are authorized to be appropriated $5,000,000 for each of fiscal years 2023 through 2027.

SEC. 10328. RESEARCH AND DISSEMINATION TO INCREASE THE PARTICIPATION OF WOMEN AND UNDERREPRESENTED MINORITIES IN STEM FIELDS.

(a) IN GENERAL.—The Director shall make awards on a competitive, merit-reviewed basis, to institutions of higher education or non-profit organizations (or consortia of such institutions or organizations), to enable such entities to increase the participation of women and underrepresented minorities in STEM studies and careers.

(b) USE OF FUNDS.—An eligible entity that receives an award under this subsection shall use such award funds to carry out one or more of the following activities designed to increase the participation of women or minorities historically underrepresented in STEM, or both:

(1) Research to analyze the record-level data collected under sections 10502 and 10504, con-

sistent with policies to ensure the privacy of individuals identifiable by such data.

(2) Research to study best practices for work-life accommodation.

(3) Research to study the impact of policies and practices that are implemented or are otherwise consistent with the purposes of this section.

(4) Mentoring programs that facilitate engagement of STEM professionals with students.

(5) Research experiences for undergraduate and graduate students in STEM fields.

(6) Outreach to elementary school and secondary school students to provide opportunities to increase their exposure to STEM fields.

(c) DISSEMINATION ACTIVITIES.—The Director shall carry out dissemination activities consistent with the purposes of this section, including—

(1) collaboration with other Federal research agencies and professional associations to exchange best practices, harmonize work-life accommodation policies and practices, and overcoming common barriers to work-life accommodation; and

(2) collaboration with institutions of higher education in order to clarify and catalyze the adop-

tion of a coherent and consistent set of work-life accommodation policies and practices.

(d) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to carry out this section $5,000,000 for each of fiscal years 2023, 2024, 2025, 2026, and 2027.

SEC. 10329. ACTIVITIES TO EXPAND STEM OPPORTUNITIES.

(a) NATIONAL SCIENCE FOUNDATION SUPPORT FOR INCREASING DIVERSITY AMONG STEM FACULTY AT INSTITUTIONS OF HIGHER EDUCATION.—Section 305 of the American Innovation and Competitiveness Act (42 U.S.C. 1862s–5) is amended—

(1) by redesignating subsections (e) and (f) as subsections (g) and (h), respectively; and

(2) by inserting after subsection (d) the following:

"(e) SUPPORT FOR INCREASING DIVERSITY AMONG STEM FACULTY AT INSTITUTIONS OF HIGHER EDUCATION.—

"(1) IN GENERAL.—The Director of the Foundation shall make awards to institutions of higher education (or consortia thereof) for the development and assessment of innovative reform efforts designed to increase the recruitment, retention, and advancement of individuals from underrepresented minority

groups in academic STEM careers, which may include implementing or expanding successful evidence-based practices.

"(2) MERIT REVIEW; COMPETITION.—Awards shall be made under this subsection on a merit-reviewed, competitive basis.

"(3) USE OF FUNDS.—Activities supported by awards under this subsection may include—

"(A) institutional assessment activities, such as data analyses and policy review, in order to identify and address specific issues in the recruitment, retention, and advancement of faculty members from underrepresented minority groups;

"(B) assessments of distribution of mentoring and advising responsibilities among faculty, particularly for faculty from underrepresented minority groups, that may detract from time spent on research, publishing papers, and other activities required to achieve tenure status or promotion (or equivalents for non-tenure track faculty) and run a productive research program;

"(C) development and assessment of training courses for administrators and search com-

mittee members designed to ensure unbiased evaluation of candidates from underrepresented minority groups;

"(D) development and hosting of intra- or inter-institutional workshops to propagate best practices in recruiting, retaining, and advancing faculty members from underrepresented minority groups;

"(E) professional development opportunities for faculty members from underrepresented minority groups;

"(F) activities aimed at making undergraduate STEM students from underrepresented minority groups aware of opportunities for academic careers in STEM fields; and

"(G) activities to identify and engage exceptional graduate students and postdoctoral researchers from underrepresented minority groups at various stages of their studies and to encourage them to enter academic careers.

"(4) SELECTION PROCESS.—

"(A) APPLICATION.—An institution of higher education (or a consortium of such institutions) seeking funding under this subsection shall submit an application to the Director of

the Foundation at such time, in such manner, and containing such information and assurances as such Director may require. The application shall include, at a minimum, a description of—

"(i) the reform effort that is being proposed for implementation by the institution of higher education;

"(ii) any available evidence of specific difficulties in the recruitment, retention, and advancement of faculty members from underrepresented minority groups in STEM academic careers within the institution of higher education submitting an application, and how the proposed reform effort would address such issues;

"(iii) support for the proposed reform effort by administrators of the institution, which may include details on previous or ongoing reform efforts;

"(iv) how the proposed reform effort may contribute to change in institutional culture and policy such that a greater value is placed on the recruitment, reten-

tion, and advancement of faculty members from underrepresented minority groups;

"(v) how the institution of higher education submitting an application plans to sustain the proposed reform effort beyond the duration of the award, if the effort proved successful; and

"(vi) how the success and effectiveness of the proposed reform effort will be evaluated and assessed in order to contribute to the national knowledge base about models for catalyzing institutional change.

"(B) AWARD DISTRIBUTION.—The Director of the Foundation shall ensure, to the extent practicable, that awards under this section are made to a variety of types of institutions of higher education.

"(5) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to carry out this subsection $8,000,000 for each of fiscal years 2023 through 2027.".

(b) NATIONAL SCIENCE FOUNDATION SUPPORT FOR BROADENING PARTICIPATION IN UNDERGRADUATE STEM EDUCATION.—Section 305 of the American Innovation

and Competitiveness Act (42 U.S.C. 1862s–5), as amended by subsection (b), is further amended by inserting after subsection (e) the following:

"(f) SUPPORT FOR BROADENING PARTICIPATION IN UNDERGRADUATE STEM EDUCATION.—

"(1) IN GENERAL.—The Director of the Foundation shall make awards to institutions of higher education (or a consortium of such institutions) to implement or expand research-based reforms in undergraduate STEM education for the purpose of recruiting and retaining students from minority groups who are underrepresented in STEM fields.

"(2) MERIT REVIEW; COMPETITION.—Awards shall be made under this subsection on a merit-reviewed, competitive basis.

"(3) USE OF FUNDS.—Activities supported by awards under this subsection may include—

"(A) implementation or expansion of innovative, research-based approaches to broaden participation of underrepresented minority groups in STEM fields;

"(B) implementation or expansion of successful, research-based bridge, cohort, tutoring, or mentoring programs, including those involving community colleges and technical schools,

designed to enhance the recruitment and retention of students from underrepresented minority groups in STEM fields;

"(C) implementation or expansion of outreach programs linking institutions of higher education and PreK–12 school systems in order to heighten awareness among precollege students from underrepresented minority groups of opportunities in college-level STEM fields and STEM careers;

"(D) implementation or expansion of faculty development programs focused on improving retention of undergraduate STEM students from underrepresented minority groups;

"(E) implementation or expansion of mechanisms designed to recognize and reward faculty members who demonstrate a commitment to increasing the participation of students from underrepresented minority groups in STEM fields;

"(F) expansion of successful reforms aimed at increasing the number of STEM students from underrepresented minority groups beyond a single course or group of courses to achieve reform within an entire academic unit,

or expansion of successful reform efforts beyond a single academic unit or field to other STEM academic units or fields within an institution of higher education;

"(G) expansion of opportunities for students from underrepresented minority groups to conduct STEM research in industry, at Federal labs, and at international research institutions or research sites;

"(H) provision of stipends for students from underrepresented minority groups participating in research;

"(I) development of research collaborations between research-intensive universities and primarily undergraduate historically Black colleges and universities, Tribal Colleges or Universities, and minority serving institutions;

"(J) support for graduate students and postdoctoral fellows from underrepresented minority groups to participate in instructional or assessment activities at primarily undergraduate institutions, including primarily undergraduate historically Black colleges and universities, Tribal Colleges or Universities, and

minority serving institutions and 2-year institutions of higher education; and

"(K) other activities consistent with paragraph (1), as determined by the Director of the Foundation.

"(4) SELECTION PROCESS.—

"(A) APPLICATION.—An institution of higher education (or a consortium thereof) seeking an award under this subsection shall submit an application to the Director of the Foundation at such time, in such manner, and containing such information and assurances as such Director may require. The application shall include, at a minimum—

"(i) a description of the proposed reform effort;

"(ii) a description of the research findings that will serve as the basis for the proposed reform effort or, in the case of applications that propose an expansion of a previously implemented reform, a description of the previously implemented reform effort, including data about the recruitment, retention, and academic achievement

of students from underrepresented minority groups;

"(iii) evidence of an institutional commitment to, and support for, the proposed reform effort, including a long-term commitment to implement successful strategies from the current reform beyond the academic unit or units included in the award proposal;

"(iv) a description of how the proposed reform effort may contribute to, or in the case of applications that propose an expansion of a previously implemented reforms has contributed to, change in institutional culture and policy such that a greater value is placed on the recruitment, retention and academic achievement of students from underrepresented minority groups;

"(v) a description of existing or planned institutional policies and practices regarding faculty hiring, promotion, tenure, and teaching assignment that reward faculty contributions to improving the edu-

cation of students from underrepresented minority groups in STEM; and

"(vi) how the success and effectiveness of the proposed reform effort will be evaluated and assessed in order to contribute to the national knowledge base about models for catalyzing institutional change,

"(B) AWARD DISTRIBUTION.—The Director of the Foundation shall ensure, to the extent practicable, that awards under this subsection are made to a variety of types of institutions of higher education, including historically Black colleges and universities, Tribal Colleges or Universities, minority serving institutions, and 2-year institutions of higher education.

"(5) EDUCATION RESEARCH.—

"(A) IN GENERAL.—All awards made under this subsection shall include an education research component that will support the design and implementation of a system for data collection and evaluation of proposed reform efforts in order to build the knowledge base on promising models for increasing recruitment and retention of students from underrepresented mi-

nority groups in STEM education at the undergraduate level across a diverse set of institutions.

"(B) DISSEMINATION.—The Director of the Foundation shall coordinate with the Committee on STEM Education of the National Science and Technology Council in disseminating the results of the research under this paragraph to ensure that best practices in broadening participation in STEM education at the undergraduate level are made readily available to all institutions of higher education, other Federal agencies that support STEM programs, non-Federal funders of STEM education, and the general public.

"(6) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to carry out this subsection $15,000,000 for each of fiscal years 2023 through 2027.".

SEC. 10330. INTRAMURAL EMERGING RESEARCH INSTITUTIONS PILOT PROGRAM.

(a) ESTABLISHMENT.—The Director may conduct multiple pilot programs, including through existing programs or other programs authorized in this division or division A, within the Foundation to expand the number of

institutions of higher education (including such institutions that are community colleges), and other eligible entities that the Director determines appropriate, that are able to successfully compete for Foundation awards.

(b) COMPONENTS.—Pilot programs under this section may include—

(1) a mentorship program;

(2) award application writing technical assistance;

(3) targeted outreach, including to a historically Black college or university, a Tribal college or university, or a minority-serving institution (including a Hispanic-serving institution or an institution of higher education with an established STEM capacity building program focused on Native Hawaiians or Alaska Natives);

(4) programmatic support or solutions for institutions or entities that do not have an experienced award management office;

(5) an increase in the number of award proposal reviewers from institutions of higher education that have not traditionally received funds from the Foundation; or

(6) an increase of the term and funding, for a period of 3 years or less, as appropriate, for awards

with a first-time principal investigator, when paired with regular mentoring on the administrative aspects of award management.

(c) LIMITATION.—As appropriate, each pilot program under this section shall work to reduce administrative burdens for recipients and award personnel.

(d) AGENCY-WIDE PROGRAMS.—Not later than 5 years after the date of enactment of this Act, the Director shall—

(1) review the results of the pilot programs under this section; and

(2) develop agencywide best practices from the pilot programs for implementation across the Foundation, in order to fulfill the requirement under section 3(e) of the National Science Foundation Act of 1950 (42 U.S.C. 1862(e)).

Subtitle D—NSF Research Security

SEC. 10331. OFFICE OF RESEARCH SECURITY AND POLICY.

The Director shall maintain a Research Security and Policy office within the Office of the Director with not fewer than four full-time equivalent positions, in addition to the Chief of Research Security established pursuant to section 10332. The functions of the Research Security and Policy office shall be to coordinate all research security policy issues across the Foundation, including by—

(1) consulting and coordinating with the Foundation Office of Inspector General, with other Federal research agencies, and intelligence and law enforcement agencies, and the National Science and Technology Council, as appropriate, in accordance with the authority provided under section 1746 of the National Defense Authorization Act for Fiscal Year 2020 (Public Law 116–92; 42 U.S.C. 6601 note), to identify and address potential security risks that threaten research integrity and other risks to the research enterprise and to develop research security policy and best practices, taking into account the policy guidelines to be issued by the Director of the Office of Science and Technology Policy under section 10631 of this division;

(2) serving as a resource at the Foundation for all issues related to the security and integrity of the conduct of Foundation-supported research;

(3) conducting outreach and education activities for recipients on research policies and potential security risks and on policies and activities to protect intellectual property and information about critical technologies relevant to national security, consistent with the controls relevant to the grant or award;

(4) educating Foundation program managers and other directorate staff on evaluating Foundation awards and recipients for potential security risks;

(5) communicating reporting and disclosure requirements to recipients and applicants for funding;

(6) performing risk assessments, in consultation, as appropriate, with other Federal agencies, of Foundation proposals and awards using analytical tools to assess nondisclosures of required information;

(7) establishing policies and procedures for identifying, communicating, and addressing security risks that threaten the integrity of Foundation-supported research and development, working in consultation, as appropriate, with other Federal agencies, to ensure compliance with National Security Presidential Memorandum–33 (relating to strengthening protections of United States Government-supported research and development against foreign government interference and exploitation) or a successor policy document; and

(8) in accordance with relevant policies of the agency, conducting or facilitating due diligence with regard to applications for research and development

awards from the Foundation prior to making such awards.

SEC. 10332. CHIEF OF RESEARCH SECURITY.

The Director shall appoint a senior agency official within the Office of the Director as a Chief of Research Security, whose primary responsibility shall be to manage the office established under section 10331.

SEC. 10333. REPORTING TO CONGRESS.

(a) REPORT ON RESOURCE NEEDS.—Not later than 180 days after the date of the enactment of this Act, the Director shall provide a report to the Committee on Science, Space, and Technology of the House of Representatives, the Committee on Commerce, Science, and Transportation of the Senate, the Committee on Appropriations of the House of Representatives, and the Committee on Appropriations of the Senate on the resources and the number of full time employees needed to carry out the functions of the office established in section 10331.

(b) ANNUAL REPORT ON OFFICE ACTIVITIES.—

(1) IN GENERAL.—Not later than one year after the date of the enactment of this Act and annually thereafter, the Director shall submit to Congress a report on the activities carried out by the Office of Research Security, detailing—

(A) a description of the activities conducted by the Office, including administrative actions taken;

(B) such recommendations as the Director may have for legislative or administrative action relating to improving research security;

(C) identification and discussion of the gaps in legal authorities that need to be improved to enhance the security of institutions of higher education performing research supported by the Foundation; and

(D) information on Foundation Inspector General cases, as appropriate, relating to undue influence and security threats to research and development activities funded by the Foundation, including theft of property or intellectual property relating to a project funded by the Foundation at an institution of higher education.

(2) FORM.—The report submitted under paragraph (1) shall be submitted in both unclassified and classified formats, as appropriate.

SEC. 10334. ONLINE RESOURCE.

The Director shall develop an online resource hosted on the Foundation's website containing up-to-date infor-

mation, tailored for institutions and individual researchers, including—

(1) an explanation of Foundation research security policies;

(2) unclassified guidance on potential security risks that threaten research integrity and other risks to the research enterprise;

(3) examples of beneficial international collaborations and how such collaborations differ from foreign government interference efforts that threaten research integrity;

(4) best practices for mitigating security risks that threaten research integrity; and

(5) additional reference materials, including tools that assist organizations seeking Foundation funding and awardees in information disclosure to the Foundation.

SEC. 10335. RESEARCH AWARDS.

The Director shall continue to make awards, on a competitive basis, to institutions of higher education or non-profit organizations (or consortia of such institutions or organizations) to support research on the conduct of research and the research environment, including research on research misconduct or breaches of research integrity and detrimental research practices.

SEC. 10336. AUTHORITIES.

In addition to existing authorities for preventing waste, fraud, abuse, and mismanagement of Federal funds, the Director, acting through the Office of Research Security and Policy and in coordination with the Foundation's Office of Inspector General, shall have the authority to conduct risk assessments, including through the use of open-source analysis and analytical tools, of research and development award applications and disclosures to the Foundation.

SEC. 10337. RESPONSIBLE CONDUCT IN RESEARCH TRAINING.

Section 7009 of the America Creating Opportunities to Meaningfully Promote Excellence in Technology, Education, and Science Act (42 U.S.C. 1862o–1) is amended by—

(1) striking ''and postdoctoral researchers'' and inserting ''postdoctoral researchers, faculty, and other senior personnel''; and

(2) by striking the period and inserting the following: '', including—

''(1) mentor training and mentorship;

''(2) training to raise awareness of potential research security threats; and

''(3) Federal export control, disclosure, and reporting requirements.''.

SEC. 10338. RESEARCH SECURITY AND INTEGRITY INFORMATION SHARING ANALYSIS ORGANIZATION.

(a) ESTABLISHMENT.—The Director shall enter into an agreement with a qualified independent organization to establish a research security and integrity information sharing analysis organization (referred to in this section as the ''RSI-ISAO''), which shall include members described in subsection (d) and carry out the duties described in subsection (b).

(b) DUTIES.—The RSI-ISAO shall—

(1) serve as a clearinghouse for information to help enable the members and other entities in the research community to understand the context of their research and identify improper or illegal efforts by foreign entities to obtain research results, know how, materials, and intellectual property;

(2) develop a set of standard risk assessment frameworks and best practices, relevant to the research community, to assess research security risks in different contexts;

(3) share information concerning security threats and lessons learned from protection and response efforts through forums and other forms of communication;

(4) provide timely reports on research security risks to provide situational awareness tailored to the research and STEM education community;

(5) provide training and support, including through webinars, for relevant faculty and staff employed by institutions of higher education on topics relevant to research security risks and response;

(6) enable standardized information gathering and data compilation, storage, and analysis for compiled incident reports;

(7) support analysis of patterns of risk and identification of bad actors and enhance the ability of members to prevent and respond to research security risks; and

(8) take other appropriate steps to enhance research security.

(c) FUNDING.—The Foundation may provide initial funds toward the RSI-ISAO but shall seek to have the fees authorized in subsection (d)(2) cover the costs of operations at the earliest practicable time.

(d) MEMBERSHIP.—

(1) IN GENERAL.—The RSI-ISAO shall serve and include members representing institutions of higher education, nonprofit research institutions, and small and medium-sized businesses.

(2) FEES.—As soon as practicable, members of the RSI-ISAO shall be charged an annual rate to enable the RSI-ISAO to cover its costs. Rates shall be set on a sliding scale based on research and development expenditures to ensure that membership is accessible to a diverse community of stakeholders and ensure broad participation. The RSI-ISAO shall develop a plan to sustain the RSI-ISAO without Federal funding, as practicable.

(e) BOARD OF DIRECTORS.—The RSI-ISAO may establish a board of directors to provide guidance for policies, legal issues, and plans and strategies of the entity's operations. The board shall include a diverse group of stakeholders representing the research community, including academia, industry, and experienced research security administrators.

(f) STAKEHOLDER ENGAGEMENT.—In establishing the RSI-ISAO under this section, the Director shall take necessary steps to ensure the services provided are aligned with the needs of the research community, including by—

(1) convening a series of workshops or other multi-stakeholder events; or

(2) publishing a description of the services the RSI-ISAO intends to provide and the requirements for membership in the Federal Register and provide

an opportunity for submission of public comments for a period of not less than 60 days.

SEC. 10339. PLAN WITH RESPECT TO CONTROLLED INFORMATION AND BACKGROUND SCREENING.

(a) IN GENERAL.—Not later than 180 days after the enactment of this Act, the Director, in consultation with the Director of National Intelligence and, as appropriate, other Federal agencies, shall develop a plan to—

(1) identify research areas supported by the Foundation, including in the key technology focus areas, that may involve access to controlled unclassified or classified information, including in the key technology focus areas; and

(2) exercise due diligence in granting access, as appropriate, to the CUI or classified information identified under paragraph (1) to individuals working on such research who are employees of the Foundation or covered individuals on research and development awards funded by the Foundation.

(b) DEFINITIONS.—In this section:

(1) CLASSIFIED INFORMATION.—The term ''classified information'' means any information that has been determined pursuant to Executive Order 13526, any predecessor or successor order, or sections 1-274, 275-321, and 1001-3115 of the Atomic

Energy Act of 1954 (42 U.S.C. 2011-2021, 2022-2286i, 2296a-2297h-13) to require protection against unauthorized disclosure and that is so designated.

(2) CONTROLLED UNCLASSIFIED INFORMATION.—The term ''controlled unclassified information'' or ''CUI'' means information described as ''Controlled Unclassified Information'' under Executive Order 13556 or any successor order, to require protection against unauthorized disclosure and that is so designated.

SEC. 10339A. FOUNDATION FUNDING TO INSTITUTIONS HOSTING OR SUPPORTING CONFUCIUS INSTITUTES.

(a) CONFUCIUS INSTITUTE DEFINED.—In this section the term ''Confucius Institute'' means a cultural institute established as a partnership between a United States institution of higher education and a Chinese institution of higher education to promote and teach Chinese language and culture that is funded, directly or indirectly, by the Government of the People's Republic of China.

(b) RESTRICTIONS OF CONFUCIUS INSTITUTES.—Except as provided in subsection (d), none of the funds made available to the Foundation under this division or division A, or an amendment made by this division or division A,

may be obligated or expended to an institution of higher education that maintains a contract or agreement between the institution and a Confucius Institute, unless the Director, after consultation with the National Academies, determines such a waiver is appropriate in accordance with subsection (c).

(c) WAIVER.—The Director, after consultation with the National Academies, may issue a waiver for an institution of higher education that maintains a contract or agreement between the institution and a Confucius Institute if such contract or agreement includes clear provisions that—

(1) protect academic freedom at the institution;

(2) prohibit the application of any foreign law on any campus of the institution;

(3) grant full managerial authority of the Confucius Institute to the institution, including full control over what is being taught, the activities carried out, the research awards that are made, and who is employed at the Confucius Institute; and

(4) prohibit co-location with the institution's Chinese language, history, and cultural programs and require separate promotional materials.

(d) SPECIAL RULE.—

(1) IN GENERAL.—Notwithstanding any other provision of this section, this section shall not apply to an institution of higher education if that institution has fulfilled the requirements for a waiver from the Department of Defense as described under section 1062 of the National Defense Authorization Act for Fiscal Year 2021 (Public Law 116–283).

(2) EXCEPTION.—Notwithstanding any other provision of this section, the prohibition under subsection (b) shall not apply to amounts provided to students as educational assistance.

(e) EFFECTIVE DATE.—The limitation under subsection (b) shall apply with respect to the first fiscal year that begins after the date that is two years after the date of the enactment of this Act and to any subsequent fiscal year subject to subsection (f).

(f) SUNSET.—This section shall cease to be effective on the date that is five years after the date of the enactment of this Act.

SEC. 10339B. FOREIGN FINANCIAL SUPPORT.

(a) IN GENERAL.—The Director shall request, on an annual basis, from a recipient institution of higher education a disclosure, in the form of a summary document, from the institution, a foundation of the institution, and related entities such as any educational, cultural, or lan-

guage entity, of the current financial support, the value of which is $50,000 or more, including gifts and contracts, received directly or indirectly from a foreign source (as such term is defined in section 117 of the Higher Education Act of 1965 (20 U.S.C. 1011f(h)(2))) associated with a foreign country of concern.

(b) RECORDS.—Each disclosure to the Director under this section shall be made on the condition that the institution will maintain a true copy of the relevant records subject to the disclosure requirement until the latest of—

(1) the date that is four years after the date of the agreement;

(2) the date on which the agreement terminates; or

(3) the last day of any period that applicable State public record law requires a true copy of such agreement to be maintained.

(c) DOCUMENTATION.—Upon review of the disclosures under this section, the Director may request that a recipient institution provide true copies of any contracts, agreements, or documentation of financial transactions associated with disclosures made under this section.

(d) OFFICE OF THE INSPECTOR GENERAL.—The Director, acting through the Office of Research Security and

Policy in coordination with the Foundation's Office of Inspector General and in consultation with the recipient institution, may reduce the award funding amount or suspend or terminate the award if the Director determines—

(1) such institution fails to comply with the records retention requirement in subsection (b) or fails to provide information requested under this section; or

(2) the Chief of Research Security determines the disclosures under this section indicate a threat to research security.

SEC. 10339C. AUTHORIZATION OF APPROPRIATIONS.

From any amounts appropriated for the Foundation for each of fiscal years 2023 through 2027, the Director shall allocate $6,000,000 to carry out the activities under this subtitle.

Subtitle E—Fundamental Research

SEC. 10341. BROADER IMPACTS.

(a) ASSESSMENT.—Not later than 120 days after the date of enactment of this Act, the Director shall enter into an agreement with a qualified independent organization to assess how the Broader Impacts review criterion is applied across the Foundation and make recommendations for improving the effectiveness for meeting the goals established in section 526 of the America Creating Opportu-

nities to Meaningfully Promote Excellence in Technology, Education, and Science Reauthorization Act of 2010 (42 U.S.C. 1862p–14).

(b) ACTIVITIES.—The Director shall make awards on a competitive basis, to institutions of higher education or non-profit organizations (or consortia of such institutions or organizations) to support activities to increase the efficiency, effectiveness, and availability of resources for implementing the Broader Impacts review criterion, including—

(1) training and workshops for program officers, merit review panelists, award office administrators, faculty, and students to improve understanding of the goals and the full range of potential broader impacts available to researchers to satisfy this criterion;

(2) repositories and clearinghouses for sharing best practices and facilitating collaboration; and

(3) tools for evaluating and documenting societal impacts of research.

SEC. 10342. SENSE OF CONGRESS.

It is the sense of Congress that the Director should continue to identify opportunities to reduce the administrative burden on researchers.

SEC. 10343. RESEARCH ETHICS.

(a) SENSE OF CONGRESS.—It is the sense of Congress that—

(1) a number of emerging areas of research have potential ethical, social, safety, and security implications that might be apparent as early as the basic research stage;

(2) the incorporation of ethical, social, safety, and security considerations into the research design and review process for Federal awards, may help mitigate potential harms before they happen;

(3) the Foundation's agreement with the National Academies to conduct a study and make recommendations with respect to governance of research in emerging technologies is a positive step toward accomplishing this goal; and

(4) the Foundation should continue to work with stakeholders to promote best practices for governance of research in emerging technologies at every stage of research.

(b) INCORPORATION OF ETHICS CONSIDERATIONS.—Drawing on stakeholder input, not later than 24 months after the date of enactment of this Act, the Director shall revise proposal instructions to require that ethical and societal considerations are to be included as part of a proposal 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

this policy with existing ethical policies or related requirements for human subjects.

(d) RESEARCH.—The Director shall make awards, on a competitive basis, to institutions of higher education or non-profit organizations (or consortia of such institutions or organizations) to support—

(1) research to assess the potential ethical and societal implications of Foundation- supported research and products or technologies enabled by such research, including the benefits and risks identified pursuant to subsection (b)(1); and

(2) the development and verification of approaches to proactively mitigate foreseeable risks to society, including the technical and social solutions identified pursuant to subsection (b)(1).

(e) ANNUAL REPORT.—The Director shall encourage recipients to update their consideration of potential risks and benefits as appropriate as part of the annual reports required by all awardees under the award terms and conditions.

SEC. 10344. RESEARCH REPRODUCIBILITY AND REPLICABILITY.

(a) IN GENERAL.—Consistent with existing Federal law for privacy, intellectual property, and security, the Director shall facilitate public access to research products,

including data, software, and code, developed as part of Foundation-supported projects.

(b) DATA MANAGEMENT PLANS.—

(1) IN GENERAL.—The Director shall require that every proposal for funding for research include a machine-readable data management plan that includes a description of how the awardee will archive and preserve public access to data, software, and code developed as part of the proposed project.

(2) REQUIREMENTS.—In carrying out the requirement in paragraph (1), the Director shall—

(A) provide necessary resources, including trainings and workshops, to educate researchers and students on how to develop and review high quality data management plans;

(B) ensure program officers and merit review panels are equipped with the resources and training necessary to review the quality of data management plans; and

(C) ensure program officers and merit review panels treat data management plans as essential elements of award proposals, where appropriate.

(c) OPEN REPOSITORIES.—The Director shall—

(1) consult with the heads of other Federal research agencies, as appropriate, and solicit input from the scientific community, to develop and widely disseminate a set of criteria for trusted open repositories to be used by Foundation-funded researchers, accounting for discipline-specific needs and necessary protections for sensitive information;

(2) work with stakeholders to identify significant gaps in available repositories meeting the criteria developed under paragraph (1) and options for supporting the development of additional or enhanced repositories;

(3) make awards on a competitive basis to institutions of higher education or non-profit organizations (or consortia of such institutions or organizations) for the development, upgrades, and maintenance of open data repositories that meet the criteria developed under paragraph (1);

(4) work with stakeholders and build on existing models, where appropriate, to establish a single, public, web-based point of access to help users locate repositories storing data, software, and code resulting from or used in Foundation-supported projects;

(5) work with stakeholders to establish the necessary policies and procedures and allocate the nec-

essary resources to ensure, as practicable, data underlying published findings resulting from Foundation-supported projects are deposited in repositories meeting the criteria developed under paragraph (1) at the time of publication;

(6) incentivize the deposition of data, software, and code into repositories that meet the criteria developed under paragraph (1); and

(7) coordinate with the scientific publishing community and the heads of other relevant Federal departments and agencies to support the development of voluntary consensus standards around data archiving and sharing.

(d) RESEARCH, DEVELOPMENT, AND EDUCATION.—The Director shall make awards, on a competitive basis to institutions of higher education or non-profit organizations (or consortia of such institutions or organizations) to—

(1) support research and development of open source, sustainable, usable tools and infrastructure that support reproducibility for a broad range of studies across different disciplines;

(2) support research on computational reproducibility, including the limits of reproducibility and the consistency of computational results in the devel-

opment of new computation hardware, tools, and methods; and

(3) support the education and training of students, faculty, and researchers on computational methods, tools, and techniques to improve the quality and sharing of data, code, and supporting metadata to produce reproducible research.

SEC. 10345. CLIMATE CHANGE RESEARCH.

The Director shall make awards, on a competitive basis, to institutions of higher education or non-profit organizations (or consortia of such institutions or organizations) to support research to improve our understanding of the climate system and related human and environmental systems.

SEC. 10346. SOCIAL, BEHAVIORAL, AND ECONOMIC SCIENCES.

The Director shall—

(1) actively communicate opportunities and solicit proposals for social, behavioral, and economic science researchers to participate in cross-cutting and interdisciplinary programs, including the Convergence Accelerator and agency priority activities, and the Mid-Scale Research Infrastructure program; and

(2) ensure social, behavioral, and economic science researchers are represented on relevant merit review panels for such activities.

SEC. 10347. MEASURING IMPACTS OF FEDERALLY FUNDED RESEARCH AND DEVELOPMENT.

The Director shall make awards on a competitive, merit-reviewed basis to institutions of higher education or non-profit organizations (or consortia of such institutions or organizations) to support research and development of data, models, indicators, and associated analytical tools to improve our understanding of the impacts of Federally funded research on society, the economy, and the workforce, including domestic job creation.

SEC. 10348. FOOD-ENERGY-WATER RESEARCH.

The Director shall make awards on a competitive basis to institutions of higher education or non-profit organizations (or consortia of such institutions or organizations) to—

(1) support research to significantly advance our understanding of the food-energy-water system through quantitative and computational modeling, including support for relevant cyberinfrastructure;

(2) develop real-time, cyber-enabled interfaces that improve understanding of the behavior of food-

energy-water systems and increase decision support capability;

(3) support research that will lead to innovative solutions to critical food-energy-water system problems; and

(4) grow the scientific workforce capable of studying and managing the food-energy-water system, through education and other professional development.

SEC. 10349. BIOLOGICAL FIELD STATIONS AND MARINE LABORATORIES.

The Director shall continue to support enhancing, repairing and maintaining research instrumentation, laboratories, telecommunications and housing at biological field stations and marine laboratories.

SEC. 10350. SUSTAINABLE CHEMISTRY RESEARCH AND EDUCATION.

In accordance with section 263 of the National Defense Authorization Act for Fiscal Year 2021, the Director shall carry out activities in support of sustainable chemistry, including—

(1) establishing a program to make awards, on a competitive basis, to institutions of higher education or non-profit organizations (or consortia of such institutions or organizations) to support—

(A) individual investigators and teams of investigators, including to the extent practicable, early career investigators for research and development;

(B) collaborative research and development partnerships among universities, industry, and non-profit organizations;

(C) integrating sustainable chemistry principles into elementary, secondary, undergraduate, and graduate chemistry and chemical engineering curriculum and research training, as appropriate to that level of education and training; and

(2) incorporating sustainable chemistry into existing Foundation research and development programs.

SEC. 10351. RISK AND RESILIENCE RESEARCH.

The Director shall make awards on a competitive basis to institutions of higher education or non-profit organizations (or consortia of such institutions or organizations) to advance knowledge of risk assessment and predictability and to support the creation of tools and technologies, including advancing data analytics and utilization of artificial intelligence, for increased resilience through—

(1) improvements in our ability to understand, model, and predict extreme events and natural hazards;

(2) the creation of novel engineered systems solutions for resilient complex infrastructures, particularly those that address critical interdependence among infrastructures and leverage the growing infusion of cyber-physical-social components into the infrastructures;

(3) development of equipment and instrumentation for innovation in resilient engineered infrastructures;

(4) multidisciplinary research on the behaviors individuals and communities engage in to detect, perceive, understand, predict, assess, mitigate, and prevent risks and to improve and increase resilience; and

(5) advancements in multidisciplinary wildfire science, including those related to air quality impacts, human behavior, and early detection and warning.

SEC. 10352. UNMANNED AIRCRAFT SYSTEMS TECHNOLOGIES.

In coordination with the Administrator of the Federal Aviation Administration and the Administrator of the Na-

tional Aeronautics and Space Administration, the Director shall carry out a program of research and related activities related to unmanned aircraft system technologies, which may include a prize competition pursuant to section 24 of the Stevenson-Wydler Technology Innovation Act of 1980 (15 U.S.C. 3719) and support for undergraduate and graduate curriculum development.

SEC. 10353. ACCELERATING UNMANNED MARITIME SYSTEMS TECHNOLOGIES.

(a) IN GENERAL.—In order to support advances in marine science, maritime domain awareness, and national security the Director, in consultation with the Under Secretary of Commerce for Oceans and Atmosphere and the Commandant of the Coast Guard, shall issue awards, on a competitive basis, to institutions of higher education or nonprofit organizations (or consortia of such institutions or organizations) to support research that will accelerate innovation to advance unmanned maritime systems for the purpose of providing greater maritime domain awareness to the Nation.

(b) COORDINATION.—In implementing this section, the Director shall coordinate with the Coast Guard, the Department of Defense, the National Oceanic and Atmospheric Administration, and other Federal agencies, including those established under the Commercial Engagement

Through Ocean Technology Act of 2018 (Public Law 115–394).

SEC. 10354. LEVERAGING INTERNATIONAL EXPERTISE IN RESEARCH.

The Director shall explore and advance opportunities for leveraging international capabilities and resources that align with the Foundation and United States research community priorities and have the potential to benefit United States prosperity, security, health, and well-being, including through binational research and development organizations and foundations and by sending teams of Foundation scientific staff for site visits of scientific facilities and agencies in other countries. The Director shall establish and implement policies, including through any research security training requirements, to mitigate the potential risks of such interactions, including risks to the protection of intellectual property and the risk of undue foreign influence on research.

SEC. 10355. BIOLOGICAL RESEARCH COLLECTIONS.

(a) IN GENERAL.—The Director shall continue to support databases, tools, methods, and other activities that secure and improve existing physical and digital biological research collections, improve the accessibility of collections and collection-related data for research and educational purposes, develop capacity for curation and collec-

tion management, and to transfer ownership of collections that are significant to the biological research community, including to museums and universities.

(b) SPECIMEN MANAGEMENT PLAN.—In consultation with other relevant Federal research agencies, and as the Director determines is appropriate, the Director shall require that proposals submitted to the Foundation for funding for research that involves collecting or generating specimens include, as part of the data management plan under section 10344, a description of how the specimens and associated data will be accessioned into and maintained in an established biological collection.

(c) ACTION CENTER FOR BIOLOGICAL COLLECTIONS.—In coordination with other relevant Federal research agencies, as appropriate, the Director shall make awards on a competitive basis to institutions of higher education or non-profit organizations (or consortia of such institutions or organizations) to facilitate coordination and data sharing among communities of practice for research, education, workforce training, evaluation, and business model development, including by establishing an Action Center for Biological Collections.

SEC. 10356. CLEAN WATER RESEARCH AND TECHNOLOGY ACCELERATION.

The Director shall make awards on a competitive, merit-reviewed basis to institutions of higher education or non-profit organizations (or consortia of such institutions or organizations) to—

(1) support transdisciplinary research to significantly advance our understanding of water availability, quality, and dynamics and the impact of human activity and a changing climate on urban and rural water and wastewater systems, including in low-income, underserved, and disadvantaged communities;

(2) develop, pilot, and deploy innovative technologies, systems, and other approaches to identifying and addressing challenges that affect water availability, quality, and security, including through direct engagement with affected communities and partnerships with the private sector, State, territorial, Tribal, and local governments, non-profit organizations and water management professionals; and

(3) grow the scientific workforce capable of studying and managing water and wastewater systems and of conducting wastewater surveillance,

through education, training, and other professional development.

SEC. 10357. TECHNOLOGY AND BEHAVIORAL SCIENCE RESEARCH.

(a) IN GENERAL.—The Director shall make awards on a merit-reviewed, competitive basis for research and development to—

(1) increase understanding of social media and consumer technology access and use patterns and related mental health, behavioral, and substance use disorder issues, particularly for children and adolescents; and

(2) explore the role of social media and consumer technology in rising rates of mental health and substance use disorder issues, including within communities experiencing long-term economic distress.

(b) COORDINATION TO AVOID DUPLICATION.—In making awards under this subsection, the Director shall, for purposes of avoiding duplication of activities and research, consult, collaborate, and coordinate with the heads of other relevant Federal departments and agencies, including the Department of Health and Human Services.

SEC. 10358. MANUFACTURING RESEARCH AMENDMENT.

Section 506(a) of the America COMPETES Reauthorization Act of 2010 (42 U.S.C. 1862p–1(a)) is amended—

(1) in paragraph (5), by striking ''and'' at the end;

(2) in paragraph (6)—

(A) by striking ''and'' before ''virtual manufacturing''; and

(B) by striking the period at the end and inserting ''; and artificial intelligence and machine learning; and''; and

(3) by adding at the end the following:

''(7) additive manufacturing, including new material designs, complex materials, rapid printing techniques, and real-time process controls.''.

SEC. 10359. CRITICAL MINERALS MINING RESEARCH AND DEVELOPMENT.

(a) CRITICAL MINERALS MINING RESEARCH AND DEVELOPMENT AT THE FOUNDATION.—

(1) IN GENERAL.—In order to support supply chain resiliency, the Director shall make awards, on a competitive basis, to institutions of higher education or nonprofit organizations (or consortia of such institutions or organizations) to support basic research that will accelerate innovation to advance

critical minerals mining strategies and technologies for the purpose of making better use of domestic resources and eliminating national reliance on minerals and mineral materials that are subject to supply disruptions.

(2) USE OF FUNDS.—Activities funded by an award under this section may include—

(A) advancing mining research and development activities to develop new mapping and mining technologies and techniques, including advanced critical mineral extraction and production, separation, alloying, or processing techniques and technologies that can decrease energy intensity to improve existing or to develop new supply chains of critical minerals, and to yield more efficient, economical, and environmentally benign mining practices;

(B) advancing critical mineral processing research activities to improve separation, alloying, manufacturing, or recycling techniques and technologies that can decrease the energy intensity, waste, potential environmental impact, and costs of those activities;

(C) conducting long-term earth observation of reclaimed mine sites, including the study of

the evolution of microbial diversity at such sites;

(D) examining the application of artificial intelligence for geological exploration of critical minerals, including what size and diversity of data sets would be required;

(E) examining the application of machine learning for detection and sorting of critical minerals, including what size and diversity of data sets would be required;

(F) conducting detailed isotope studies of critical minerals and the development of more refined geologic models;

(G) improved understanding of the geological and geochemical processes through which critical minerals form and are concentrated into economically viable deposits; or

(H) providing training and research opportunities to undergraduate and graduate students to prepare the next generation of mining engineers and researchers.

(3) EXISTING PROGRAMS.—The Director shall ensure awards made under this subsection are complementary and not duplicative of existing programs across the Foundation and Federal Government.

(b) CRITICAL MATERIALS INTERAGENCY SUBCOMMITTEE.—

(1) IN GENERAL.—The Critical Minerals Subcommittee of the National Science and Technology Council (referred to in this section as the ''Subcommittee''), shall coordinate Federal science and technology efforts to ensure secure, reliable, and environmentally sustainable supplies of critical materials to the United States.

(2) PURPOSES.—The purposes of the Subcommittee shall be—

(A) to advise and assist the National Science and Technology Council, including the Committee on Homeland and National Security, on United States policies, procedures, and plans as it relates to critical materials, including—

(i) Federal research, development, and commercial application efforts to minimize the environmental impacts of methods for extractions, concentration, separation and purification of conventional, secondary, and unconventional sources of critical materials;

(ii) efficient use, substitution, and reuse of critical materials;

(iii) the critical materials workforce of the United States; and

(iv) United States private industry investments in innovation and technology transfer from federally funded science and technology;

(B) to identify emerging opportunities, stimulate international cooperation, and foster the development of secure and reliable supply chains of critical materials and establish scenario modeling systems for supply problems of critical materials and energy critical materials;

(C) to ensure the transparency of information and data related to critical materials; and

(D) to provide recommendations on coordination and collaboration among the research, development, and deployment programs and activities of Federal agencies to promote a secure and reliable supply of critical materials necessary to maintain national security, economic well-being, public health, and industrial production.

(3) RESPONSIBILITIES.—In carrying out this subsection, the Subcommittee may, taking into ac-

count the findings and recommendations of relevant advisory committees—

(A) provide recommendations on how Federal agencies may improve the topographic, geologic, and geophysical mapping of the United States and improve the discoverability, accessibility, and usability of the resulting and existing data, to the extent permitted by law and subject to appropriate limitation for purposes of privacy and security;

(B) assess the progress towards developing critical materials recycling and reprocessing technologies, and technological alternatives to critical materials;

(C) establish a mechanism for the coordination and evaluation of Federal programs with critical material needs, including Federal programs involving research and development, in a manner that complements related efforts carried out by the private sector and other domestic and international agencies and organizations;

(D) examine options for accessing and developing critical materials through investment

and trade with our allies and partners and provide recommendations;

(E) evaluate and provide recommendations to incentivize the development and use of advances in science and technology in the private industry;

(F) assess the need for and make recommendations to address the challenges the United States critical materials supply chain workforce faces, including aging and retiring personnel and faculty, and foreign competition for United States talent;

(G) develop, and update as necessary, a strategic plan to guide Federal programs and activities to enhance scientific and technical capabilities across critical material supply chains, including a roadmap that identifies key research and development needs and coordinates on-going activities for source diversification, more efficient use, recycling, and substitution for critical materials; as well as cross-cutting mining science, data science techniques, materials science, manufacturing science and engineering, computational modeling, and environ-

mental health and safety research and development;

(H) assess the need for, and make recommendations concerning, the availability and adequacy of the supply of technically trained personnel necessary for critical materials research, development, extraction, and industrial production, with a particular focus on the problem of attracting and maintaining high-quality professionals for maintaining an adequate supply of energy critical materials; and

(I) report to the appropriate Congressional committees on activities and findings under this section.

(c) DEFINITIONS OF CRITICAL MINERAL AND CRITICAL MINERAL OR METAL.—In this section, the terms ''critical mineral'' and ''critical mineral or metal'' include any host mineral of a critical mineral (within the meaning of those terms in section 7002 of title VII of division Z of the Consolidated Appropriations Act, 2021 (Public Law 116–260)).

SEC. 10360. STUDY OF AI RESEARCH CAPACITY.

(a) IN GENERAL.—The Director shall conduct a study or support the development of a study by a qualified independent organization as determined by the Director,

on artificial intelligence research capacity at United States institutions of higher education.

(b) STUDY CONTENTS.—The Director shall ensure that, at a minimum, the study under subsection (a) addresses the following topics:

(1) Which universities are putting out significant peer-reviewed artificial intelligence research, including based on quantity and number of citations.

(2) For each of the universities described in paragraph (1), what specific factors enable their AI research, including computing power, data set availability, specialized curriculum, faculty and graduate students, sources of Federal and non-Federal research funding, and industry and other partnerships.

(3) Promising practices at universities described in paragraph (1) for advancing diversity, equity, and inclusion in AI research programs.

(4) Geographic diversity across the country of universities with the factors identified in paragraph (2).

(5) How universities not included in paragraph (1) could implement the factors in paragraph (2) to produce AI research, as well as case studies that universities can look to as examples and potential pilot programs that the Federal Government could

develop or support to help universities produce AI research.

(c) WORKSHOPS.—The Director may support workshops to help inform the study required under this subsection.

(d) PUBLICATION.—The Director shall ensure that the study carried out under this subsection is made publicly available not later than 12 months after the date of enactment of this Act.

(e) AVOID DUPLICATION.—The Director shall ensure that the activities carried out under this section are not duplicative of activities supported by other parts of the Foundation or other relevant Federal agencies, including but not limited to the activities of the National AI Research Resource Task Force.

SEC. 10361. ADVANCING IOT FOR PRECISION AGRICULTURE CAPABILITIES ACT.

(a) SHORT TITLE.—This section may be cited as the ''Advancing IoT for Precision Agriculture Act of 2021''.

(b) PURPOSE.—It is the purpose of this section to promote scientific research and development opportunities for connected technologies that advance precision agriculture capabilities.

(c) FOUNDATION DIRECTIVE ON AGRICULTURAL SENSOR RESEARCH.—In making awards under the sensor

systems and networked systems programs of the Foundation, the Director shall include in consideration of portfolio balance research and development on sensor connectivity in environments of intermittent connectivity and intermittent computation—

(1) to improve the reliable use of advance sensing systems in rural and agricultural areas; and

(2) that considers—

(A) direct gateway access for locally stored data;

(B) attenuation of signal transmission;

(C) loss of signal transmission; and

(D) at-scale performance for wireless power.

(d) UPDATING CONSIDERATIONS FOR PRECISION AGRICULTURE TECHNOLOGY WITHIN THE NSF ADVANCED TECHNICAL EDUCATION PROGRAM.—Section 3 of the Scientific and Advanced-Technology Act of 1992 (42 U.S.C. 1862i), as amended by section 10312, is further amended—

(1) in subsection (d)(2), by adding at the end the following:

''(G) applications that incorporate distance learning tools and approaches.''; and

(2) in subsection (e)(3)—

(A) in subparagraph (C), by striking ''and'' after the semicolon;

(B) in subparagraph (D), by striking the period at the end and inserting ''; and''; and

(C) by adding at the end the following:

''(E) applications that incorporate distance learning tools and approaches.''.

(e) GAO REVIEW.—Not later than 18 months after the date of enactment of this section, the Comptroller General of the United States shall provide—

(1) a technology assessment of precision agriculture technologies, such as the existing use of—

(A) sensors, scanners, radio-frequency identification, and related technologies that can monitor soil properties, irrigation conditions, and plant physiology;

(B) sensors, scanners, radio-frequency identification, and related technologies that can monitor livestock activity and health;

(C) network connectivity and wireless communications that can securely support digital agriculture technologies in rural and remote areas;

(D) aerial imagery generated by satellites or unmanned aerial vehicles;

(E) ground-based robotics;

(F) control systems design and connectivity, such as smart irrigation control systems;

(G) Global Positioning System-based applications; and

(H) data management software and advanced analytics that can assist decision making and improve agricultural outcomes; and

(2) a review of Federal programs that provide support for precision agriculture research, development, adoption, education, or training, in existence on the date of enactment of this section.

SEC. 10362. ASTRONOMY AND SATELLITE CONSTELLATIONS.

The Director shall support research into and the design, development, and testing of mitigation measures to address the potential impact of satellite constellations on Foundation scientific programs by—

(1) making awards on a competitive basis to support study of the potential impacts of satellite constellations on ground-based optical, infrared, and radio astronomy, including through existing programs such Spectrum and Wireless Innovation en-

abled by Future Technologies (SWIFT) and the Spectrum Innovation Initiative;

(2) supporting research on potential satellite impacts and benefits and mitigation strategies to be carried out at one or more Foundation supported Federally Funded Research and Development Centers or major multiuser research facilities as defined in section 110(g) of the American Innovation and Competitiveness Act (42 U.S.C. 1862s–2(g)), as appropriate; and

(3) supporting workshops related to the potential impact of satellite constellations on scientific research and how those constellations could be used to improve scientific research.

SEC. 10363. RESEARCH ON THE IMPACT OF INFLATION.

(a) IN GENERAL.—The Director may make awards, on a competitive merit-reviewed basis, to institutions of higher education or nonprofit organizations (or consortia of such institutions or organizations) to support research to improve our understanding of the impact of inflation.

(b) USE OF FUNDS.—Activities funded by an award under this section may include—

(1) measuring the economic impact of inflation on the American people, including an analysis of cost-of-living and wage impacts;

(2) considering the impact of inflation on American international competitiveness;

(3) evaluating the impact of inflation on rural and underserved communities throughout the country;

(4) assessing the ways inflation could impact future American generations; and

(5) evaluating the impact of policymaking on inflation, including the impact of further Government spending.

(c) COORDINATION TO AVOID DUPLICATION.—In making awards under this section, the Director shall, for purposes of avoiding duplication of activities and research, consult, collaborate, and coordinate with the programs and policies of other relevant Federal agencies.

SEC. 10364. MICROGRAVITY UTILIZATION POLICY.

(a) SENSE OF CONGRESS.—It is the sense of Congress that space technology and the utilization of the microgravity environment for science, engineering, and technology development is critical to long-term competitiveness with near-peer competitors, including China.

(b) POLICY.—To the extent appropriate during an award period, the Foundation shall facilitate access by recipients of Foundation awards to the microgravity environment, including in private sector platforms, for the de-

velopment of science, engineering, and technology relevant to the award.

(c) REPORT.—Not later than 180 days after the date of enactment of this Act, the Director shall provide to the appropriate committees of Congress a report on the Foundation's plan for facilitating awardee access to the microgravity environment.

SEC. 10365. RECOGNITION OF THE ARECIBO OBSERVATORY.

(a) FINDINGS.—Congress finds the following:

(1) The Department of Defense began developing the Arecibo Observatory located in Barrio Esperanza, Arecibo, Puerto Rico, during the 1950s, and its characteristic instrument, a large radio telescope of 305 meters in diameter was completed in 1963.

(2) The facility was later owned by the National Science Foundation, and supported by the National Aeronautics and Space Administration and various university partners.

(3) The Arecibo Observatory's 305-meter fixed spherical radio telescope, was the world's largest single-dish radio telescope until the Five-Hundred-Meter Aperture Spherical Radio Telescope located in Gizhou, China, began observing in 2016.

(4) The 305-meter radio telescope made unparalleled contributions to the fields of radio astronomy, planetary, and atmospheric sciences, and played a role in inspiring thousands of students in Puerto Rico, the Nation, and the world to pursue careers in STEM fields through the Arecibo Observatory Education and Public Outreach Programs.

(5) The radio telescope significantly advanced the field of radio astronomy, including the first indirect detection of gravitational waves, the first detection of extrasolar planets, innumerable contributions to the field of time domain astronomy and the study of the interstellar medium, and played a key role in the search for extraterrestrial intelligence.

(6) The Arecibo Observatory had the best planetary radar system in the world, used by the National Aeronautics and Space Administration for near-Earth object detection and was an essential part of the agency's planetary defense program.

(7) The planetary radar at the Arecibo Observatory has contributed fundamentally and significantly to the knowledge of the solar system.

(8) The Arecibo Observatory's Incoherent Scatter Radar and supporting facilities have provided fundamental understanding of the ionosphere and

upper atmosphere, and the interface between the atmosphere and space that protects the planet from solar wind, meteors, and other potential threats.

(9) December 1, 2021, marks the 1-year anniversary of the uncontrolled collapse sustained by the radio telescope after a series of cable failures in tower 4.

(b) SENSE OF CONGRESS.—It is the sense of Congress that the Congress—

(1) acknowledges the loss of the Arecibo Observatory's radio telescope due to its collapse and its implications for the loss of a unique world-class multidisciplinary science facility which conducted research in the areas of space and atmospheric sciences, radar astronomy and planetary sciences, astronomy, and astrophysics;

(2) acknowledges that the uncontrolled collapse of the 305-meter radio telescope represents a loss of astronomical observation capabilities, scientific research and development, planetary defense capabilities, and applied science capabilities for the United States;

(3) recognizes the rich scientific, educational, and economic benefits that the Arecibo Telescope

has made to the people of Puerto Rico, the Nation, and the world;

(4) recognizes the work and contributions made by the thousands of dedicated staff who have supported the Arecibo Observatory for close to 6 decades;

(5) commends the National Science Foundation for convening a virtual workshop in June 2021, to explore ideas for future scientific and educational activities at the Arecibo Observatory; and

(6) encourages the National Science Foundation, in consultation with other Federal agencies, to explore opportunities for strengthening and expanding the role of the Arecibo Observatory in Puerto Rico through education, outreach, and diversity programs, and future research capabilities and technology at the site.

Subtitle F—Research Infrastructure

SEC. 10371. FACILITY OPERATION AND MAINTENANCE.

(a) IN GENERAL.—The Director shall continue the Facility Operation Transition pilot program for a total of 5 years.

(b) COST SHARING.—The Facility Operation Transition program shall provide funding for 10 to 50 percent

of the operations and maintenance costs for major research facilities that are within the first five years of operation, where the share is determined based on—

(1) the operations and maintenance costs of the major research facility; and

(2) the capacity of the managing directorate or division to absorb such costs.

(c) REPORT.—After the fifth year of the pilot program, the Director shall transmit a report to Congress that includes—

(1) an assessment, that includes feedback from the research community, of the effectiveness of the pilot program for—

(A) supporting research directorates and divisions in balancing investments in research grants and funding for the initial operation and maintenance of major facilities;

(B) incentivizing the development of new world-class facilities;

(C) facilitating interagency and international partnerships;

(D) funding core elements of multi-disciplinary facilities; and

(E) supporting facility divestment costs; and

(2) if deemed effective, a plan for permanent implementation of the pilot program.

SEC. 10372. REVIEWS.

The Director shall periodically carry out reviews within each of the directorates and divisions to assess the cost and benefits of extending the operations of research facilities that have exceeded their planned operational lifespan.

SEC. 10373. HELIUM CONSERVATION.

(a) MAJOR RESEARCH INSTRUMENTATION SUPPORT.—

(1) IN GENERAL.—The Director shall support, through the Major Research Instrumentation program, proposal requests that include the purchase, installation, operation, and maintenance of equipment and instrumentation to reduce consumption of helium.

(2) COST SHARING.—The Director may waive the cost-sharing requirement for helium conservation measures for non-Ph.D.-granting institutions of higher education and Ph.D.-granting institutions of higher education that are not ranked among the top 100 institutions receiving Federal research and development funding, as documented by the National Center for Science and Engineering Statistics.

(b) ANNUAL REPORT.—No later than 1 year after the date of enactment of this Act and annually for the subsequent two years, the Director shall submit an annual report to Congress on the use of funding awarded by the Foundation for the purchase and conservation of helium. The report should include—

(1) the volume and price of helium purchased;

(2) changes in pricing and availability of helium; and

(3) any supply disruptions impacting a substantial number of institutions.

SEC. 10374. ADVANCED COMPUTING.

(a) COMPUTING NEEDS.—To gather information about the computational needs of Foundation-funded projects, the Director shall require award proposals submitted to the Foundation, as appropriate, to include estimates of computational resource needs for projects that require use of advanced computing. The Director shall encourage and provide access to tools that facilitate the inclusion of these measures, including those identified in the 2016 National Academies report entitled ''Future Directions for NSF Advanced Computing Infrastructure to Support U.S. Science and Engineering in 2017–2020''.

(b) REPORTS.—The Director shall document and publish every two years a summary of the amount and

types of advanced computing capabilities that are needed to fully meet the Foundation's project needs as identified under subsection (a).

(c) ROADMAP.—To set priorities and guide strategic decisions regarding investments in advanced computing capabilities, the Director shall develop, publish, and regularly update a 5-year advanced computing roadmap that—

(1) describes the advanced computing resources and capabilities that would fully meet anticipated project needs, including through investments in the Mid-Scale Research Infrastructure program and the Major Research Equipment and Facilities Construction account;

(2) draws on community input, information contained in research proposals, allocation requests, insights from Foundation-funded cyber-infrastructure operators, and Foundation-wide information gathering regarding community needs;

(3) considers computational needs of planned major facilities;

(4) reflects anticipated technology trends;

(5) informs users and potential partners about future facilities and services;

(6) addresses the needs of groups historically underrepresented in STEM and geographic regions

with low availability and high demand for advanced computing resources;

(7) considers how Foundation-supported advanced computing capabilities can be leveraged for activities through the Directorate for Technology, Innovation, and Partnerships; and

(8) provides an update to Congress about the level of funding necessary to fully meet computational resource needs for the research community.

(d) SECURING AMERICAN RESEARCH FROM CYBER THEFT.—

(1) NETWORKING AND INFORMATION TECHNOLOGY RESEARCH AND DEVELOPMENT UPDATE.—Section 101(a)(1) of the High-Performance Computing Act of 1991 (15 U.S.C. 5511) is amended—

(A) by moving the margins of subparagraph (D) and each of subparagraphs (J) through (O) two ems to the left;

(B) by redesignating subparagraphs (J) through (O) as subparagraphs (K) through (P), respectively; and

(C) by inserting after subparagraph (I) the following:

''(J) provide for improving the security, reliability, and resiliency of computing and net-

working systems used by institutions of higher education and other nonprofit research institutions for the processing, storage and transmission of sensitive federally funded research and associated data;''.

(2) COMPUTING ENCLAVE PILOT PROGRAM.—

(A) IN GENERAL.—The Director, in consultation with the Director of the National Institute of Standards and Technology and the Secretary of Energy, and the heads of other relevant Federal departments and agencies, shall establish a pilot program to make awards to ensure the security of federally supported research data and to assist regional institutions of higher education and their researchers in compliance with regulations regarding the safeguarding of sensitive information and other relevant regulations and Federal guidelines.

(B) STRUCTURE.—In carrying out the pilot program established pursuant to subparagraph (A), the Director shall select, for the development, installation, maintenance, or sustainment of secure computing enclaves, three institutions of higher education that have an established graduate student program and a dem-

onstrated history of working with secure information, consistent with appropriate security protocols.

(C) REGIONALIZATION.—

(i) IN GENERAL.—In selecting universities pursuant to subparagraph (B), the Director shall give preference to institutions of higher education with the capability of serving other regional universities.

(ii) GEOGRAPHIC DISPERSAL.—The enclaves should be geographically dispersed to better meet the needs of regional interests.

(D) PROGRAM ELEMENTS.—The Director shall work with institutions of higher education selected pursuant to subparagraph (B) to—

(i) develop an approved design blueprint for compliance with Federal data protection protocols;

(ii) develop a comprehensive and confidential list, or a bill of materials, of each binary component of the software, firmware, or product that is required to deploy additional secure computing enclaves;

(iii) develop templates for all policies and procedures required to operate the secure computing enclave in a research setting;

(iv) develop a system security plan template; and

(v) develop a process for managing a plan of action and milestones for the secure computing enclave.

(E) SUSTAINABILITY.—In reviewing applications for awards, the Director shall review and consider plans and prospects of the applicant institution of higher education to ensure long-term sustainability of the computing enclave, beyond the availability of Federal funds.

(F) DURATION.—Subject to other availability of appropriations, the pilot program established pursuant to subparagraph (A) shall operate for not less than 3 years.

(G) REPORT.—

(i) IN GENERAL.—The Director shall report to Congress not later than 6 months after the completion of the pilot program under subparagraph (A).

(ii) CONTENTS.—The report required under clause (i) shall include—

(I) an assessment of the pilot program under subparagraph (A), including an assessment of the security benefits provided by such secure computing enclaves;

(II) recommendations related to the value of expanding the network of secure computing enclaves; and

(III) recommendations on the efficacy of the use of secure computing enclaves by other Federal agencies in a broader effort to expand security of Federal research.

(H) AUTHORIZATION OF APPROPRIATIONS.—There is authorized to be appropriated to the Director, $38,000,000 for fiscal years 2023 through 2025, to carry out the activities outlined in this paragraph.

SEC. 10375. NATIONAL SECURE DATA SERVICE.

(a) IN GENERAL.—The Director, in consultation with the Director of the Office of Management and Budget and the interagency committee established under section 5103 of the National Artificial Intelligence Initiative Act of

2020 (15 U.S.C. 9415), shall establish a demonstration project to develop, refine, and test models to inform the full implementation of the Commission on Evidence-Based Policymaking recommendation for a governmentwide data linkage and access infrastructure for statistical activities conducted for statistical purposes, as defined in chapter 35 of title 44, United States Code.

(b) ESTABLISHMENT.—Not later than one year after the date of enactment of this Act, the Director shall establish a National Secure Data Service demonstration project. The National Secure Data Service demonstration project shall be—

(1) aligned with the principles, best practices, and priority actions recommended by the Advisory Committee on Data for Evidence Building, to the extent feasible; and

(2) operated directly by or via a contract that is managed by the National Center for Science and Engineering Statistics.

(c) DATA.—In carrying out this section, the Director shall engage with Federal and State agencies to collect, acquire, analyze, report, and disseminate statistical data in the United States and other nations to support governmentwide evidence-building activities consistent with the

Foundations for Evidence-Based Policymaking Act of 2018.

(d) VOLUNTARY PARTICIPATION.—Participation in the National Secure Data Service demonstration project by Federal and State agencies shall be voluntary.

(e) PRIVACY AND CONFIDENTIALITY PROTECTIONS.—If the Director issues a management contract under subsection (b), the recipient shall be designated as an ''agent'' under subchapter III of chapter 35 of title 44, United States Code, with all requirements and obligations for protecting confidential information delineated in the Confidential Information Protection and Statistical Efficiency Act of 2018 and the Privacy Act of 1974.

(f) TECHNOLOGY AND PRIVACY STANDARDS.—In carrying out this subsection, the Director shall—

(1) consider application and use only of systems and technologies that incorporate protection measures to reasonably ensure confidential data and statistical products are protected in accordance with obligations under subchapter III of chapter 35 of title 44, United States Code, including systems and technologies that ensure—

(A) raw data and other sensitive inputs are not accessible to recipients of statistical outputs

from the National Secure Data Service demonstration project;

(B) no individual entity's data or information is revealed by the National Secure Data Service demonstration project platform to any other party in an identifiable form;

(C) no information about the data assets used in the National Secure Data Service demonstration project is revealed to any other party, except as incorporated into the final statistical output;

(D) the National Secure Data Service demonstration project permits only authorized analysts to perform statistical queries necessary to answer approved project questions, and prohibits any other queries; and

(E) the National Secure Data Service demonstration project conducts privacy risk assessments to minimize the privacy risks to individual entities whose data has been made available by a reporting entity, including those privacy risks that could result from data breaches of any system operated by the reporting entity, as well as for determining approved project questions under subparagraph (D) to minimize

the privacy risks to individuals affected by uses of the statistical output; and

(2) the National Secure Data Service demonstration project shall implement reasonable measures commensurate with the risks to individuals' privacy to achieve the outcomes under subparagraphs (A) through (E) of paragraph (1), which may include the appropriate application of privacy-enhancing technologies and appropriate measures to minimize or prevent reidentification risks consistent with any applicable guidance or regulations issued under subchapter III of chapter 35 of title 44, United States Code.

(g) TRANSPARENCY.—The National Secure Data Service established under subsection (b) shall maintain a public website with up-to-date information on supported projects.

(h) REPORT.—Not later than 2 years after the date of enactment of this Act, the National Secure Data Service demonstration project established under subsection (b) shall submit a report to Congress that includes—

(1) a description of policies for protecting data, consistent with applicable Federal law;

(2) a comprehensive description of all completed or active data linkage activities and projects;

(3) an assessment of the effectiveness of the demonstration project for mitigating risks and removing barriers to a sustained implementation of the National Secure Data Service as recommended by the Commission on Evidence-Based Policymaking; and

(4) if deemed effective by the Director, a plan for scaling up the demonstration project to facilitate data access for evidence building while ensuring transparency and privacy.

(i) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the Director to carry out this subsection $9,000,000 for each of fiscal years 2023 through 2027.

Subtitle G—Directorate for Technology, Innovation, and Partnerships

SEC. 10381. ESTABLISHMENT.

There is established within the Foundation the Directorate for Technology, Innovation, and Partnerships to advance research and development, technology development, and related solutions to address United States societal, national, and geostrategic challenges, for the benefit of all Americans.

SEC. 10382. PURPOSES.

The purposes of the Directorate established under section 10381 are to—

(1) support use-inspired and translational research and accelerate the development and use of federally funded research;

(2) strengthen United States competitiveness by accelerating the development of key technologies; and

(3) grow the domestic workforce in key technology focus areas, and expand the participation of United States students and researchers in areas of societal, national, and geostrategic importance, at all levels of education.

SEC. 10383. ACTIVITIES.

Subject to the availability of appropriated funds, the Director shall achieve the purposes described in section 10382 by making awards through the Directorate that—

(1) support transformational advances in use-inspired and translational research and technology development, including through diverse funding mechanisms and models at different scales, to include convergence accelerators and projects designed to achieve specific technology metrics or objectives;

(2) encourage the translation of research into innovations, processes, and products, including by—

(A) engaging researchers on topics relevant to United States societal, national, and geostrategic challenges, including by educating researchers on engaging with end users and the public;

(B) advancing novel approaches and reducing barriers to technology transfer, including through intellectual property frameworks between academia and industry, nonprofit entities, venture capital communities, and approaches to technology transfer for applications with public benefit that may not rely on traditional commercialization tools; and

(C) establishing partnerships that connect researchers and research products to businesses, accelerators, and incubators that enable research uptake, prototype development and scaling, entrepreneurial education, and the formation and growth of new companies;

(3) develop mutually-beneficial research and technology development partnerships and collaborations among institutions of higher education, including historically Black colleges and universities, Tribal Colleges or Universities, minority-serving institutions, emerging research institutions, EPSCoR insti-

tutions, and nonprofit organizations, labor organizations, businesses and other for-profit entities, Federal or State agencies, local or Tribal governments, civil society organizations, other Foundation directorates, national labs, field stations and marine laboratories, and, as appropriate, international entities and binational research and development foundations and funds, excluding foreign entities of concern;

(4) partner with other directorates and offices of the Foundation for specific projects or research areas including—

(A) to pursue basic questions about natural, human, and physical phenomena that could enable advances in the challenges and key technology focus areas under section 10387;

(B) to study questions that could affect the design (including human interfaces), safety, security, operation, deployment, or the social and ethical consequences of technologies and innovations in the challenges and key technology focus areas under section 10387, including the development of technologies and innovations that complement or enhance the abilities of

workers and impact of specific innovations on domestic jobs and equitable opportunity; and

(C) to further the creation of a domestic workforce capable of advancing, using, and adapting to the key technology focus areas;

(5) build capacity and infrastructure for use-inspired and translational research at institutions of higher education across the United States, including by making awards to support administrative activities that advance development, operation, integration, deployment, and sharing of innovation;

(6) support the education, mentoring, and training of undergraduate students, graduate students, and postdoctoral researchers, to both advance use-inspired and translational research and to address workforce challenges, through scholarships, fellowships, and traineeships; and

(7) identify social, behavioral, and economic drivers and consequences of technological innovations that could enable advances in the challenges and key technology focus areas under section 10387.

SEC. 10384. REQUIREMENTS.

In carrying out the activities under the Directorate, the Director shall ensure the programmatic work of the Directorate and Foundation—

(1) utilizes the full potential of the United States workforce by avoiding undue geographic concentration of research and development and education funding across the United States, and encourages broader participation in the key technology focus area workforce by populations historically underrepresented in STEM; and

(2) incorporates a worker perspective through participation by labor organizations and workforce training organizations.

SEC. 10385. ASSISTANT DIRECTOR.

(a) IN GENERAL.—The Director shall appoint an Assistant Director responsible for the management of the Directorate established under this subtitle, in the same manner as other Assistant Directors of the Foundation are appointed.

(b) QUALIFICATIONS.—The Assistant Director shall be an individual, who by reason of professional background and experience, is specially qualified to—

(1) advise the Director on all matters pertaining to use-inspired and translational research, development, and commercialization at the Foundation, including partnership with the private sector and other users of Foundation funded research; and

(2) develop and implement the necessary policies and procedures to promote a culture of use-inspired and translational research within the Directorate and across the Foundation and carry out the responsibilities under subsection (c).

(c) RESPONSIBILITIES.—The responsibilities of the Assistant Director shall include—

(1) advising the Director on all matters pertaining to use-inspired and translational research and development activities at the Foundation, including effective practices for convergence research, and the potential impact of Foundation research on United States societal, national and geostrategic challenges;

(2) identifying opportunities for and facilitating coordination and collaboration, where appropriate, on use-inspired and translational research, development, adoption, and commercialization—

(A) among the offices, directorates, and divisions within the Foundation; and

(B) between the Foundation and stakeholders in academia, the private sector, including non-profit entities, labor organizations, Federal or State agencies, and international entities, as appropriate;

(3) ensuring that the activities carried out under this subtitle do not substantially and unnecessarily duplicate activities supported by other parts of the Foundation or other relevant Federal agencies;

(4) approving all new programs within the Directorate;

(5) developing and testing diverse merit-review models and mechanisms for selecting and providing awards for use-inspired and translational research and development at different scales, from individual investigator awards to large multi-institution collaborations;

(6) assessing the success of programs;

(7) administering awards to achieve the purposes described in section 10382; and

(8) performing other such duties pertaining to the purposes in section 10382 as are required by the Director.

(d) RELATIONSHIP TO THE DIRECTOR.—The Assistant Director shall report to the Director.

(e) RELATIONSHIP TO OTHER PROGRAMS.—No other directorate within the Foundation shall report to the Assistant Director.

SEC. 10386. ADVISORY COMMITTEE.

(a) IN GENERAL.—In accordance with the Federal Advisory Committee Act (5 U.S.C. App.) the Director shall establish an advisory committee to assess, and make recommendations regarding, the activities carried out under this subtitle.

(b) MEMBERSHIP.—The advisory committee members shall—

(1) be individuals with relevant experience or expertise, including individuals from industry and national labs, educators, academic subject matter experts, including individuals with knowledge of key technology focus areas and their impact on United States national security and geostrategic leadership, the technical and social dimensions of science and technology, technology transfer experts, labor organizations, representatives of civil society, and other nongovernmental organizations; and

(2) consist of at least 10 members broadly representative of stakeholders, including no less than 3 members from the private sector, none of whom shall be an employee of the Federal Government, and no less than 1 member with significant expertise in United States national security and economic competitiveness.

(c) RESPONSIBILITIES.—The Committee's responsibilities shall include—

(1) reviewing and advising on activities carried out under this subtitle;

(2) proposing strategies for fulfilling the purposes in section 10382;

(3) proposing potential areas of research, particularly as relevant to United States societal, national, and geostrategic challenges; and

(4) other relevant issues as determined by the Director.

SEC. 10387. CHALLENGES AND FOCUS AREAS.

(a) IN GENERAL.—In consultation with the Assistant Director, the Board, and the interagency working group established under subtitle F of title VI, the Director shall identify, and annually review and update as appropriate, a list of—

(1) not more than 5 United States societal, national, and geostrategic challenges that may be addressed by technology to guide activities under this subtitle; and

(2) not more than 10 key technology focus areas to guide activities under this subtitle.

(b) INITIAL LIST OF SOCIETAL, NATIONAL, AND GEOSTRATEGIC CHALLENGES.—The initial list of societal, national, and geostrategic challenges are the following:

(1) United States national security.

(2) United States manufacturing and industrial productivity.

(3) United States workforce development and skills gaps.

(4) Climate change and environmental sustainability.

(5) Inequitable access to education, opportunity, or other services.

(c) INITIAL LIST OF KEY TECHNOLOGY FOCUS AREAS.—The initial list of key technology focus areas are the following:

(1) Artificial intelligence, machine learning, autonomy, and related advances.

(2) High performance computing, semiconductors, and advanced computer hardware and software.

(3) Quantum information science and technology.

(4) Robotics, automation, and advanced manufacturing.

(5) Natural and anthropogenic disaster prevention or mitigation.

(6) Advanced communications technology and immersive technology.

(7) Biotechnology, medical technology, genomics, and synthetic biology.

(8) Data storage, data management, distributed ledger technologies, and cybersecurity, including biometrics.

(9) Advanced energy and industrial efficiency technologies, such as batteries and advanced nuclear technologies, including but not limited to for the purposes of electric generation (consistent with section 15 of the National Science Foundation Act of 1950 (42 U.S.C. 1874).

(10) Advanced materials science, including composites 2D materials, other next-generation materials, and related manufacturing technologies.

(d) RELATIONSHIP BETWEEN UNITED STATES SOCIETAL, NATIONAL, AND GEOSTRATEGIC CHALLENGES AND KEY TECHNOLOGY FOCUS AREAS.—

(1) In updating the list under subsection (a)(1), the Director shall evaluate national and global technology trends.

(2) In updating the list under subsection (a)(2), the Director shall consider the impact of the selected

technologies on United States societal, national, and geostrategic challenges.

(3) The list under subsection (a)(2) may, but is not required to, align directly with the list under subsection (a)(1).

(4) Nothing under this section shall prevent the Director from making limited investments in technologies or areas not identified in subsection (a)(1) or subsection (a)(2).

(e) REVIEW AND UPDATES.—The Director, in coordination with the interagency working group established under subtitle F of title VI and in consultation with the Director of National Intelligence and the Director of the Federal Bureau of Investigation, shall annually review and update as appropriate, the list of key technology focus areas for purposes of this division. As part of the annual review, the Director—

(1) shall consider input from relevant industries and stakeholders;

(2) may consider the challenges and recommendations identified in the reports required by sections 206 and 206B of the National Science and Technology Policy, Organization, and Priorities Act of 1976, as added by section 10611 and 10613 of this division and in other relevant reports, such as

technology and global trend reports from the defense and intelligence communities;

(3) shall consider the potential impact of the key technology focus areas on addressing societal, national, and geostrategic challenges; and

(4) subject to the limitation under subsection (a), may add or delete key technology focus areas in light of shifting national needs or competitive threats to the United States (including for reasons of the United States or other countries having advanced or fallen behind in a technological area).

(f) REPORTING.—At the conclusion of the annual review and update process required by subsection (e), the Director, in consultation with other Federal research agencies, as appropriate, shall deliver a report to Congress detailing—

(1) the key technology focus areas and rationale for their selection;

(2) the societal, national, and geostrategic challenges and rationale for their selection;

(3) the role of the Foundation in advancing the key technology focus areas;

(4) the impact, including to the academic research community, of any changes to the key technology focus areas; and

(5) the activities and partnerships between the Directorate and the private sector.

(g) DETAILED DESCRIPTION.—The National Science Foundation shall, in coordination with the Office of Management and Budget, submit as part of their annual budget requests to Congress, a detailed description of the activities to be funded under this subtitle, including an explanation of how the requested funding is complementary and not redundant of programs, efforts, and infrastructure undertaken or supported by other relevant Federal agencies.

(h) NATIONAL ACADEMIES.—Not later than 5 years after the date of enactment of this Act, the Director shall contract with the National Academies to conduct a review of the key technology focus areas and the societal, national, and geostrategic challenges, including—

(1) an assessment of their selection process;

(2) an assessment of their relevance to the purposes of the Directorate, including to solving challenges with social, economic, health, scientific, and national security implications;

(3) a review of whether Federal investment in the key technology focus areas have resulted in new domestic manufacturing capacity and job creation;

(4) an assessment of any critical, new emerging areas;

(5) an assessment of Federal investments in education and workforce development to support the key technology focus areas; and

(6) an assessment of relative balance in leadership in addressing the key technology focus areas between the United States, allied and partner countries, and the People's Republic of China.

SEC. 10388. REGIONAL INNOVATION ENGINES.

(a) IN GENERAL.—From amounts made available to the Directorate, the Director shall make awards to eligible entities for the planning, establishment, and support of Regional Innovation Engines.

(b) PURPOSE.—The purpose of the Regional Innovation Engines shall be to—

(1) advance multidisciplinary, collaborative, use-inspired and translational research, technology development, in key technology focus areas;

(2) address regional, national, societal, or geostrategic challenges;

(3) leverage the expertise of multi-disciplinary and multi- sector partners, including partners from private industry, nonprofit organizations, and civil society organizations; and

(4) support the development of scientific, innovation, entrepreneurial, and STEM educational capacity within the region of the Regional Innovation Engine to grow and sustain regional innovation.

(c) USES OF FUNDS.—Funds awarded under this section may be used by a Regional Innovation Engine to—

(1) conduct use-inspired and translational research and technology development to advance innovation in at least one of the key technology focus areas and to help solve a compelling regional, national, societal, or geostrategic challenge;

(2) further the development, adoption, and commercialization of innovations in key technology focus areas, including through support for proof-of-concept development, and through partnership with other Federal agencies and Federal laboratories, industry, including startup companies, labor organizations, civil society organizations, and State, territorial, local, and Tribal governments;

(3) develop and manage, or facilitate access to, test beds and instrumentation, which may include fabrication facilities and cyberinfrastructure, to advance the development, integration, and demonstration of new, innovative technologies, including hardware or software;

(4) establish traineeship programs for graduate students who pursue degrees and research related to the key technology focus areas leading to a masters or doctorate degree by providing funding and other assistance, and opportunities for research experiences in government or industry related to the students' studies;

(5) engage in outreach and engagement in the region to broaden participation in the activities of the Regional Innovation Engine; and

(6) reimburse, in part or in whole, the cost of instrumentation, technology transfer, and commercialization activities, including patenting and licensing, and for operations and staff, as the Director determines appropriate.

(d) SELECTION PROCESS.—In making awards under this subtitle, the Director shall consider, in addition to the scientific and technical merit of the proposal, the extent to which the activities and locations proposed—

(1) have the potential to create an innovation ecosystem, or enhance existing ecosystems and contribute to job creation in a region;

(2) demonstrate a capacity to engage and partner with multiple types of institutions of higher education, industry, labor, nonprofit organizations, civil

society organizations, other Federal agencies, Federal laboratories, State, local, and Tribal governments, and other appropriate organizations, including to inform research directions and account for ethical, societal, safety, and security implications relevant to the potential applications of the research;

(3) demonstrate a capacity to broaden participation of populations historically underrepresented in STEM in the activities of the Regional Innovation Engine; and

(4) demonstrate a plan and capability to prevent the inappropriate use or dissemination of the research and technology, including research results, data, and intellectual property, as appropriate and consistent with the requirements of the relevant award.

(e) REQUIREMENTS.—

(1) ELIGIBILITY.—For the purposes of this section, an ''eligible entity'' means an institution of higher education, a nonprofit organization, a private sector entity, or a consortium thereof.

(2) PARTNERSHIPS.—To be eligible for an award under this section an eligible entity—

(A) shall include in its proposal partnership with 1 or more institution that is—

(i) a historically Black college or university;

(ii) a Tribal College or University;

(iii) a minority-serving institution;

(iv) an EPSCoR institution;

(v) an emerging research institution; or

(vi) a community college;

(B) may include partnership with 1 or more—

(i) additional entities described in paragraph (2)(A);

(ii) industry entities, including startups, small businesses, and public-private partnerships;

(iii) economic development organizations or venture development organizations, as such terms are defined in section 28(a) of the Stevenson-Wydler Technology Innovation Act of 1980 (15 U.S.C. 13701 et seq.), as added by section 10621 of this division;

(iv) National Laboratories;

(v) Federal laboratories, as defined in section 4 of the Stevenson-Wydler Tech-

nology Innovation Act of 1980 (15 U.S.C. 3703);

(vi) Federal research facilities;

(vii) labor organizations;

(viii) entities described in paragraph (1) or (2) from allied or partner countries;

(ix) other entities to be vital to the success of the program, as determined by the Director;

(x) binational research and development foundations and funds, excluding those affiliated with foreign entities of concern, as defined in section 10612; and

(xi) Engineer Research and Development Center laboratories of the Army Corps of Engineers; and

(C) shall include as part of its proposal a plan for—

(i) establishing a sustained partnership that is jointly developed and managed, draws from the capacities of each institution, and is mutually beneficial; and

(ii) documents governance and management plans, financial contributions from non-Federal sources, and plans for

ownership and use of any intellectual property.

(3) PROMOTING PARTNERSHIPS.—In making awards under this section, the Director shall encourage applicants for a Regional Innovation Engine that include multiple regional partners as described in subsection (e)(2).

(4) GEOGRAPHIC DISTRIBUTION.—In making awards under this section, the Director shall take into consideration the extent to which the proposals expand the geographic distribution of the Regional Innovation Engines, including by giving special consideration to rural-serving institutions of higher education.

(5) RESOURCE AVAILABILITY.—The Director shall ensure that any eligible entity receiving an award under this section shall—

(A) provide information on relevant currently existing resources available to the proposing team from all internal and external sources, including all partner organizations; and

(B) include letters of collaboration from partner organizations that include information on resource contributions committed by such partners.

(f) COLLABORATION WITH REGIONAL TECHNOLOGY HUBS.—Each Regional Innovation Engine established under this section may collaborate and participate in, as appropriate, the activities of any regional technology hub designated under section 28 of the Stevenson-Wydler Technology Innovation Act of 1980 (15 U.S.C. 3701 et seq.), as added by section 10621.

(g) DURATION.—

(1) INITIAL PERIOD.—An award under this section shall be for an initial period of 5 years.

(2) RENEWAL.—An established Regional Innovation Engine may apply for, and the Director may award, extended funding for periods of 5 years on a merit-reviewed basis.

(h) COMPETITIVE, MERIT-REVIEW.—In making awards under this section, the Director shall—

(1) use a competitive, merit review process that includes peer review by a diverse group of individuals with relevant expertise from both the private and public sectors; and

(2) ensure the focus areas of the Regional Innovation Engines do not substantially and unnecessarily duplicate the efforts of any other Regional Innovation Engine or any other similar effort at another Federal agency.

(i) COLLABORATION.—In making awards under this section, the Director may collaborate with Federal departments and agencies whose missions contribute to or are affected by the technology focus area of the institute.

SEC. 10389. TRANSLATION ACCELERATOR.

(a) IN GENERAL.—The Director shall establish Translation Accelerators to further the research, development, and commercialization of innovation in the key technology focus areas.

(b) PARTNERSHIPS.—

(1) IN GENERAL.—Each Translation Accelerator shall be comprised of a partnership including 2 or more of the following entities:

(A) An institution of higher education.

(B) A for-profit company.

(C) A nonprofit organization.

(D) A Federal agency.

(E) Another entity, if that entity is determined by the Director to be vital to the success of the program.

(2) INSTITUTIONAL OR ORGANIZATIONAL LEVEL.—The Director shall work to ensure that such partnerships exist at the institutional or organization level, rather than solely at the principal investigator level.

(3) COST SHARE.—Not less than 25 percent of the funding for an institute shall be provided by non-Federal entities.

(4) NUMBER OF CENTERS AND INSTITUTES ESTABLISHED.—The Director shall endeavor to establish a balance in the number of Regional Innovation Engines and Translation Accelerators.

(c) AUTHORIZATION OF APPROPRIATIONS.—From within funds authorized for the Directorate for Technology, Innovation, and Partnerships, there are authorized to carry out the activities under this section and section 10388 $6,500,000,000 for fiscal years 2023 through 2027.

SEC. 10390. TEST BEDS.

(a) PROGRAM AUTHORIZED.—

(1) IN GENERAL.—From amounts made available for the Directorate, the Director, in coordination with the Director of the National Institute of Standards and Technology, the Secretary of Energy, and other Federal agencies, as determined appropriate by the Director, shall establish a program in the Directorate to make awards, on a competitive basis, to institutions of higher education, nonprofit organizations, or consortia thereof to establish and operate test beds, which may include fabrication fa-

cilities and cyberinfrastructure, to advance the development, operation, integration, deployment, and, as appropriate, demonstration of new, innovative critical technologies, which may include hardware or software.

(2) COORDINATION.—In establishing new test beds under this section, the Director shall ensure coordination with other test beds supported by the Foundation or other Federal agencies to avoid duplication and maximize the use of Federal resources.

(b) PROPOSALS.—An applicant for an award under this section shall submit a proposal to the Director, at such time, in such manner, and containing such information as the Director may reasonably require. The proposal shall, at a minimum, describe—

(1) the technology or technologies that will be the focus of the test bed;

(2) the goals of the work to be done at the test bed;

(3) how the applicant will assemble a workforce with the skills needed to operate the test bed;

(4) how the applicant will ensure broad access to the test bed;

(5) how the applicant will collaborate with firms in critical technologies, including through coordi-

nated research and development and funding, to ensure that work in the test bed will contribute to the commercial viability of any technologies and will include collaboration from industry and labor organizations;

(6) how the applicant will encourage the participation of inventors and entrepreneurs and the development of new businesses;

(7) how the applicant will increase participation by populations that are underrepresented in STEM;

(8) how the applicant will demonstrate that the commercial viability of any new technologies will support the creation of high-quality domestic jobs;

(9) how the test bed will operate after Federal funding has ended;

(10) how the test bed will disseminate lessons and other technical information to United States entities or allied or partner country entities in the United States; and

(11) how the applicant plans to take measures to prevent the inappropriate use of research results, data, and intellectual property, as applicable and consistent with the requirements of the award.

(c) AUTHORIZED USE OF FUNDS.—A recipient of an award under this section may, consistent with the pur-

poses of this section, use the award for the purchase of equipment and for the support of students, faculty and staff, and postdoctoral researchers.

(d) GEOGRAPHIC DIVERSITY.—In selecting award recipients under this section, the Director shall consider the extent to which proposals would expand the geographic diversity of test beds.

SEC. 10391. PLANNING AND CAPACITY BUILDING AWARDS.

(a) IN GENERAL.—Under the program established in section 508 of the America COMPETES Reauthorization Act of 2010 (42 U.S.C. 1862p–2) and the activities authorized under this section, from amounts made available to the Directorate, the Director, in coordination with other Federal agencies as determined appropriate by the Director, shall make awards, on a competitive basis, to eligible entities to advance the development, adoption, and commercialization of technologies, consistent with the purposes of the Directorate under section 10382.

(b) ELIGIBLE ENTITY.—To be eligible to receive an award under this section, an entity shall be—

(1) an institution of higher education, which may be a community college (or a consortium of such institutions);

(2) a nonprofit organization that is either affiliated with an institution of higher education or de-

signed to support technology development or entrepreneurship; or

(3) a consortium that includes—

(A) an entity described in paragraph (1) or (2) as the lead award recipient; and

(B) one or more additional individuals or entities, which shall be—

(i) an economic development organization or similar entity that is focused primarily on improving science, technology, innovation, or entrepreneurship;

(ii) an industry organization or firm in a relevant technology or innovation sector;

(iii) an industry-experienced executive with entrepreneurship experience that is focused primarily on de-risking technologies from both a scientific and a business perspective; or

(iv) an individual or entity with industry and startup expertise, including a mentor network, across relevant technology or innovation sectors.

(c) USE OF FUNDS.—In addition to activities listed under section 10383, an eligible entity receiving an award under this section may use funds to—

(1) identify academic research with the potential for technology transfer and commercialization, particularly as relevant to the purposes of the Directorate under section 10382;

(2) ensure the availability of staff, including technology transfer professionals, entrepreneurs in residence, and other mentors as required to accomplish the purpose of this section;

(3) help offset the costs of patenting and licensing research products, both domestically and internationally;

(4) revise institution policies, including policies related to intellectual property and faculty entrepreneurship, and taking other necessary steps to implement relevant best practices for academic technology transfer;

(5) develop local, regional, and national partnerships among institutions of higher education and between institutions of higher education and private sector entities and other relevant organizations, including investors, with the purpose of building networks, expertise, and other capacity to identify

promising research that may have potential market value and enable researchers to pursue further development and transfer of their ideas into possible commercial or other use;

(6) develop seminars, courses, and other educational opportunities for students, post-doctoral researchers, faculty, and other relevant staff at institutions of higher education to increase awareness and understanding of entrepreneurship, patenting, business planning, research security, and other areas relevant to technology transfer, and connect students and researchers to relevant resources, including mentors in the private sector; and

(7) create, support, or fund entities or competitions to allow entrepreneurial students and faculty to illustrate the commercialization potential of their ideas, including through venture funds of institution of higher education.

(d) LIMITATIONS ON FUNDING.—

(1) Awards made under this section shall be at least 3 years in duration and shall not exceed $1,000,000 per fiscal year.

(2) Awards made under this section shall not support the development or operation of capital investment funds.

(e) APPLICATION.—An eligible entity seeking funding under this section shall submit an application to the Director at such time, in such manner, and containing such information and assurances as such Director may require. The application shall include, at a minimum, a description of—

(1) how the eligible entity submitting an application plans to sustain the proposed activities beyond the duration of the award;

(2) the steps the applicant will take to enable technology transfer and adoption and why such steps are likely to be effective;

(3) how the applicant will encourage the training and participation of students and potential entrepreneurs and the transition of research results to practice, including the development of new businesses;

(4) as relevant, potential steps to drive economic growth in a particular region, by collaborating with industry, venture capital entities, non-profit organizations, and State and local governments within that region; and

(5) background information that the Director determines is relevant to demonstrate the success of the innovation and entrepreneurship support models

proposed by the applicant to commercialize technologies.

(f) COLLABORATIVE INNOVATION RESOURCE CENTER PROGRAM.—

(1) IN GENERAL.—The Director shall make awards under this section to eligible entities to establish collaborative innovation resource centers that promote regional technology transfer and technology development activities available to more than one institution of higher education and to other entities in a region.

(2) USE OF FUNDS.—An eligible entity that receives an award under this subsection shall use award funds to carry out one or more of the following activities, to the benefit of the region in which the center is located:

(A) Providing start-ups and small business concerns (as defined in section 3 of the Small Business Act (15 U.S.C. 632)) within the region with access to facilities, scientific infrastructure, personnel, and other assets as required for technology maturation.

(B) Supporting entrepreneurial training for start-up and small business personnel.

(3) Providing engineering and entrepreneurial experiences and hands-on training for students enrolled in participating institutions of higher education.

(g) REPORTING ON COMMERCIALIZATION METRICS.—The Director shall establish—

(1) metrics related to commercialization for an award under this section; and

(2) a reporting schedule for recipients of such awards that takes into account both short- and long-term goals of the programs under this section.

(h) GEOGRAPHIC DIVERSITY.—The Director shall ensure regional and geographic diversity in issuing awards under this section.

(i) AUTHORIZATION OF APPROPRIATIONS.—From within funds authorized for the Directorate for Technology, Innovation, and Partnerships, there are authorized to carry out the activities under this section $3,100,000,000 for fiscal years 2023 through 2027.

SEC. 10392. ENTREPRENEURIAL FELLOWSHIPS.

(a) IN GENERAL.—The Director, acting through the Directorate for Technology, Innovation, and Partnerships, shall award fellowships to scientists and engineers to help develop leaders capable of maturing promising ideas and technologies from lab to market or other use and forge

connections between academic research and the government, industry, financial sectors, and other end users.

(b) APPLICATION.—An applicant for a fellowship under this section shall submit to the Director an application at such time, in such manner, and containing such information as the Director may require. At a minimum, the Director shall require that applicants—

(1) have completed a doctoral degree in a STEM field no more than 5 years prior to the date of the application, or have otherwise demonstrated significant postbaccalaureate scientific research experience and are considered early career, according to requirements established by the Director; and

(2) have included in the application a proposal for how the fellow will be embedded in a host institution's research environment.

(c) OUTREACH.—The Director shall conduct program outreach to recruit fellowship applicants—

(1) from diverse research institutions;

(2) from all regions of the country; and

(3) from groups historically underrepresented in STEM fields.

(d) ADMINISTRATION AGREEMENTS.—The Director may enter into an agreement with a qualified third-party

entity to administer the fellowships, subject to the provisions of this section.

(e) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the Director a total of $125,000,000 for fiscal years 2023 through 2027, to carry out the activities outlined in this section.

SEC. 10393. SCHOLARSHIPS AND FELLOWSHIPS.

(a) IN GENERAL.—The Director, acting through the Directorate, shall fund undergraduate scholarships (including at community colleges), graduate fellowships and traineeships, and postdoctoral awards in the key technology focus areas.

(b) IMPLEMENTATION.—The Director may carry out subsection (a) by making awards—

(1) directly to students; and

(2) to institutions of higher education or consortia of institutions of higher education, including those institutions or consortia involved in operating Regional Innovation Engines established under section 10388.

(c) BROADENING PARTICIPATION.—In carrying out this section, the Director shall take steps to increase the participation of populations that are underrepresented in STEM, which may include—

(1) establishing or augmenting programs targeted at populations that are underrepresented in STEM;

(2) supporting traineeships or other relevant programs at historically Black colleges and universities, Tribal Colleges or Universities, and minority-serving institutions;

(3) enabling low-income populations to pursue associate, undergraduate, or graduate level degrees in STEM;

(4) addressing current and expected gaps in the availability or skills of the STEM workforce, or addressing needs of the STEM workforce, including by increasing educational capacity at institutions and by prioritizing awards to United States citizens, permanent residents, and individuals that will grow the domestic workforce; and

(5) addressing geographic diversity in the STEM workforce.

(d) ENCOURAGING INNOVATION.—In carrying out this section, the Director shall encourage innovation in graduate education, including through encouraging institutions of higher education to offer graduate students opportunities to gain experience in industry or Government as part of their graduate training, and through support

for students in professional master's programs related to the key technology focus areas or to the societal, national, and geostrategic challenges.

(e) AREAS OF FUNDING SUPPORT.—Subject to the availability of funds to carry out this section, the Director shall—

(1) issue—

(A) postdoctoral awards,

(B) graduate fellowships and traineeships, inclusive of the NSF Research Traineeships and fellowships awarded under the Graduate Research Fellowship Program; and

(C) scholarships, including undergraduate scholarships, research experiences, and internships, including—

(i) scholarships to attend community colleges; and

(ii) research experiences and internships under sections 513, 514, and 515 of the America COMPETES Reauthorization Act of 2010 (42 U.S.C. 1862p–5; 1862p–6; 1862p–7);

(2) ensure that not less than 10 percent of the funds made available to carry out this section are used to support additional awards that focus on

community college training, education, and teaching programs that increase the participation of populations that are historically underrepresented in STEM, including technical programs through programs such as the Advanced Technological Education program; and

(3) if funds remain after carrying out paragraphs (1) and (2) make awards to institutions of higher education to enable the institutions to fund the development and establishment of new or specialized programs of study for graduate, undergraduate, or technical college students and the evaluation of the effectiveness of those programs of study.

(f) LOW-INCOME SCHOLARSHIP PROGRAM.—

(1) IN GENERAL.—The Director shall award scholarships to low-income individuals to enable such individuals to pursue associate, undergraduate, or graduate level degrees in STEM fields.

(2) ELIGIBILITY.—

(A) IN GENERAL.—To be eligible to receive a scholarship under this subsection, an individual—

(i) must be a citizen of the United States, a national of the United States (as

defined in section 1101(a) of title 8), an alien admitted as a refugee under section 1157 of title 8, or an alien lawfully admitted to the United States for permanent residence;

(ii) shall prepare and submit to the Director an application at such time, in such manner, and containing such information as the Director may require; and

(iii) shall certify to the Director that the individual intends to use amounts received under the scholarship to enroll or continue enrollment at an institution of higher education (as defined in section 1001(a) of title 20) in order to pursue an associate, undergraduate, or graduate level degree in STEM fields designated by the Director.

(B) ABILITY.—Awards of scholarships under this subsection shall be made by the Director solely on the basis of the ability of the applicant, except that in any case in which 2 or more applicants for scholarships are deemed by the Director to be possessed of substantially equal ability, and there are not sufficient schol-

arships available to award one to each of such applicants, the available scholarship or scholarships shall be awarded to the applicants in a manner that will tend to result in a geographically wide distribution throughout the United States recipients' places of permanent residence.

(3) SCHOLARSHIP AMOUNT AND RENEWAL.—Section 414(d) of the American Competitiveness and Workforce Improvement Act of 1998 (42 U.S.C. 1869c) is amended in paragraph (3) by—

(A) striking ", except that the Director shall not award a scholarship in an amount exceeding $10,000 per year"; and

(B) striking "4 years" and inserting "5 years".

(4) AUTHORIZATION.—Of amounts authorized for the Directorate for Technology, Innovation, and Partnerships, $100,000,000 shall be authorized to carry out this subsection.

(g) EXISTING PROGRAMS.—The Director may use or augment existing STEM education programs of the Foundation and leverage education or entrepreneurial partners to carry out this section.

SEC. 10394. RESEARCH AND DEVELOPMENT AWARDS.

(a) IN GENERAL.—From amounts made available for the Directorate, the Director shall make awards, on a competitive basis, for research and technology development within the key technology focus areas, including investments that advance solutions to the challenges under section 10387.

(b) PURPOSE.—The purpose of the awards under this section shall be to accelerate technological advances and technology adoption in the key technology focus areas.

(c) RECIPIENTS.—Recipients of funds under this section may include institutions of higher education, research institutions, non-profit organizations, private sector entities, consortia, or other entities as defined by the Director.

(d) METRICS.—The Director may set metrics, including goals and deadlines, for the development and demonstration of technology as determined in the terms of the award, and may use such metrics to determine whether an award recipient shall be eligible for continued or follow-on funding.

(e) SHORT TERM TECHNOLOGY DEPLOYMENT.—The Director shall also make awards, including through the SBIR and STTR programs (as defined in section 9(e) of the Small Business Act (15 U.S.C. 638(e)), to expedite short-term technology deployment within a period of no longer than 24 months.

(f) SELECTION CRITERIA.—In selecting recipients for an award under this section, the Director shall consider, at a minimum—

(1) the relevance of the project to the challenges and the key technology focus areas under section 10387, and the potential of the project to result in transformational advances for such challenges and the key technology focus areas;

(2) the current status of similar technology, the limits of current practice, and the novelty and risks of the proposed project;

(3) the ethical, societal, safety, and security implications relevant to the application of the technology;

(4) the appropriateness of quantitative goals and metrics for evaluating the project and a plan for evaluating those metrics; and

(5) the path for developing and, as appropriate, commercializing the technology into products and processes in the United States.

(g) AUTHORIZATION OF APPROPRIATIONS.—From within funds authorized for the Directorate for Technology, Innovation, and Partnerships, there are authorized to carry out the activities under this section $1,000,000,000 for fiscal years 2023 through 2027.

SEC. 10395. SCALING INNOVATIONS IN PREK–12 STEM EDUCATION.

(a) IN GENERAL.—Taking into consideration the recommendations under section 10311(a)(4) of subtitle B, the Director shall make awards, on a competitive, merit-reviewed basis, to establish multidisciplinary Centers for Transformative Education Research and Translation (in this section referred to as ''Centers'') to support research and development on widespread and sustained implementation of STEM education innovations.

(b) ELIGIBILITY.—The entity seeking an award for a Center under this section must be an institution of higher education, a nonprofit organization, or a consortium of such institutions or organizations, which may include a STEM ecosystem .

(c) APPLICATION.—An eligible entity under subsection (b) seeking an award under this section shall submit an application to the Director at such time, in such manner, and containing such information as the Director may require. The application shall include, at a minimum, a description of how the proposed Center will be used to—

(1) establish partnerships among academic institutions, local or State educational agencies, and other relevant stakeholders in supporting programs and activities to facilitate the widespread and sustained implementation of promising, evidence-based

STEM education practices, models, programs, curriculum, and technologies;

(2) support enhanced STEM education infrastructure, including cyberlearning technologies, to facilitate the widespread adoption of promising, evidence-based practices;

(3) support research and development on scaling practices, partnerships, and alternative models to current approaches, including approaches sensitive to the unique combinations of capabilities, resources, and needs of varying localities, educators, and learners;

(4) include a focus on the learning needs of under-resourced schools and learners in low-resource or underachieving local educational agencies in urban and rural communities and the development of high-quality curriculum that engages these learners in the knowledge and practices of STEM fields;

(5) include a focus on the learning needs and unique challenges facing students with disabilities;

(6) support research, development, or education on one or more of the key technology focus areas;

(7) support research and development on scaling practices and models to support and sustain

highly-qualified STEM educators in urban and rural communities; and

(8) at the discretion of the Director, any other requirements recommended in the study commissioned under section 10311(a) of subtitle B.

(d) ADDITIONAL CONSIDERATIONS.—In making an award under this section, the Director may also consider the extent to which the proposed Center will—

(1) leverage existing collaborations, tools, and strategies supported by the Foundation, including NSF INCLUDES and the Convergence Accelerators;

(2) support research on and the development and scaling of innovative approaches to distance learning and education for various student populations;

(3) support education innovations that leverage new technologies or deepen understanding of the impact of technology on educational systems; and

(4) include a commitment from local or State education administrators to making the proposed reforms and activities a priority.

(e) PARTNERSHIP.—In carrying out the program under this section, the Director shall explore opportunities

to partner with the Department of Education, including through jointly funding activities under this section.

(f) DURATION.—Each award made under this section shall be for a duration of no more than 5 years.

(g) ANNUAL MEETING.—The Director shall encourage and facilitate an annual meeting of the Centers, as appropriate, to foster collaboration among the Centers and to further disseminate the results of the Centers' supported activities.

(h) EXISTING PROGRAMS.—The Director may use existing NSF programs to establish and execute this section.

(i) REPORT.—Not later than 5 years after the date of enactment of this Act, the Director shall submit to Congress and make widely available to the public a report that includes—

(1) a description of the focus and proposed goals of each Center;

(2) an assessment, based on a common set of benchmarks and tools, of the Centers' success in helping to promote scalable solutions in PreK–12 STEM education; and

(3) any recommendations for administrative and legislative action that could optimize the effectiveness of the Centers established under this section.

SEC. 10396. AUTHORITIES.

In addition to existing authorities available to the Foundation, the Director may exercise the following authorities in carrying out the activities under this subtitle:

(1) AWARDS.—In carrying out this subtitle, the Director may provide awards in the form of grants, contracts, cooperative agreements, cash prizes, and other transactions.

(2) PROGRAM DIRECTORS.—

(A) DESIGNATION.—The Director may designate individuals to serve as program directors for the programs established within the Directorate pursuant to the responsibilities established under subparagraph (B). The Director shall ensure that program directors—

(i) have expertise in one or more of the challenges and key technology focus areas under section 10387; and

(ii) come from a variety of backgrounds, including industry, and from a variety of institutions of higher education.

(B) RESPONSIBILITIES.—A program director of a program of the Directorate, in consultation with the Assistant Director, shall be responsible for—

(i) establishing research and development goals for the program, including through the convening of workshops, conferring with a broad range of stakeholders and outside experts, taking into account relevant expert reports, and publicizing the goals of the program to the public and private sectors;

(ii) surveying a wide range of institutions of higher education, nonprofit organizations, and private entities to identify emerging trends in the challenges and key technology focus areas under section 10387, and, as appropriate, soliciting proposals from such entities to conduct research in areas of particular promise that the private sector is the not likely to undertake independently.

(iii) facilitating research collaborations in the challenges and key technology focus areas under section 10387, including connecting academic researchers with potential end-users of technology, including industry, labor organizations, nonprofit or-

ganizations, civil society organizations, and other relevant organizations;

(iv) reviewing applications for projects submitted under section 10394 according to the Merit Review Criteria established by the Director for such projects and described in the Foundation's Proposal and Award Policies and Procedures Guide, and any such additional criteria as determined by the Director; and

(v) monitoring the progress of projects supported under the program and taking into account input from relevant experts and stakeholders, recommending program updates as needed.

(C) SELECTION CRITERIA.—Program directors may use diverse merit review models for selection of award recipients under section 10394, including internal review and different models that use peer review.

(D) TERMS.—Program directors of the Directorate may be appointed by the Director for a limited term, renewable at the discretion of the Director.

(3) EXPERTS IN SCIENCE AND ENGINEERING.—

(A) PROGRAM AUTHORIZED.—The Foundation may carry out a program of personnel management authority provided under subparagraph (B) in order to facilitate recruitment of eminent experts in science or engineering for research and development projects and to enhance the administration and management of the Foundation.

(B) PERSONNEL MANAGEMENT AUTHORITY.—Under the program under subparagraph (A), the Foundation may—

(i) without regard to any provision of title 5, United States Code, governing the appointment of employees in the competitive service, appoint individuals to a total of not more than 70 positions in the Foundation, of which not more than 5 such positions may be positions of administration or management of the Foundation;

(ii) prescribe the rates of basic pay for positions to which employees are appointed under clause (i)—

(I) in the case of employees appointed pursuant to clause (i) to any of 5 positions designated by the Foun-

dation for purposes of this clause, at rates not in excess of a rate equal to 150 percent of the maximum rate of basic pay authorized for positions at level I of the Executive Schedule under section 5312 of title 5, United States Code; and

(II) in the case of any other employee appointed pursuant to clause (i), at rates not in excess of the maximum rate of basic pay authorized for senior-level positions under section 5376 of title 5, United States Code; and

(iii) pay any employee appointed under subparagraph (A), other than an employee appointed to a position designated as described in clause (ii)(I), payments in addition to basic pay within the limit applicable to the employee under subparagraph (D).

(C) LIMITATION ON TERM OF APPOINTMENT.—

(i) IN GENERAL.—Except as provided in clause (ii), the service of an employee

under an appointment under subparagraph (B)(i) may not exceed 4 years.

(ii) EXTENSION.—The Director may, in the case of a particular employee under the program under subparagraph (A), extend the period to which service is limited under clause (i) by up to 2 years if the Director determines that such action is necessary to promote the efficiency of the Foundation.

(D) MAXIMUM AMOUNT OF ADDITIONAL PAYMENTS PAYABLE.—Notwithstanding any other provision of this subsection or section 5307 of title 5, United States Code, no additional payments may be paid to an employee under subparagraph (B)(iii) in any calendar year if, or to the extent that, the employee's total annual compensation in such calendar year will exceed the maximum amount of total annual compensation payable at the salary set in accordance with section 104 of title 3, United States Code.

(4) HIGHLY QUALIFIED EXPERTS IN NEEDED OCCUPATIONS.—

(A) IN GENERAL.—The Foundation may carry out a program using the authority provided in subparagraph (B) in order to attract highly qualified experts in needed occupations, as determined by the Foundation. Individuals hired by the Director through such authority may include individuals with expertise in business creativity, innovation management, design thinking, entrepreneurship, venture capital, and related fields.

(B) AUTHORITY.—Under the program, the Foundation may—

(i) appoint personnel from outside the civil service and uniformed services (as such terms are defined in section 2101 of title 5, United States Code) to positions in the Foundation without regard to any provision of title 5, United States Code, governing the appointment of employees in the competitive service;

(ii) prescribe the rates of basic pay for positions to which employees are appointed under clause (i) at rates not in excess of the maximum rate of basic pay authorized

for senior-level positions under section 5376 of title 5, United States Code; and

(iii) pay any employee appointed under clause (i) payments in addition to basic pay within the limits applicable to the employee under subparagraph (D).

(C) LIMITATION ON TERM OF APPOINTMENT.—

(i) IN GENERAL.—Except as provided in clause (ii), the service of an employee under an appointment made pursuant to this subsection may not exceed 5 years.

(ii) EXTENSION.—The Foundation may, in the case of a particular employee, extend the period to which service is limited under clause (i) by up to 1 additional year if the Foundation determines that such action is necessary to promote the Foundation's national security missions.

(D) LIMITATIONS ON ADDITIONAL PAYMENTS.—

(i) TOTAL AMOUNT.—The total amount of the additional payments paid to an employee under this subsection for any 12-month period may not exceed the max-

imum amount of total compensation payable at the salary set in accordance with section 104 of title, United States Code.

(ii) ELIGIBILITY FOR PAYMENTS.—An employee appointed under this subsection is not eligible for any bonus, monetary award, or other monetary incentive for service, except for payments authorized under this subsection.

(E) LIMITATION ON NUMBER OF HIGHLY QUALIFIED EXPERTS.—The number of highly qualified experts appointed and retained by the Foundation under sub (B)(i) shall not exceed 70 at any time.

(F) SAVINGS PROVISIONS.—In the event that the Foundation terminates the program under this paragraph, in the case of an employee who, on the day before the termination of the program, is serving in a position pursuant to an appointment under this paragraph—

(i) the termination of the program does not terminate the employee's employment in that position before the expiration of the lesser of—

(I) the period for which the employee was appointed; or

(II) the period to which the employee's service is limited under subparagraph (C), including any extension made under this paragraph before the termination of the program; and

(ii) the rate of basic pay prescribed for the position under this paragraph may not be reduced as long as the employee continues to serve at an acceptable level of performance in the position without a break in service.

(5) ADDITIONAL HIRING AUTHORITY.—To the extent needed to carry out the duties under paragraph (1)(A), the Director is authorized to utilize hiring authorities under section 3372 of title 5, United States Code, to staff the Foundation with employees from other Federal agencies, State and local governments, Indian Tribes and Tribal organizations, institutions of higher education, and other organizations, as described in that section, in the same manner and subject to the same conditions,

that apply to such individuals utilized to accomplish other missions of the Foundation.

(6) NATIONAL ACADEMY OF PUBLIC ADMINISTRATION.—

(A) STUDY.—Not later than 30 days after the date of enactment of this Act, the Director shall contract with the National Academy of Public Administration to conduct a study on the organizational and management structure of the Foundation, to—

(i) evaluate and make recommendations to efficiently and effectively implement the Directorate for Technology, Innovation, and Partnerships; and

(ii) evaluate and make recommendations to ensure coordination of the Directorate for Technology, Innovation, and Partnerships with other directorates and offices of the Foundation and other Federal agencies.

(B) REVIEW.—Upon completion of the study under subparagraph (A), the Foundation shall review the recommendations from the National Academy of Public Administration and provide a briefing to Congress on the plans of

the Foundation to implement any such recommendations.

(7) PROVIDING AUTHORITY TO DISSEMINATE INFORMATION.—Section 11 of the National Science Foundation Act of 1950 (42 U.S.C. 1870) is amended—

(A) in subsection (j), by striking ''and'' after the semicolon;

(B) in subsection (k), by striking the period at the end and inserting ''; and''; and

(C) by adding at the end the following:

''(l) to provide for the widest practicable and appropriate dissemination of information within the United States concerning the Foundation's activities and the results of those activities.''.

SEC. 10397. COORDINATION OF ACTIVITIES.

(a) IN GENERAL.—In carrying out the activities of the Directorate, the Director shall coordinate and collaborate as appropriate with the Secretary of Energy, the Director of the National Institute of Standards and Technology, and the heads of other Federal research agencies, as appropriate, to further the goals of this subtitle.

(b) AVOID DUPLICATION.—The Director shall ensure, to the greatest extent practicable, that activities carried out by the Directorate are not duplicative of activities

supported by other parts of the Foundation or other relevant Federal agencies. In carrying out the activities prescribed by this division, the Director shall coordinate with the interagency working group established under subtitle F of title VI and heads of other Federal research agencies to ensure these activities enhance and complement, but do not constitute unnecessary duplication of effort and to ensure the responsible stewardship of funds.

(c) EMERGING TECHNOLOGIES.—After completion of the studies regarding emerging technologies conducted by the Secretary of Commerce under title XV of division FF of the Consolidated Appropriations Act, 2021 (Public Law 116–260), the Director shall consider the results of such studies in carrying out the activities of the Directorate.

SEC. 10398. ETHICAL, LEGAL, AND SOCIETAL CONSIDERATIONS.

The Director shall engage, as appropriate, experts in the social dimensions of science and technology and set up formal avenues for public input, as appropriate, to ensure that ethical, legal, and societal considerations are taken into account in the priorities and activities of the Directorate, including in the selection of the challenges and key technology focus areas under section 10387 and the award-making process, and throughout all stages of supported projects.

SEC. 10399. REPORTS AND ROADMAPS.

(a) ANNUAL REPORT.—The Director shall provide to the relevant authorizing and appropriations committees of Congress an annual report describing projects supported by the Directorate during the previous year.

(b) ROADMAP.—Not later than 1 year after the date of enactment of this Act, the Director shall provide to the relevant authorizing and appropriations committees of Congress a roadmap describing the strategic vision that the Directorate will use to guide investment decisions over the following 3 years.

(c) REPORTS.—Not later than 1 year after the date of enactment of this Act and every 3 years thereafter, the Director, in consultation with the heads of relevant Federal agencies, shall prepare and submit to Congress—

(1) a strategic vision for the next 5 years for the Directorate, including a description of how the Foundation will increase funding for research and education for populations underrepresented in STEM and geographic areas; and

(2) a description of the planned activities of the Directorate to secure federally funded science and technology pursuant to section 1746 of the National Defense Authorization Act for Fiscal Year 2020 (Public Law 116–92; 42 U.S.C. 6601 note) and section 223 of William M. (Mac) Thornberry National

Defense Authorization Act for Fiscal Year 2021 (Public Law 116–283) and the requirements under subtitle D of this title and subtitle E of title VI .

(d) SELECTION CRITERIA REPORT.—Not later than 24 months after the establishment of the Directorate, the Director shall prepare and submit a report to Congress regarding the use of alternative methods for the selection of award recipients and the distribution of funding to recipients, as compared to the traditional peer review process.

SEC. 10399A. EVALUATION.

(a) IN GENERAL.—After the Directorate has been in operation for 6 years, the Director shall enter into an agreement with the National Academies to provide an evaluation of how well the Directorate is achieving the purposes identified in section 10382.

(b) INCLUSIONS.—The evaluation shall include—

(1) an assessment of the impact of Directorate activities on the Foundation's primary science mission;

(2) an assessment of the Directorate's impact on the challenges and key technology focus areas under section 10387;

(3) an assessment of efforts to ensure coordination between the Directorate and other Federal agencies, and with external entities;

(4) a description of lessons learned from operation of the Directorate; and

(5) recommended funding levels for the Directorate;

(c) AVAILABILITY.—On completion of the evaluation, the evaluation shall be made available to Congress and the public.

Subtitle H—Administrative Amendments

SEC. 10399D. SUPPORTING VETERANS IN STEM CAREERS.

Section 3(c) of the Supporting Veterans in STEM Careers Act (42 U.S.C. 1862t) is amended by striking ''annual'' and inserting ''biennial''.

SEC. 10399E. SUNSHINE ACT COMPLIANCE.

Section 15(a) of the National Science Foundation Authorization Act of 2002 (42 U.S.C. 1862n–5(a)) is amended—

(1) so that paragraph (3) reads as follows:

''(3) COMPLIANCE REVIEW.—The Inspector General of the Foundation shall conduct a review of the compliance by the Board with the requirements described in paragraph (2) as necessary based on a

triennial risk assessment. Any review deemed necessary shall examine the proposed and actual content of closed meetings and determine whether the closure of the meetings was consistent with section 552b of title 5, United States Code.''; and

(2) by striking paragraphs (4) and (5) and inserting the following:

''(4) MATERIALS RELATING TO CLOSED PORTIONS OF MEETING.—To facilitate the risk assessment required under paragraph (3) of this subsection, and any subsequent review conducted by the Inspector General, the Office of the National Science Board shall maintain the General Counsel's certificate, the presiding officer's statement, and a transcript or recording of any closed meeting, for at least 3 years after such meeting.''.

SEC. 10399F. SCIENCE AND ENGINEERING INDICATORS REPORT SUBMISSION.

Section 4(j)(1) of the National Science Foundation Act of 1950 (42 U.S.C. 1863(j)(1)) is amended by striking ''January 15'' and inserting ''March 15''.

TITLE IV—BIOECONOMY RESEARCH AND DEVELOPMENT

SEC. 10401. DEFINITIONS.

In this title:

(1) INITIATIVE.—The term ''Initiative'' means the National Engineering Biology Research and Development Initiative established under section 10402.

(2) OMICS.—The term ''omics'' refers to the collective technologies used to explore the roles, relationships, and actions of the various types of molecules that make up the cells and systems of an organism and the systems level analysis of their functions.

SEC. 10402. NATIONAL ENGINEERING BIOLOGY RESEARCH AND DEVELOPMENT INITIATIVE.

(a) IN GENERAL.—The President, acting through the Office of Science and Technology Policy, shall implement a National Engineering Biology Research and Development Initiative to advance societal well-being, national security, sustainability, and economic productivity and competitiveness through the following:

(1) Advancing areas of research at the intersection of the biological, physical, chemical, data, and computational and information sciences and engineering to accelerate scientific understanding and technological innovation in engineering biology.

(2) Advancing areas of biomanufacturing research to optimize, standardize, scale, and deliver new products and solutions.

(3) Supporting social and behavioral sciences and economics research that advances the field of engineering biology and contributes to the development and public understanding of new products, processes, and technologies.

(4) Improving the understanding of engineering biology of the scientific and lay public and supporting greater evidence-based public discourse about its benefits and risks.

(5) Supporting research relating to the risks and benefits of engineering biology, including under subsection (d).

(6) Supporting the development of novel tools and technologies to accelerate scientific understanding and technological innovation in engineering biology.

(7) Expanding the number of researchers, educators, and students and a retooled workforce with engineering biology training, including from traditionally underrepresented and underserved populations.

(8) Accelerating the translation and commercialization of engineering biology and biomanufacturing research and development by the private sector.

(9) Improving the interagency planning and coordination of Federal Government activities related to engineering biology.

(b) INITIATIVE ACTIVITIES.—The activities of the Initiative shall include the following:

(1) Sustained support for engineering biology research and development through the following:

(A) Grants to fund the work of individual investigators and teams of investigators, including interdisciplinary teams.

(B) Projects funded under joint solicitations by a collaboration of not fewer than two agencies participating in the Initiative.

(C) Interdisciplinary research centers that are organized to investigate basic research questions, carry out technology development and demonstration activities, and increase understanding of how to scale up engineering biology processes, including biomanufacturing.

(2) Sustained support for databases and related tools, including the following:

(A) Support for the establishment, curation, and maintenance of curated genomics, epigenomics, and other relevant omics databases, including plant, animal, and microbial databases, that are available to researchers to carry out engineering biology research in a manner that does not compromise national security or the privacy or security of information within such databases.

(B) Development of standards for such databases, including for curation, interoperability, and protection of privacy and security.

(C) Support for the development of computational tools, including artificial intelligence tools, that can accelerate research and innovation using such databases.

(D) An inventory and assessment of all Federal government omics databases to identify opportunities to improve the utility of such databases, as appropriate and in a manner that does not compromise national security or the privacy and security of information within such databases, and inform investment in such databases as critical infrastructure for the engineering biology research enterprise.

(3) Sustained support for the development, optimization, and validation of novel tools and technologies to enable the dynamic study of molecular processes in situ, including through the following:

(A) Research conducted at Federal laboratories.

(B) Grants to fund the work of investigators at institutions of higher education and other nonprofit research institutions.

(C) Incentivized development of retooled industrial sites across the country that foster a pivot to modernized engineering biology initiatives.

(D) Awards under the Small Business Innovation Research Program and the Small Business Technology Transfer Program (as described in section 9 of the Small Business Act (15 U.S.C. 638)).

(4) Support for education and training of undergraduate and graduate students in engineering biology, biomanufacturing, bioprocess engineering, and computational science applied to engineering biology and in the related ethical, legal, environmental, safety, security, and other societal domains.

(5) Support for a national network of testbeds based on open standards, interfaces, and processes, including by repurposing existing facilities such as those specified in paragraph (3)(C), that would enable scale up of laboratory engineering biology research.

(6) Activities to develop robust mechanisms for documenting and quantifying the outputs and economic benefits of engineering biology.

(7) Activities to accelerate the translation and commercialization of new products, processes, and technologies by carrying out the following:

(A) Identifying precompetitive research opportunities.

(B) Facilitating public-private partnerships in engineering biology research and development, including to address barriers to scaling up innovations in engineering biology.

(C) Connecting researchers, graduate students, and postdoctoral fellows with entrepreneurship education and training opportunities.

(D) Supporting proof of concept activities and the formation of startup companies including through programs such as the Small Busi-

ness Innovation Research Program and the Small Business Technology Transfer Program.

(c) EXPANDING PARTICIPATION.—The Initiative shall include, to the maximum extent practicable, outreach to primarily undergraduate and historically Black colleges and universities, Tribal Colleges or Universities, and minority-serving institutions about Initiative opportunities, and shall encourage the development of research collaborations between research-intensive universities and primarily undergraduate and historically Black colleges and universities, Tribal Colleges or Universities, and minority-serving institutions.

(d) ETHICAL, LEGAL, ENVIRONMENTAL, SAFETY, SECURITY, AND SOCIETAL ISSUES.—Initiative activities shall take into account ethical, legal, environmental, safety, security, and other appropriate societal issues by carrying out the following:

(1) Supporting research, including in the social sciences, and other activities addressing ethical, legal, environmental, and other appropriate societal issues related to engineering biology, including integrating research on such topics with the research and development in engineering biology, and encouraging the dissemination of the results of such research, including through interdisciplinary engineer-

ing biology research centers described in subsection (b)(1)(C).

(2) Supporting research and other activities related to the safety and security implications of engineering biology, including outreach to increase awareness among Federal researchers and federally-funded researchers at institutions of higher education about potential safety and security implications of engineering biology research, as appropriate.

(3) Ensuring that input from Federal and non-Federal experts on the ethical, legal, environmental, safety, security, and other appropriate societal issues related to engineering biology is integrated into the Initiative.

(4) Ensuring, through the agencies and departments that participate in the Initiative, that public input and outreach are integrated into the Initiative by the convening of regular and ongoing public discussions through mechanisms such as workshops, consensus conferences, and educational events, as appropriate.

(5) Complying with all applicable provisions of Federal law.

SEC. 10403. INITIATIVE COORDINATION.

(a) INTERAGENCY COMMITTEE.—The President, acting through the Office of Science and Technology Policy, shall designate an interagency committee to coordinate activities of the Initiative as appropriate, which shall be co-chaired by the Office of Science and Technology Policy. The Director of the Office of Science and Technology Policy shall select an additional co-chairperson from among the members of the interagency committee. The interagency committee shall oversee the planning, management, and coordination of the Initiative. The interagency committee shall carry out the following:

(1) Provide for interagency coordination of Federal engineering biology research, development, and other activities undertaken pursuant to the Initiative.

(2) Establish and periodically update goals and priorities for the Initiative.

(3) Develop, not later than 12 months after the date of the enactment of this Act, and update every five years thereafter, a strategic plan submitted to the Committee on Science, Space, and Technology, the Committee on Agriculture, and the Committee on Energy and Commerce of the House of Representatives and the Committee on Commerce, Science, and Transportation, the Committee on Ag-

riculture, Nutrition, and Forestry, the Committee on Small Business and Entrepreneurship, and the Committee on Health, Education, Labor, and Pensions of the Senate that—

(A) guides the activities of the Initiative for purposes of meeting the goals and priorities established under (and updated pursuant to) paragraph (2); and

(B) describes—

(i) the Initiative's support for long-term funding for interdisciplinary engineering biology research and development;

(ii) the Initiative's support for education and public outreach activities;

(iii) the Initiative's support for research and other activities on ethical, legal, environmental, safety, security, and other appropriate societal issues related to engineering biology, including—

(I) an applied biorisk management research plan;

(II) recommendations for integrating security into biological data access and international reciprocity agreements;

(III) recommendations for manufacturing restructuring to support engineering biology research, development, and scaling-up initiatives; and

(IV) an evaluation of existing biosecurity governance policies, guidance, and directives for the purposes of creating an adaptable, evidence-based framework to respond to emerging biosecurity challenges created by advances in engineering biology;

(iv) how the Initiative will contribute to moving results out of the laboratory and into application for the benefit of society and United States competitiveness; and

(v) how the Initiative will measure and track the contributions of engineering biology to United States economic growth and other societal indicators.

(4) Develop a national genomic sequencing strategy to ensure engineering biology research fully leverages plant, animal, and microbe biodiversity, as appropriate and in a manner that does not compromise economic competitiveness, national security, or the privacy or security of human genetic informa-

tion, to enhance long-term innovation and competitiveness in engineering biology in the United States.

(5) Develop a plan to utilize Federal programs, such as the Small Business Innovation Research Program and the Small Business Technology Transfer Program (as described in section 9 of the Small Business Act (15 U.S.C. 638)), in support of the activities described in section 10402(b)(3).

(6) In carrying out this section, take into consideration the recommendations of the advisory committee established under section 10404, the results of the workshop convened under section 10402, existing reports on related topics, and the views of academic, State, industry, and other appropriate groups.

(b) QUINQUENNIAL REPORT.—Beginning with fiscal year 2023 and every five years thereafter for ten years, the interagency committee shall prepare and submit to the Committee on Science, Space, and Technology, the Committee on Energy and Commerce, and the Committee on Agriculture of the House of Representatives and the Committee on Commerce, Science, and Transportation, the Committee on Health, Education, Labor, and Pensions, the Committee on Small Business and Entrepreneurship,

and the Committee on Agriculture, Nutrition, and Forestry of the Senate a report that includes the following:

(1) A summarized agency budget in support of the Initiative for the current fiscal year, including a breakout of spending for each agency participating in the Program, and for the development and acquisition of any research facilities and instrumentation.

(2) An assessment of how Federal agencies are implementing the plan described in subsection (a)(3), including the following:

(A) A description of the amount and number of awards made under the Small Business Innovation Research Program and the Small Business Technology Transfer Program (as described in section 9 of the Small Business Act (15 U.S.C. 638)) in support of the Initiative.

(B) A description of the amount and number of projects funded under joint solicitations by a collaboration of not fewer than two agencies participating in the Initiative.

(C) A description of effects of newly-funded projects by the Initiative.

(c) INITIATIVE COORDINATION OFFICE.—

(1) IN GENERAL.—The President shall establish an Initiative Coordination Office, with a Director and full-time staff, which shall—

(A) provide technical and administrative support to the interagency committee and the advisory committee established under subsection (a) and section 10404;

(B) serve as the point of contact on Federal engineering biology activities for government organizations, academia, industry, professional societies, State governments, interested citizen groups, and others to exchange technical and programmatic information;

(C) oversee interagency coordination of the Initiative, including by encouraging and supporting joint agency solicitation and selection of applications for funding of activities under the Initiative, as appropriate;

(D) conduct public outreach, including dissemination of findings and recommendations of the advisory committee, as appropriate;

(E) serve as the coordinator of ethical, legal, environmental, safety, security, and other appropriate societal input; and

(F) promote access to, and early application of, the technologies, innovations, and expertise derived from Initiative activities to agency missions and systems across the Federal Government, and to United States industry, including startup companies.

(2) FUNDING.—The Director of the Office of Science and Technology Policy, in coordination with each participating Federal department and agency, as appropriate, shall develop and annually update an estimate of the funds necessary to carry out the activities of the Initiative Coordination Office and submit such estimate with an agreed summary of contributions from each agency to Congress as part of the President's annual budget request to Congress.

(3) TERMINATION.—The Initiative Coordination Office established under this subsection shall terminate on the date that is 10 years after the date of the enactment of this Act.

(d) RULE OF CONSTRUCTION.—Nothing in this section may be construed to alter the policies, processes, or practices of individual Federal agencies in effect on the day before the date of the enactment of this Act relating to the conduct of biomedical research and advanced devel-

opment, including the solicitation and review of extramural research proposals.

SEC. 10404. ADVISORY COMMITTEE ON ENGINEERING BIOLOGY RESEARCH AND DEVELOPMENT.

(a) IN GENERAL.—The agency co-chair of the interagency committee established under section 10403 shall, in consultation with the Office of Science and Technology Policy, designate or establish an advisory committee on engineering biology research and development (in this section referred to as the ''advisory committee'') to be composed of not fewer than 12 members, including representatives of research and academic institutions, industry, and nongovernmental entities, who are qualified to provide advice on the Initiative.

(b) ASSESSMENT.—The advisory committee shall assess the following:

(1) The current state of United States competitiveness in engineering biology, including the scope and scale of United States investments in engineering biology research and development in the international context.

(2) Current market barriers to commercialization of engineering biology products, processes, and tools in the United States.

(3) Progress made in implementing the Initiative.

(4) The need to revise the Initiative.

(5) The balance of activities and funding across the Initiative.

(6) Whether the strategic plan developed or updated by the interagency committee established under section 10403 is helping to maintain United States leadership in engineering biology.

(7) Whether ethical, legal, environmental, safety, security, and other appropriate societal issues are adequately addressed by the Initiative.

(c) REPORTS.—Beginning not later than two years after the date of the enactment of this Act and not less frequently than once every five years thereafter, the advisory committee shall submit to the President, the Committee on Science, Space, and Technology, the Committee on Energy and Commerce, and the Committee on Agriculture of the House of Representatives, and the Committee on Commerce, Science, and Transportation, the Committee on Health, Education, Labor, and Pensions, and the Committee on Agriculture, Nutrition, and Forestry of the Senate, a report on the following:

(1) The findings of the advisory committee's assessment under subsection (b).

(2) The advisory committee's recommendations for ways to improve the Initiative.

(d) APPLICATION OF FEDERAL ADVISORY COMMITTEE ACT.—Section 14 of the Federal Advisory Committee Act (5 U.S.C. App.) shall not apply to the advisory committee.

(e) TERMINATION.—The advisory committee established under subsection (a) shall terminate on the date that is 10 years after the date of the enactment of this Act.

SEC. 10405. EXTERNAL REVIEW OF ETHICAL, LEGAL, ENVIRONMENTAL, SAFETY, SECURITY, AND SOCIETAL ISSUES.

(a) IN GENERAL.—Not later than six months after the date of enactment of this Act, the Director of the National Science Foundation shall seek to enter into an agreement with the National Academies of Sciences, Engineering, and Medicine to conduct a review, and make recommendations with respect to, the ethical, legal, environmental, safety, security, and other appropriate societal issues related to engineering biology research and development. The review shall include the following:

(1) An assessment of the current research on such issues.

(2) A description of the research needs relating to such issues.

(3) Recommendations on how the Initiative can address the research needs identified pursuant to paragraph (2).

(4) Recommendations on how researchers engaged in engineering biology can best incorporate considerations of such issues into the development of research proposals and the conduct of research.

(b) REPORT TO CONGRESS.—The agreement entered into under subsection (a) shall require the National Academies of Sciences, Engineering, and Medicine to, not later than two years after the date of the enactment of this Act—

(1) submit to the Committee on Science, Space, and Technology and the Committee on Agriculture of the House of Representatives and the Committee on Commerce, Science, and Transportation and the Committee on Agriculture, Nutrition, and Forestry of the Senate a report containing the findings and recommendations of the review conducted under subsection (a); and

(2) make a copy of such report available on a publicly accessible website.

SEC. 10406. AGENCY ACTIVITIES.

(a) NATIONAL SCIENCE FOUNDATION.—As part of the Initiative, the National Science Foundation shall carry out the following:

(1) Support research in engineering biology and biomanufacturing through individual grants, collaborative grants, and through interdisciplinary research centers.

(2) Support research on the environmental, legal, ethical, and social implications of engineering biology.

(3) Provide support for research instrumentation, equipment, and cyberinfrastructure for engineering biology disciplines, including support for research, development, optimization, and validation of novel technologies to enable the dynamic study of molecular processes in situ.

(4) Support curriculum development and research experiences for secondary, undergraduate, and graduate students in engineering biology and biomanufacturing, including through support for graduate fellowships and traineeships in engineering biology.

(5) Award grants, on a competitive basis, to enable institutions to support graduate students and

postdoctoral fellows who perform some of their engineering biology research in an industry setting.

(b) DEPARTMENT OF COMMERCE.—

(1) NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY.—As part of the Initiative, the Director of the National Institute of Standards and Technology shall carry out the following:

(A) Advance the development of standard reference materials and measurements, including to promote interoperability between new component technologies and processes for engineering biology and biomanufacturing discovery, innovation, and production processes.

(B) Establish new data tools, techniques, and processes necessary to advance engineering biology and biomanufacturing.

(C) Provide access to user facilities with advanced or unique equipment, services, materials, and other resources to industry, institutions of higher education, nonprofit organizations, and government agencies to perform research and testing.

(D) Provide technical expertise to inform the potential development of guidelines or safe-

guards for new products, processes, and systems of engineering biology.

(2) NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION.—As part of the initiative, the Administrator of the National Oceanic and Atmospheric Administration shall carry out the following:

(A) Conduct and support research in omics and associated bioinformatic sciences and develop tools and products to improve ecosystem stewardship, monitoring, management, assessments. and forecasts, consistent with the mission of the agency.

(B) Collaborate with other agencies to understand potential environmental threats and safeguards related to engineering biology.

(c) DEPARTMENT OF ENERGY.—As part of the Initiative, the Secretary of Energy shall carry out the following:

(1) Conduct and support research, development, demonstration, and commercial application activities in engineering biology, including in the areas of synthetic biology, advanced biofuel and bioproduct development, biobased materials, and environmental remediation.

(2) Support the development, optimization and validation of novel, scalable tools and technologies to enable the dynamic study of molecular processes in situ.

(3) Provide access to user facilities with advanced or unique equipment, services, materials, and other resources, including secure access to high-performance computing, as appropriate, to industry, institutions of higher education, nonprofit organizations, and government agencies to perform research and testing;.

(4) Strengthen collaboration between the Office of Science and the Energy Efficiency and Renewable Energy Office to help transfer fundamental research results to industry and accelerate commercial applications.

(d) DEPARTMENT OF DEFENSE.—As part of the Initiative, the Secretary of Defense shall carry out the following:

(1) Conduct and support research and development in engineering biology and associated data and information sciences.

(2) Support curriculum development and research experiences in engineering biology and associated data and information sciences across the mili-

tary education system, including the service academies, professional military education, and military graduate education.

(3) Assess risks of potential national security and economic security threats relating to engineering biology.

(e) NATIONAL AERONAUTICS AND SPACE ADMINISTRATION.—As part of the Initiative, the National Aeronautics and Space Administration shall carry out the following:

(1) Conduct and support research in engineering biology, including in synthetic biology, and related to Earth and space sciences, aeronautics, space technology, and space exploration and experimentation, consistent with the priorities established in the National Academies' decadal surveys.

(2) Award grants, on a competitive basis, that enable institutions to support graduate students and postdoctoral fellows who perform some of their engineering biology research in an industry setting.

(f) DEPARTMENT OF AGRICULTURE.—As part of the Initiative, the Secretary of Agriculture shall support research and development in engineering biology through the Agricultural Research Service, the National Institute of

Food and Agriculture programs and grants, and the Office of the Chief Scientist.

(g) ENVIRONMENTAL PROTECTION AGENCY.—As part of the Initiative, the Environmental Protection Agency shall support research on how products, processes, and systems of engineering biology will affect or can protect the environment.

(h) DEPARTMENT OF HEALTH AND HUMAN SERVICES.—As part of the Initiative, the Secretary of Health and Human Services, as appropriate and consistent with activities of the Department of Health and Human Services in effect on the day before the date of the enactment of this Act, shall carry out the following:

(1) Support research and development to advance the understanding and application of engineering biology for human health.

(2) Support relevant interdisciplinary research and coordination.

(3) Support activities necessary to facilitate oversight of relevant emerging biotechnologies.

SEC. 10407. RULE OF CONSTRUCTION.

Nothing in this title may be construed to require public disclosure of information that is exempt from mandatory disclosure under section 552 of title 5, United States Code.

TITLE V—BROADENING PARTICIPATION IN SCIENCE

Subtitle A—STEM Opportunities

SEC. 10501. FEDERAL RESEARCH AGENCY POLICIES FOR CAREGIVERS.

(a) OSTP GUIDANCE.—Not later than 12 months after the date of the enactment of this Act, the Director, in consultation with the heads of relevant agencies, shall provide guidance to each Federal research agency to establish policies that—

(1) apply to all—

(A) research awards granted by such agency; and

(B) principal investigators of such research and their trainees, including postdoctoral researchers and graduate students, who have caregiving responsibilities, including care for a newborn or newly adopted child and care for an immediate family member who has a disability or a serious health condition; and

(2) provide, to the extent feasible—

(A) flexibility in timing for the initiation of approved research awards granted by such agency;

(B) no-cost extensions of such research awards;

(C) award supplements, as appropriate, to research awards to sustain research activities conducted under such awards; and

(D) any other appropriate accommodations at the discretion of the director of each such agency.

(b) UNIFORMITY OF GUIDANCE.—In providing guidance under subsection (a), the Director shall encourage uniformity, to the extent practicable, and consistency in the policies established pursuant to such guidance across all Federal research agencies.

(c) ESTABLISHMENT OF POLICIES.—Consistent, to the extent practicable, with the guidance under subsection (a), Federal research agencies shall—

(1) maintain or develop and implement policies for individuals described in paragraph (1)(B) of such subsection; and

(2) broadly disseminate in easily accessible formats such policies to current and potential award recipients.

(d) DATA ON USAGE.—Federal research agencies shall consider—

(1) collecting data, including demographic data that can be disaggregated by sex, geographic location, and socioeconomic indicators, which may include employment status, occupation, educational attainment, parental education, and income, on the usage of the policies under subsection (c), at both institutions of higher education and Federal laboratories; and

(2) reporting such data on an annual basis to the Director in such form as required by the Director.

SEC. 10502. COLLECTION AND REPORTING OF DATA ON FEDERAL RESEARCH AWARDS.

(a) COLLECTION OF DATA.—

(1) IN GENERAL.—Each Federal research agency shall collect, as practicable, with respect to all applications for merit-reviewed research and development awards made by such agency, standardized record-level annual information on demographics, primary field, award type, institution type, review rating, budget request, funding outcome, and awarded budget.

(2) UNIFORMITY AND STANDARDIZATION.—The Director, in consultation with the heads of each Federal research agency, shall establish, and update as

necessary, a policy to ensure uniformity and standardization of the data collection required under paragraph (1).

(3) RECORD-LEVEL DATA.—

(A) REQUIREMENT.—Beginning not later than two years after the issuance of the policy under paragraph (2) to Federal research agencies, and on an annual basis thereafter, each Federal research agency shall submit to the National Center for Science and Engineering Statistics record-level data collected under paragraph (1) in the form required by the Director of the National Science Foundation.

(B) PREVIOUS DATA.—As part of the first submission under subparagraph (A), each Federal research agency, to the extent practicable, shall also submit comparable record-level data, if it is available to the agency, for the five years preceding the date of such submission, or an analysis for why such data cannot be provided.

(b) REPORTING OF DATA.—The Director of the National Science Foundation shall publish statistical summary data, as practicable, collected under this section, disaggregated and cross-tabulated by race, ethnicity, sex, socioeconomic indicators, which may include employment

status, occupation, educational attainment, parental education, and income, geographic location, and years since completion of doctoral degree, including in conjunction with the National Science Foundation's report required by section 37 of the Science and Engineering Equal Opportunities Act (42 U.S.C. 1885d; Public Law 96–516).

SEC. 10503. POLICIES FOR REVIEW OF FEDERAL RESEARCH AWARDS.

(a) ASSESSMENT OF POLICIES.—Federal research agencies shall regularly assess, and update as necessary, policies, and practices to remove or reduce cultural and institutional barriers limiting the recruitment, retention, and success of groups historically underrepresented in STEM research careers, including policies and practices relevant to the unbiased review of Federal research applications.

(b) CONSIDERATIONS AND ACTIVITIES.—In carrying out the requirements under subsection (a), Federal research agencies shall—

(1) review current levels of participation of groups historically underrepresented in STEM in peer-review panels and consider approaches for expanding their participation;

(2) analyze the data collected under section 10502, including funding rates of proposals from all

groups, including those historically underrepresented in STEM;

(3) collect and disseminate best practices to remove or reduce cultural and institutional barriers limiting the recruitment, retention, and success of groups historically underrepresented in STEM research careers; and

(4) implement evidence-based policies and practices to achieve the goals of this section.

SEC. 10504. COLLECTION OF DATA ON DEMOGRAPHICS OF FACULTY.

(a) COLLECTION OF DATA.—

(1) IN GENERAL.—Not later than 5 years after the date of the enactment of this Act and at least every five years thereafter, the Director of the National Science Foundation shall carry out a survey to collect data from award recipients on the demographics of STEM faculty, by broad fields of STEM, at different types of institutions of higher education that receive Federal research funding.

(2) SURVEY CONSIDERATIONS.—To the extent practicable, the Director of the National Science Foundation shall survey, by sex, race, socioeconomic indicators, which may include employment status, occupation, educational attainment, parental edu-

cation, and income, geographic location, ethnicity, citizenship status, and years since completion of doctoral degree—

(A) the number and percentage of faculty;

(B) the number and percentage of faculty at each rank;

(C) the number and percentage of faculty who are in nontenure-track positions, including teaching and research;

(D) the number and percentage of faculty who are reviewed for promotion, including tenure, and the percentage of that number who are promoted, including being awarded tenure;

(E) faculty years in rank;

(F) the number and percentage of faculty to leave tenure-track positions;

(G) the number and percentage of faculty hired, by rank; and

(H) the number and percentage of faculty in leadership positions.

(b) EXISTING SURVEYS.—The Director of the National Science Foundation, may, in modifying or expanding existing Federal surveys of higher education (as necessary)—

(1) take into account the considerations under subsection (a)(2) by collaborating with statistical centers at other Federal agencies; or

(2) make an award to an institution of higher education or nonprofit organization (or consortia thereof) to take such considerations into account.

(c) REPORTING DATA.—The Director of the National Science Foundation shall publish statistical summary data collected under this section, including as part of the National Science Foundation's report required by section 37 of the Science and Engineering Equal Opportunities Act (42 U.S.C. 1885d; Public Law 96–516).

(d) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the Director of the National Science Foundation $4,000,000 in each of fiscal years 2023 through 2025 to develop and carry out the initial survey required under subsection (a).

SEC. 10505. CULTURAL AND INSTITUTIONAL BARRIERS TO EXPANDING THE ACADEMIC AND FEDERAL STEM WORKFORCE.

(a) BEST PRACTICES.—

(1) DEVELOPMENT OF GUIDANCE.—Not later than 12 months after the date of enactment of this Act, the Director, in consultation with the interagency working group on inclusion in STEM and

utilizing existing guidance already developed by Federal research agencies where applicable, shall broadly disseminate to entities that receive Federal research funding best practices for—

(A) conducting periodic climate surveys of STEM departments and divisions, with a particular focus on identifying and addressing any cultural or institutional barriers to the recruitment, retention, or advancement of groups historically underrepresented in STEM studies and careers; and

(B) providing educational opportunities, including workshops, for STEM professionals to learn about current research on effective practices for unbiased recruitment, evaluation, and promotion of undergraduate and graduate students and research personnel.

(2) ESTABLISHMENT OF POLICIES.—Consistent with the guidance developed under paragraph (1)—

(A) The Director of the National Science Foundation, in consultation with the heads of Federal research agencies, shall develop a policy that—

(i) applies to, at a minimum, doctoral degree granting institutions that receive Federal research funding; and

(ii) requires each such institution, not later than 3 years after the date of enactment of this Act, and to the extent practicable, to report to the Director of the National Science Foundation on activities and policies developed and implemented based on the guidance disseminated under paragraph (1); and

(B) each Federal research agency with a Federal laboratory shall maintain or develop and implement practices and policies for the purposes described in paragraph (1) for such laboratory and, not later than three years after the date of the enactment of this Act, each Federal laboratory shall report to the head of such agency on such practices and policies.

(b) REPORT TO CONGRESS.—Not later than four years after the date of the enactment of this Act, the Director of the National Science Foundation shall submit a report to Congress that includes a summary and analysis of the types and frequency of activities and policies devel-

oped and carried out under subsection (a) based on the reports submitted under paragraph (2) of such subsection.

SEC. 10506. EXISTING ACTIVITIES.

A Federal research agency may satisfy requirements under this subtitle through activities and programs in existence as of the date of the enactment of this Act.

SEC. 10507. REPORT TO CONGRESS.

Not later than four years after the date of the enactment of this Act, the Director shall submit to Congress a report that includes the following:

(1) A description and evaluation of the status and usage of policies implemented pursuant to section 10505 at all Federal research agencies, including any recommendations for revising or expanding such policies.

(2) With respect to efforts to remove or reduce cultural and institutional barriers limiting the recruitment, retention, and success of groups historically underrepresented in academic and government STEM research careers under section 10505—

(A) what steps all Federal research agencies have taken to implement policies and practices to further such efforts;

(B) a description of any significant updates to the policies for review of Federal research awards required under such section; and

(C) any evidence of the impact of such policies on the review or awarding of Federal research awards; and

(3) A description and evaluation of the status of institution of higher education and Federal laboratory policies and practices required under section 10505, including any recommendations for revising or expanding such policies.

SEC. 10508. MERIT REVIEW.

Nothing in this subtitle may be construed as altering any intellectual or broader impacts criteria at Federal research agencies for evaluating award applications.

SEC. 10509. DETERMINATION OF BUDGETARY EFFECTS.

The budgetary effects of this subtitle, for the purpose of complying with the Statutory Pay-As-You-Go Act of 2010, shall be determined by reference to the latest statement titled ''Budgetary Effects of PAYGO Legislation'' for this subtitle, submitted for printing in the Congressional Record by the Chairman of the House Budget Committee, provided that such statement has been submitted prior to the vote on passage.

SEC. 10510. DEFINITION.

In this subtitle, the term ''Director'' means the Director of the Office of Science and Technology Policy.

Subtitle B—Rural STEM Education Research

SEC. 10511. DEFINITION.

In this subtitle, the term ''Director'' means the Director of the National Science Foundation.

SEC. 10512. NATIONAL SCIENCE FOUNDATION RURAL STEM ACTIVITIES.

(a) PREPARING RURAL STEM EDUCATORS.—

(1) IN GENERAL.—The Director shall make awards on a merit- reviewed, competitive basis to institutions of higher education or nonprofit organizations (or a consortium thereof) for research and development activities to advance innovative approaches to support and sustain high-quality STEM teaching in rural schools.

(2) USE OF FUNDS.—

(A) IN GENERAL.—Awards made under this subsection shall be used for the research and development activities referred to in paragraph (1), which may include—

(i) engaging rural educators, principals, or other school leaders of students in prekindergarten through grade 12 in

professional learning opportunities to enhance STEM knowledge, including computer science, and develop best practices;

(ii) supporting research on effective STEM teaching and school leadership practices in rural settings, including the use of rubrics and mastery- based grading practices to assess student performance when employing the transdisciplinary teaching approach for STEM disciplines;

(iii) designing and developing preservice and in-service training resources to assist such rural educators, principals, and other school leaders in adopting transdisciplinary teaching practices across STEM courses;

(iv) coordinating with local partners to adapt STEM teaching practices to leverage local, natural, and community assets in order to support in-place learning in rural areas;

(v) providing hands-on training and research opportunities for rural educators described in clause (i) at Federal labora-

tories or institutions of higher education, or in industry;

(vi) developing training and best practices for educators who teach multiple grade levels within a STEM discipline;

(vii) designing and implementing professional development courses and experiences, including mentoring, for rural educators, principals, and other school leaders described in clause (i) that combine face-to-face and online experiences; and

(viii) any other activity the Director determines will accomplish the goals of this paragraph.

(B) RURAL STEM COLLABORATIVE.—The Director shall establish a pilot program of regional cohorts in rural areas that will provide peer support, mentoring, and hands-on research experiences for rural STEM educators, principals, and other school leaders of students in prekindergarten through grade 12, in order to build an ecosystem of cooperation among educators, principals, other school leaders, researchers, academia, and local industry.

(b) BROADENING PARTICIPATION OF RURAL STUDENTS IN STEM.—

(1) IN GENERAL.—The Director shall make awards on a merit- reviewed, competitive basis to institutions of higher education or nonprofit organizations (or a consortium thereof) for—

(A) research and development of programming to identify the barriers rural students face in accessing high-quality STEM education; and

(B) development of innovative solutions to improve the participation and advancement of rural students in prekindergarten through grade 12 in STEM studies.

(2) USE OF FUNDS.—

(A) IN GENERAL.—Awards made under this subsection shall be used for the research and development activities referred to in paragraph (1), which may include—

(i) developing partnerships with community colleges to offer advanced STEM course work, including computer science, to rural high school students;

(ii) supporting research on effective STEM practices in rural settings;

(iii) implementing a school-wide STEM approach, including preparation and support for principals and other school leaders;

(iv) improving the Foundation's Advanced Technology Education program's coordination and engagement with rural communities;

(v) collaborating with existing community partners and networks, such as the Cooperative Extension System services and extramural research programs of the Department of Agriculture and youth serving organizations like 4-H, after school STEM programs, and summer STEM programs, to leverage community resources and develop place-based programming;

(vi) connecting rural school districts and institutions of higher education, to improve precollegiate STEM education and engagement;

(vii) supporting partnerships that offer hands- on inquiry-based science activities, including coding, and access to lab resources for students studying STEM in

prekindergarten through grade 12 in a rural area;

(viii) evaluating the role of broadband connectivity and its associated impact on the STEM and technology literacy of rural students;

(ix) building capacity to support extracurricular STEM programs in rural schools, including mentor-led engagement programs, STEM programs held during non-school hours, STEM networks, makerspaces, coding activities, and competitions;

(x) creating partnerships with local industries and local educational agencies to tailor STEM curricula and educational experiences to the needs of a particular local or regional economy; and

(xi) any other activity the Director determines will accomplish the goals of this paragraph.

(c) APPLICATION.—An applicant seeking an award under subsection (a) or (b) shall submit an application at such time, in such manner, and containing such informa-

tion as the Director may require. The application may include the following:

(1) A description of the target population to be served by the research activity or activities for which such award is sought.

(2) A description of the process for recruitment and selection of students, educators, principals, and other school leaders, or schools from rural areas to participate in such activity or activities.

(3) A description of how such activity or activities may inform efforts to promote the engagement and achievement of rural students in prekindergarten through grade 12 in STEM studies.

(4) In the case of a proposal consisting of a partnership or partnerships with one or more rural schools and one or more researchers, a plan for establishing a sustained partnership that is jointly developed and managed, draws from the capacities of each partner, and is mutually beneficial.

(d) PARTNERSHIPS.—In making awards under subsection (a) or (b), the Director shall—

(1) encourage applicants which, for the purpose of the activity or activities funded through the award, include or partner with a nonprofit organization or an institution of higher education (or a con-

sortium thereof) that has extensive experience and expertise in increasing the participation of rural students in prekindergarten through grade 12 in STEM;

(2) encourage applicants which, for the purpose of the activity or activities funded through the award, include or partner with a consortium of rural schools or rural school districts; and

(3) encourage applications which, for the purpose of the activity or activities funded through the award, include commitments from school principals, other school leaders, and administrators to making reforms and activities proposed by the applicant a priority.

(e) EVALUATIONS.—All proposals for awards under subsections (a) and (b) shall include an evaluation plan that includes the use of outcome-oriented measures to assess the impact and efficacy of the award. Each recipient of an award under this subsection shall include results from these evaluative activities in annual and final projects.

(f) ACCOUNTABILITY AND DISSEMINATION.—

(1) EVALUATION REQUIRED.—The Director shall evaluate the portfolio of awards made under subsections (a) and (b). Such evaluation shall—

(A) use a common set of benchmarks and tools to assess the results of research conducted under such awards and identify best practices; and

(B) to the extent practicable, integrate the findings of research resulting from the activity or activities funded through such awards with the findings of other research on rural students' pursuit of degrees or careers in STEM.

(2) REPORT ON EVALUATIONS.—Not later than 180 days after the completion of the evaluation under paragraph (1), the Director shall submit to Congress and make widely available to the public a report that includes—

(A) the results of the evaluation; and

(B) any recommendations for administrative and legislative action that could optimize the effectiveness of the awards made under this subsection.

(g) REPORT BY COMMITTEE ON EQUAL OPPORTUNITIES IN SCIENCE AND ENGINEERING.—As part of the first report required by section 36(e) of the Science and Engineering Equal Opportunities Act (42 U.S.C. 1885c(e)) transmitted to Congress after the date of enactment of this division, the Committee on Equal Opportuni-

ties in Science and Engineering, in consultation with the Chief Diversity Officer of the National Science Foundation, shall include—

(1) a description of past and present policies and activities of the Foundation to encourage full participation of students in rural communities in science, mathematics, engineering, and computer science fields;

(2) an assessment of trends in participation of rural students in prekindergarten through grade 12 in Foundation activities; and

(3) an assessment of the policies and activities of the Foundation, along with proposals for new strategies or the broadening of existing successful strategies towards facilitating the goal of increasing participation of rural students in prekindergarten through grade 12 in Foundation activities.

(h) COORDINATION.—In carrying out this subsection, the Director shall, for purposes of enhancing program effectiveness and avoiding duplication of activities, consult, cooperate, and coordinate with the programs and policies of other relevant Federal agencies.

(i) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the Director—

(1) $8,000,000 to carry out the activities under subsection (a) for each of fiscal years 2023 through 2027; and

(2) $12,000,000 to carry out the activities under subsection (b) for each of fiscal years 2023 through 2027.

SEC. 10513. OPPORTUNITIES FOR ONLINE EDUCATION.

(a) IN GENERAL.—The Director shall make competitive awards to institutions of higher education or nonprofit organizations (or a consortium thereof, which may include a private sector partner) to conduct research on online STEM education courses for rural communities.

(b) RESEARCH AREAS.—The research areas eligible for funding under this subsection shall include—

(1) evaluating the learning and achievement of rural students in prekindergarten through grade 12 in STEM subjects;

(2) understanding how computer-based and online professional development courses and mentor experiences can be integrated to meet the needs of educators, principals, and other school leaders of rural students in prekindergarten through grade 12;

(3) combining computer-based and online STEM education and training with mentoring and other applied learning arrangements;

(4) leveraging online programs to supplement STEM studies for rural students that need physical and academic accommodation; and

(5) any other activity the Director determines will accomplish the goals of this subsection.

(c) EVALUATIONS.—All proposals for awards under this section shall include an evaluation plan that includes the use of outcome-oriented measures to assess the impact and efficacy of the award. Each recipient of an award under this subsection shall include results from these evaluative activities in annual and final projects.

(d) ACCOUNTABILITY AND DISSEMINATION.—

(1) EVALUATION REQUIRED.—The Director shall evaluate the portfolio of awards made under this subsection. Such evaluation shall—

(A) use a common set of benchmarks and tools to assess the results of research conducted under such awards and identify best practices; and

(B) to the extent practicable, integrate findings from activities carried out pursuant to research conducted under this section, with respect to the pursuit of careers and degrees in STEM, with those activities carried out pursu-

ant to other research on serving rural students and communities.

(2) REPORT ON EVALUATIONS.—Not later than 180 days after the completion of the evaluation under paragraph (1), the Director shall submit to Congress and make widely available to the public a report that includes—

(A) the results of the evaluation; and

(B) any recommendations for administrative and legislative action that could optimize the effectiveness of the awards made under this section.

(e) COORDINATION.—In carrying out this section, the Director shall, for purposes of enhancing program effectiveness and avoiding duplication of activities, consult, cooperate, and coordinate with the programs and policies of other relevant Federal agencies.

SEC. 10514. NATIONAL ACADEMIES EVALUATION.

(a) STUDY.—Not later than 12 months after the date of enactment of this division, the Director shall enter into an agreement with the National Academies under which the National Academies agree to conduct an evaluation and assessment that—

(1) evaluates the quality and quantity of current Federal programming and research directed at

examining STEM education for students in prekindergarten through grade 12 and workforce development in rural areas;

(2) in coordination with the Federal Communications Commission, assesses the impact that the scarcity of broadband connectivity in rural communities, and the affordability of broadband connectivity, have on STEM and technical literacy for students in prekindergarten through grade 12 in rural areas;

(3) assesses the core research and data needed to understand the challenges rural areas are facing in providing quality STEM education and workforce development;

(4) makes recommendations for action at the Federal, State, and local levels for improving STEM education, including online STEM education, for students in prekindergarten through grade 12 and workforce development in rural areas; and

(5) makes recommendations to inform the implementation of programs in sections 10512 and 10513 (_____-LOG262) and (_____-LOG263).

(b) REPORT TO DIRECTOR.—The agreement entered into under subsection (a) shall require the National Academies, not later than 24 months after the date of enact-

ment of this division, to submit to the Director a report on the study conducted under such paragraph, including the National Academies' findings and recommendations.

(c) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the Director to carry out this section $1,000,000 for fiscal year 2023.

SEC. 10515. GAO REVIEW.

Not later than 3 years after the date of enactment of this division, the Comptroller General of the United States shall conduct a study on the engagement of rural populations in Federal STEM education programs and submit to Congress a report that includes—

(1) an assessment of how Federal STEM education programs are serving rural populations;

(2) a description of initiatives carried out by Federal agencies that are targeted at supporting STEM education in rural areas;

(3) an assessment of what is known about the impact and effectiveness of Federal investments in STEM education programs that are targeted to rural areas; and

(4) an assessment of challenges that State and Federal STEM education programs face in reaching rural population centers.

SEC. 10516. NIST ENGAGEMENT WITH RURAL COMMUNITIES.

(a) PRIZE COMPETITION.—Pursuant to section 24 of the Stevenson-Wydler Technology Innovation Act of 1980 (15 U.S.C. 3719), the Secretary of Commerce shall carry out a program to award prizes competitively to stimulate research and development of creative technologies to support the deployment of affordable and reliable broadband connectivity in rural communities, including unserved rural communities.

(b) PLAN FOR DEPLOYMENT IN RURAL COMMUNITIES.—Each proposal submitted pursuant to subsection (a) shall include a proposed plan for deployment of the technology that is the subject of such proposal.

(c) PRIZE AMOUNT.—In carrying out the program under subsection (a), the Secretary may award not more than a total of $5,000,000 to one or more winners of the prize competition.

(d) REPORT.—Not later than 60 days after the date on which a prize is awarded under the prize competition, the Secretary shall submit to the relevant committees of Congress a report that describes the winning proposal of the prize competition.

(e) CONSULTATION.—In carrying out the program under this section, the Secretary shall consult with the Federal Communications Commission and the heads of

relevant departments and agencies of the Federal Government.

Subtitle C—MSI STEM Achievement

SEC. 10521. GAO REVIEW.

Not later than three years after the date of the enactment of this Act, the Comptroller General of the United States shall report to Congress—

(1) an inventory of competitive funding programs and initiatives carried out by Federal research agencies that are targeted to HBCUs, TCUs, and MSIs or partnerships with HBCUs, TCUs, and MSIs;

(2) an assessment of Federal research agency outreach activities to increase the participation and competitiveness of HBCUs, TCUs, and MSIs in the funding programs and initiatives identified in paragraph (1); and

(3) recommendations of the Comptroller General to increase the participation of and the rate of success of HBCUs, TCUs, and MSIs in competitive funding programs offered by Federal research agencies.

SEC. 10522. AGENCY RESPONSIBILITIES.

(a) IN GENERAL.—In consultation with outside stakeholders and the heads of Federal research agencies and the Interagency Working Group on Inclusion in STEM, the Director of the Office of Science and Technology Policy shall develop a uniform set of policy guidelines for Federal research agencies to carry out a sustained program of outreach activities to increase clarity, transparency, and accountability for Federal research agency investments in STEM education and research activities at HBCUs, TCUs, and MSIs, including such institutions in rural areas.

(b) OUTREACH ACTIVITIES.—In developing policy guidelines under subsection (a) the Director of the Office of Science and Technology Policy shall include guidelines that require each Federal research agency—

(1) to designate a liaison for HBCUs, TCUs, and MSIs responsible for—

(A) enhancing direct communication with HBCUs, TCUs, and MSIs to increase the Federal research agency's understanding of the capacity and needs of such institutions and to raise awareness of available Federal funding opportunities at such institutions;

(B) coordinating programs, activities, and initiatives while accounting for the capacity and needs of HBCUs, TCUs, and MSIs;

(C) tracking Federal research agency investments in and engagement with HBCUs, TCUs, and MSIs; and

(D) reporting progress toward increasing participation of HBCUs, TCUs, and MSIs in award programs;

(2) to the extent practicable, to produce an annual summary of funding opportunities and proposal deadlines targeted at HBCUs, TCUs, and MSIs, including for grants, contracts, subcontracts, and cooperative agreements;

(3) to the extent practicable, identifying in annual budget requests potential areas for collaboration with HBCUs, TCUs, and MSIs in the relevant fiscal year, including relating to potential meetings and workshops;

(4) to investigate proposal structures that support broader participation by emerging research institutions, including HBCUs, TCUs, and MSIs;

(5) to conduct on-site reviews of research facilities at HBCUs, TCUs, and MSIs, as practicable,

and make recommendations regarding strategies for becoming more competitive in research;

(6) to hold geographically accessible or virtual workshops on research priorities of the Federal research agency and on how to write competitive award proposals and how to bolster award management capacity for the entire award lifecycle, from application to completion;

(7) to ensure opportunities for HBCUs, TCUs, and MSIs to directly communicate with Federal research agency officials responsible for managing competitive award programs in order to receive feedback on research ideas and proposals, including guidance on the Federal research agency's merit review process; and

(8) to foster mutually beneficial public-private collaboration among Federal research agencies, industry, Federal laboratories, academia, and nonprofit organizations to—

(A) identify alternative sources of funding for STEM education and research at HBCUs, TCUs, and MSIs;

(B) provide access to high-quality, relevant research experiences for students and faculty of HBCUs, TCUs, and MSIs;

(C) expand the professional networks of students and faculty of HBCUs, TCUs, and MSIs;

(D) broaden STEM educational opportunities for students and faculty of HBCUs, TCUs, and MSIs; and

(E) support the transition of students of HBCUs, TCUs, and MSIs into the STEM workforce;

(c) STRATEGIC PLAN.—

(1) IN GENERAL.—Not later than one year after the date of the enactment of this Act, the Director of the Office of Science and Technology Policy, in collaboration with the head of each Federal research agency, shall submit to Congress a report containing a strategic plan which reflects the plans of each Federal research agency to increase the capacity of HBCUs, TCUs, and MSIs to compete effectively for grants, contracts, or cooperative agreements and to encourage HBCUs, TCUs, and MSIs to participate in Federal programs.

(2) CONSIDERATIONS.—In developing a strategic plan under paragraph (1), the Director and the head of each Federal research agency shall consider the following:

(A) Issuing new or expanding existing funding opportunities targeted to HBCUs, TCUs, and MSIs.

(B) Modifying existing research and development program solicitations to incentivize effective partnerships with HBCUs, TCUs, and MSIs.

(C) Offering planning grants for HBCUs, TCUs, and MSIs to develop or equip grant offices with the requisite depth of knowledge to submit competitive grant proposals and manage awarded grants.

(D) Offering additional training programs, including individualized and timely guidance to grant officers, faculty, and postdoctoral researchers at HBCUs, TCUs, and MSIs to ensure their understanding of the requirements for an effective grant proposal.

(E) Other approaches for making current competitive funding models more accessible for underresourced HBCUs, TCUs, and MSIs.

(d) REPORT ON POLICY GUIDELINES.—Not later than two years after the date of the enactment of this Act and every five years thereafter, the Director of the Office of Science and Technology Policy shall report to Congress

on the implementation by Federal research agencies of the policy guidelines developed under this section.

(e) REPORT ON COORDINATION OF FEDERAL STEM EDUCATION.—Subsection (d) of section 101(d) of the America COMPETES Reauthorization Act of 2010 (42 U.S.C. 6621) is amended—

(1) in paragraph (7) by striking ''and'';

(2) in paragraph (8) by striking the period at the end;

(3) by adding at the end the following:

''(9) an account of Federal research agency investments in HBCUs, TCUs, and MSIs, including, to the degree practicable, data on the level of participation of HBCUs, TCUs, and MSIs as prime recipients, contractors, subrecipients, or subcontractors of an award, or reasonable estimates thereof; and

''(10) a description of material changes to the implementation of section 10522 of the Research and Development, Competition, and Innovation Act.''.

SEC. 10523. RESEARCH AT THE NATIONAL SCIENCE FOUNDATION.

(a) IN GENERAL.—The Director shall make awards, on a competitive basis, to institutions of higher education or nonprofit organizations (or consortia thereof) to—

(1) conduct research described in subsection (b) with respect to HBCUs, TCUs, and MSIs; and

(2) identify and broadly disseminate effective models for programs and practices at HBCUs, TCUs, and MSIs that promote the education and workforce preparation of minority students pursuing STEM studies and careers in which such students are underrepresented.

(b) RESEARCH.—Research described in this subsection is research on the contribution of HBCUs, TCUs, and MSIs to the education and training of underrepresented minority students in STEM fields and to the meeting of national STEM workforce needs, including relating to the following:

(1) The diversity with respect to local context, cultural differences, and institutional structure among HBCUs, TCUs, and MSIs and any associated impact on education and research endeavors.

(2) Effective practices at HBCUs, TCUs, and MSIs and associated outcomes on student recruitment, retention, and advancement in STEM fields, including the ability for students to compete for fellowships, employment, and advancement in the workforce.

(3) Contributions made by HBCUs, TCUs, and MSIs to local, regional, and national workforces.

(4) The challenges and opportunities for HBCUs, TCUs, and MSIs in attaining the resources needed for integrating effective practices in STEM education, including providing research experiences for underrepresented minority students.

(5) The access of students at HBCUs, TCUs, and MSIs to STEM infrastructure and any associated outcomes for STEM competency.

(6) Models of STEM curriculum, learning, and teaching successful at HBCUs, TCUs, and MSIs for increasing participation, retention, and success of underrepresented minority students.

(7) Successful or promising partnerships between HBCUs, TCUs, and MSIs and other institutions of higher education, private sector and nonprofit organizations, Federal laboratories, and international research institutions.

(c) RESEARCH EXPERIENCES.—Awards under this section may fund the development or expansion of opportunities for the exchange of students and faculty to conduct research, facilitate professional development, and provide mentorship, including through partnerships with institutions of higher education that are not HBCUs,

TCUs, or MSIs, private sector and nonprofit organizations, Federal laboratories, and international research institutions.

SEC. 10524. CAPACITY-BUILDING PROGRAM FOR DEVELOPING UNIVERSITIES.

(a) AWARDS.—

(1) IN GENERAL.—The Director shall make awards, on a competitive basis, to eligible institutions described in subsection (b) to support the mission of the Foundation and to build institutional research capacity at eligible institutions.

(2) ADMINISTRATION.—The Director may administer separate competitions for each category of eligible institution described in subparagraphs (A) through (C) of subsection (b)(1) in order to ensure fair competition for institutions with significantly different research capacities.

(b) ELIGIBLE INSTITUTIONS.—To be eligible to receive an award under this subsection, an entity—

(1) shall be—

(A) a historically Black college or university;

(B) a Tribal College or University;

(C) a minority-serving institution;

(D) an institution of higher education with an established STEM capacity-building program focused on Native Hawaiians and Alaska Natives; or

(E) consortia thereof;

(2) shall—

(A) have not more than $50,000,000 in annual federally financed research and development expenditures for science and engineering as reported through the National Science Foundation Higher Education Research and Development Survey; or

(B) not be an institution classified as having very high research activity by the Carnegie Classification of Institutions of Higher Education.

(c) PARTNERSHIPS.—In making awards under this section, the Director shall—

(1) encourage entities that are consortia of eligible institutions to submit proposals and require such proposals to include a plan for establishing a sustained partnership that is jointly developed and managed, draws from the capacities of each institution, and is mutually beneficial;

(2) encourage proposals submitted in partnership with the private sector, nonprofit organizations, Federal laboratories, and international research institutions, as appropriate;

(3) require proposals described in paragraphs (1) and (2) to include a plan to strengthen the administrative and research capacity of the partnering HBCUs, TCUs, or MSIs to lead future proposals.

(d) VERY HIGH RESEARCH ACTIVITY STATUS HISTORICALLY BLACK COLLEGES AND UNIVERSITIES PROGRAM.—Awards under this section may be used to enable HBCUs which have high research activity status to achieve very high research activity status, as classified under the Carnegie Classification of Institutions of Higher Education, by enabling—

(1) faculty professional development;

(2) stipends for graduate and undergraduate students, and postdoctoral scholars;

(3) acquisition of laboratory equipment and instrumentation; and

(4) other activities as necessary to build research capacity.

(e) PROPOSALS.—To receive an award under this subsection, an eligible institution shall submit an application 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.

638(e)) and direct contracts at an eligible institution;

(G) enhance STEM curriculum and research training opportunities at the undergraduate, graduate, and postdoctoral levels at an eligible institution;

(H) further faculty development initiatives and strengthen institutional research training infrastructure, capacity, and competitiveness of an eligible institution;

(I) address plans and prospects for long-term sustainability of institutional enhancements at an eligible institution resulting from the award including, if applicable, how the award may be leveraged by an eligible institution to build a broader base of support; and

(J) develop and implement mechanisms for institutions of higher education to partner with HBCUs, TCUs, and MSIs on STEM education, including the facilitation of student exchanges, course and resource sharing, collaboration, and matriculation of students to either institution's graduate programs, mentoring programs for students and junior faculty, joint research

projects, and student access to graduate education; and

(2) as relevant, a plan, which shall be updated every three years, that describes the institution's strategy to achieve very high research activity status, including making investments with institutional and non-Federal funds, to achieve that status within a decade of the grant award, to the extent practicable.

(f) MSI CENTERS OF INNOVATION.—Awards under this section may fund the establishment of not more than five MSI Centers of Innovation to leverage successes of HBCUs, TCUs, and MSIs in STEM education and research training of underrepresented minority students as models for other institutions, including both HBCUs, TCUs, and MSIs and institutions of higher education that are not HBCUs, TCUs, or MSIs. Such centers will be located on campuses of selected HBCUs, TCUs, or MSIs, and serve as incubators to allow institutions of higher education to experiment, pilot, evaluate, and scale up promising practices.

(g) AWARDS.—Awards made under this subsection shall be for periods of three years and may be extended for periods of not more than five years.

(h) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the Director $200,000,000 for fiscal year 2023 and $250,000,000 for each of fiscal years 2024 through 2027 to carry out the activities in this section and section 10523.

(i) REPORT ON IMPROVING THE RESEARCH CAPACITY AT HIGH RESEARCH ACTIVITY HISTORICALLY BLACK COLLEGES AND UNIVERSITIES.—

(1) IN GENERAL.—Not later than one year after the date of the enactment of this Act, the National Science and Technology Council shall prepare and submit a report that—

(A) identifies challenges and barriers to Federal research and development awards for high research activity status HBCUs; and

(B) identifies recommendations for Federal research agencies to sustainably boost the research capacity of high research activity status HBCUs through awards-making authorities.

(2) REPORT SUBMISSION.—The National Science and Technology Council shall transmit the report required under paragraph (1) to the Director, the Administrator of the National Aeronautics and Space Administration, the Secretary of Agriculture, the Secretary of Commerce, the Secretary of De-

fense, the Secretary of Energy, the Secretary of Health and Human Services, and the heads of other such agencies as determined relevant by the National Science and Technology Council.

(3) INFORMATION FROM FEDERAL AGENCIES.—The National Science and Technology Council may secure directly from a Federal department or agency such information as the National Science and Technology Council considers necessary to prepare the report required under paragraph (1). Upon a request from the National Science and Technology Council, the head of a Federal department or agency shall furnish such information as is requested to the National Science and Technology Council.

SEC. 10525. TRIBAL COLLEGES AND UNIVERSITIES PROGRAM.

(a) AWARDS TO BROADEN TRIBAL COLLEGE AND UNIVERSITY STUDENT PARTICIPATION IN COMPUTER SCIENCE.—Section 525 of the America COMPETES Reauthorization Act of 2010 (42 U.S.C. 1862p–13) is amended by adding at the end the following:

"(d) AWARDS TO BROADEN TRIBAL COLLEGE AND UNIVERSITY STUDENT PARTICIPATION IN COMPUTER SCIENCE.—

"(1) IN GENERAL.—The Director, as part of the program authorized under this section, shall make awards on a competitive, merit-reviewed basis to eligible entities to increase the participation of Tribal populations in computer science and computational thinking education programs to enable students to develop skills and competencies in coding, problem-solving, critical thinking, creativity and collaboration.

"(2) PURPOSE.—Awards made under this subsection shall support—

"(A) research and development needed to bring computer science and computational thinking courses and degrees to Tribal Colleges or Universities;

"(B) research and development of instructional materials needed to integrate computer science and computational thinking into programs that are culturally relevant to students attending Tribal Colleges or Universities;

"(C) research, development and evaluation of distance education for computer science and computational thinking courses and degree programs for students attending Tribal Colleges and Universities; and

"(D) other activities consistent with the activities described in paragraphs (1) through (4) of subsection (b), as determined by the Director.

"(3) PARTNERSHIPS.—A Tribal College or University seeking an award under this subsection, or consortia thereof, may partner with an institution of higher education or nonprofit organization with demonstrated expertise in academic program development.

"(4) COORDINATION.—In carrying out this subsection, the Director shall consult and cooperate with the programs and policies of other relevant Federal agencies to avoid duplication with and enhance the effectiveness of the program under this subsection.

"(5) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the Director $2,000,000 in each of fiscal years 2023 through 2027 to carry out this subsection.".

(b) EVALUATION.—

(1) IN GENERAL.—Not later than two years after the date of the enactment of this Act, the Director shall evaluate the award program authorized under section 525 of the America COMPETES Re-

authorization Act of 2010 (42 U.S.C. 1862p–13), as amended by subsection (a).

(2) REQUIREMENTS.—In conducting the evaluation under paragraph (1), the Director shall, as practicable—

(A) use a common set of benchmarks and assessment tools to identify best practices and materials developed or demonstrated by the research conducted pursuant to award programs under section 525 of the America COMPETES Reauthorization Act of 2010 (42 U.S.C. 1862p–13), as amended by subsection (a);

(B) include an assessment of the effectiveness of such award programs in expanding access to high quality STEM education, research, and outreach at Tribal Colleges or Universities, as applicable;

(C) assess the number of students who participated in such award programs; and

(D) assess the percentage of students participating in such award programs who successfully complete their education programs.

(3) REPORT.—Not later than 180 days after the date on which the evaluation under paragraph (1) is completed, the Director shall submit to Con-

gress and make available to the public, a report on the results of the evaluation, including any recommendations for legislative action that could optimize the effectiveness of the award program authorized under section 525 of the America COMPETES Reauthorization Act of 2010, as amended by subsection (a).

SEC. 10526. DEFINITIONS.

In this subtitle:

(1) DIRECTOR.—The term ''Director'' means the Director of the National Science Foundation.

(2) HBCU.—The term ''HBCU'' has the meaning given the term ''part B institution'' in section 322 of the Higher Education Act of 1965 (20 U.S.C. 1061).

(3) MINORITY SERVING INSTITUTION.—The term ''minority serving institution'' or ''MSI'' means Hispanic-Serving Institutions as defined in section 502 of the Higher Education Act of 1965 (20 U.S.C. 1101a); Alaska Native Serving Institutions and Native Hawaiian-Serving Institutions as defined in section 317 of the Higher Education Act of 1965 (20 U.S.C. 1059d); and Predominantly Black Institutions, Asian American and Native American Pacific Islander-Serving Institutions, and Native Amer-

ican-Serving Nontribal Institutions as defined in section 371 of the Higher Education Act of 1965 (20 U.S.C. 1067q(c)).

(4) TCU.—The term ''TCU'' has the meaning given the term ''Tribal College or University'' in section 316 of the Higher Education Act of 1965 (20 U.S.C. 1059c).

Subtitle D—Combating Sexual Harassment in Science

SEC. 10531. FINDINGS.

Congress makes the following findings:

(1) According to the report issued by the National Academies of Sciences, Engineering, and Medicine in 2018 entitled ''Sexual Harassment of Women: Climate, Culture, and Consequences in Academic Sciences, Engineering, and Medicine''—

(A) sexual harassment is pervasive in institutions of higher education;

(B) the most common type of sexual harassment is gender harassment;

(C) 58 percent of individuals in the academic workplace experience sexual harassment, the second highest rate when compared to the military, the private sector, and Federal, State, and local government;

(D) women who are members of racial or ethnic minority groups are more likely to experience sexual harassment and to feel unsafe at work than White women, White men, or men who are members of such groups;

(E) the training for each individual who has a Doctor of Philosophy in the science, technology, engineering, and mathematics fields is estimated to cost approximately $500,000; and

(F) attrition of an individual so trained results in a loss of talent and money.

(2) According to a 2017 University of Illinois study, among astronomers and planetary scientists, 18 percent of women who are members of racial or ethnic minority groups and 12 percent of White women skipped professional events because they did not feel safe attending.

(3) Reporting procedures with respect to sexual harassment are inconsistent among Federal research agencies and have varying degrees of accessibility.

(4) There is not adequate communication among Federal research agencies and between such agencies and recipients regarding reports of sexual harassment, which has resulted in harassers receiv-

ing Federal funding after moving to a different institution.

SEC. 10532. PURPOSE.

The purpose of this subtitle is to increase understanding of the causes and consequences of sex-based and sexual harassment, as discussed in the report issued by the National Academies in 2018 entitled ''Sexual Harassment of Women: Climate, Culture, and Consequences in Academic Sciences, Engineering, and Medicine'', and to advance evidence-based approaches to reduce the prevalence and negative impact of such harassment.

SEC. 10533. DEFINITION.

In this subtitle, the term ''Director'' means the Director of the National Science Foundation.

SEC. 10534. RESEARCH AWARDS.

(a) IN GENERAL.—The Director shall make awards, on a competitive basis, to institutions of higher education or nonprofit organizations (or consortia of such institutions or organizations)—

(1) to expand research efforts to better understand the factors contributing to, and consequences of, sex-based and sexual harassment affecting individuals in the STEM workforce, including students and trainees; and

(2) to examine approaches to reduce the incidence and negative consequences of such harassment.

(b) USE OF FUNDS.—Activities funded by an award under this section may include—

(1) research on the sex-based and sexual harassment experiences of individuals, including in racial and ethnic minority groups, disabled individuals, foreign nationals, sexual-minority individuals, and others;

(2) development and assessment of policies, procedures, trainings, and interventions, with respect to sex-based and sexual harassment, conflict management, and ways to foster respectful and inclusive climates;

(3) research on approaches for remediating the negative impacts and outcomes of such harassment on individuals experiencing such harassment;

(4) support for institutions of higher education or nonprofit organizations to develop, adapt, implement, and assess the impact of innovative, evidence-based strategies, policies, and approaches to policy implementation to prevent and address sex-based and sexual harassment;

(5) research on alternatives to the power dynamics, hierarchical, and dependent relationships, including but not limited to the mentor-mentee relationship, in academia that have been shown to create higher levels of risk for and lower levels of reporting of sex- based and sexual harassment; and

(6) establishing a center for the ongoing compilation, management, and analysis of organizational climate survey data.

SEC. 10535. RESPONSIBLE CONDUCT GUIDE.

(a) IN GENERAL.—Not later than 180 days after the date of enactment of this Act, the Director shall enter into an agreement with the National Academies to update the report entitled ''On Being a Scientist: A Guide to Responsible Conduct in Research'' issued by the National Academies. The report, as so updated, shall include—

(1) updated professional standards of conduct in research;

(2) promising practices for preventing, addressing, and mitigating the negative impact of sex-based and sexual harassment, to include—

(A) standards of treatment individuals can expect to receive under updated standards of conduct;

(B) evidence-based practices for fostering a climate intolerant of sex-based, sexual, and other forms of harassment;

(C) methods, including bystander intervention, for identifying and addressing incidents of such harassment; and

(D) professional standards for mentorship and teaching with an emphasis on power diffusion mechanisms and preventing such harassment; and

(3) promising practices for mitigating potential security risks that threaten research security.

(b) REPORT.—Not later than 18 months after the effective date of the agreement under subsection (a), the National Academies, as part of such agreement, shall submit to the Director and the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate the report referred to in such subparagraph, as updated pursuant to such subparagraph.

SEC. 10536. INTERAGENCY WORKING GROUP.

(a) IN GENERAL.—The Director of the Office of Science and Technology Policy, acting through the National Science and Technology Council, shall establish or designate an interagency working group for the purpose

of coordinating Federal research agency efforts to reduce the prevalence of sex-based and sexual harassment involving award personnel. In coordination with the working group on inclusion in STEM fields established under section 308 of the American Innovation and Competitiveness Act (42 U.S.C. 6626) and the Safe Inclusive Research Environments Subcommittee of the National Science and Technology Council, and in consultation with representatives from each Federal research agency, the Office for Civil Rights at the Department of Health and Human Services, the Office for Civil Rights at the Department of Education, and the Equal Employment Opportunity Commission, the working group shall—

(1) not later than 90 days after the date of the enactment of this Act, submit to the Committee on Science, Space, and Technology, the Committee on Education and Labor, and the Committee on Energy and Commerce of the House of Representatives and the Committee on Commerce, Science, and Transportation and the Committee on Health, Education, Labor, and Pensions of the Senate an inventory of Federal research agency policies, procedures, and resources dedicated to preventing and responding to reports of sex-based and sexual harassment;

(2) not later than 6 months after the date on which the inventory is submitted under paragraph (1)—

(A) in consultation with outside stakeholders, develop a consistent set of policy guidelines for Federal research agencies; and

(B) submit a report to the committees referred to in paragraph (1) containing such guidelines;

(3) encourage and monitor efforts of Federal research agencies to develop or maintain and implement policies based on the guidelines developed under paragraph (2);

(4) not later than 1 year after the date on which the inventory under paragraph (1) is submitted, and every 5 years thereafter, the Director of the Office of Science and Technology Policy shall report to Congress on the implementation by Federal research agencies of the policy guidelines developed under paragraph (2); and

(5) update such policy guidelines as needed.

(b) REQUIREMENTS.—In developing policy guidelines under subsection (a)(2), the Director of the Office of Science and Technology Policy shall include guidelines that require, to the extent practicable—

(1) recipients to submit to the Federal research agency or agencies from which the recipients receive funding reports relating to—

(A) any decision made to launch a formal investigation of sex-based or sexual harassment, including bullying, retaliation, or hostile working conditions by, or of, award personnel;

(B) administrative action, related to an allegation against award personnel of any such harassment, as set forth in organizational policies or codes of conduct, statutes, regulations, or executive orders, that affects the ability of award personnel or their trainees to carry out the activities of the award;

(C) the total number of investigations with no findings or determinations of misconduct including such harassment;

(D) findings or determinations of such harassment, as set forth in organizational policies or codes of conduct, statutes, regulations, or Executive orders by, or of, award personnel, including the final disposition of a matter involving a violation of organizational policies and processes, to include the exhaustion of permissible appeals, or a determination of a sexual of-

fense in a court of law, or any other disciplinary action taken;

(2) the sharing, updating, and archiving of reports of sex- based and sexual harassment from recipients submitted under paragraph (1) with relevant Federal research agencies, on a yearly basis and by agency request; and

(3) consistency among Federal research agencies with regard to the policies and procedures for receiving reports submitted pursuant to paragraph (1).

(4) FERPA.—The Director of the Office of Science and Technology Policy shall ensure that such guidelines and requirements are consistent with the requirements of section 444 of the General Education Provisions Act (20 U.S.C. 1232g) (commonly referred to as the ''Family Educational Rights and Privacy Act of 1974'').

(5) PRIVACY PROTECTIONS.—The Director of the Office of Science and Technology Policy shall ensure that such guidelines and requirements—

(A) do not infringe upon the privacy rights of individuals associated with reports submitted to Federal research agencies; and

(B) do not require recipients to provide interim reports to Federal research agencies.

(c) CONSIDERATIONS.—In carrying out subsection (a)(2), the Director of the Office of Science and Technology Policy shall consider issuing guidelines that require or incent—

(1) recipients to periodically assess their organizational climate, which may include the use of climate surveys, focus groups, or exit interviews;

(2) recipients to publish on a publicly available internet website the results of assessments conducted pursuant to paragraph (1), disaggregated by sex and, if practicable, race, ethnicity, disability status, and sexual orientation, and in a manner that does not include personally identifiable information;

(3) recipients to make public on an annual basis the number of reports of sex-based and sexual harassment at that institution or organization;

(4) recipients to regularly assess and improve policies, procedures, and interventions to reduce the prevalence of and improve the reporting of sex-based and sexual harassment;

(5) each entity applying for a research and development award certify that a code of conduct is in place for maintaining a healthy and welcoming work-

place for award personnel and posted on their public website;

(6) each recipient and Federal research agency to have in place mechanisms for addressing the needs of individuals who have experienced sex-based and sexual harassment, including those individuals seeking to reintegrate at the recipient entity; and

(7) recipients to work to create a climate intolerant of sex- based and sexual harassment and that values and promotes diversity and inclusion.

(d) FEDERAL RESEARCH AGENCY IMPLEMENTATION.—Not later than 270 days after receiving the guidelines under paragraph (a)(2), each Federal research agency shall—

(1) develop or maintain and implement policies with respect to sex-based and sexual harassment that are consistent with policy guidelines under subsection (a)(2) and that protect the privacy of all parties involved in any report and investigation of sex-based or sexual harassment, to the maximum extent practicable; and

(2) broadly disseminate such policies to current and potential recipients of research and development awards made by such agency.

SEC. 10537. NATIONAL ACADEMIES ASSESSMENT.

Not later than 3 years after the date of enactment of this Act, the Director shall enter into an agreement with the National Academies to undertake a study and issue a report on the influence of sex-based and sexual harassment in institutions of higher education on the career advancement of individuals in the STEM workforce. The study shall assess—

(1) the state of research on sex-based and sexual harassment in such workforce;

(2) whether research demonstrates a decrease in the prevalence of sex-based and sexual harassment in such workforce;

(3) the progress made with respect to implementing recommendations promulgated in the National Academies consensus study report entitled ''Sexual Harassment of Women: Climate, Culture, and Consequences in Academic Sciences, Engineering, and Medicine'';

(4) where to focus future efforts with respect to decreasing the prevalence of sex-based and sexual harassment in such institutions, including specific recommendations; and

(5) other recommendations and issues, as the National Academies determines appropriate.

SEC. 10538. GAO STUDY.

Not later than 3 years after the date of enactment of this division, the Comptroller General of the United States shall—

(1) complete a study that assesses the degree to which Federal research agencies have implemented the policy guidelines developed under section 10536(a)(2) and the effectiveness of that implementation; and

(2) submit a report to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate on the results of such study, including recommendations on potential changes to practices and policies to improve those guidelines and that implementation.

SEC. 10539. AUTHORIZATION OF APPROPRIATIONS.

There is authorized to be appropriated to the Director to carry out this subtitle, $32,500,000.

TITLE VI—MISCELLANEOUS SCIENCE AND TECHNOLOGY PROVISIONS

Subtitle A—Supporting Early-career Researchers

SEC. 10601. EARLY-CAREER RESEARCH FELLOWSHIP PROGRAM.

(a) IN GENERAL.—The Director of the National Science Foundation may establish a 2-year pilot program to make awards to highly qualified early-career investigators to carry out an independent research program at the institution of higher education or participating Federal research facility chosen by such investigator, to last for a period not greater than two years.

(b) SELECTION PROCESS.—The Director of the National Science Foundation shall select recipients under subsection (a) from among citizens, nationals, and lawfully admitted permanent resident aliens of the United States.

(c) OUTREACH.—The Director of the National Science Foundation shall conduct program outreach to recruit fellowship applicants—

(1) from all regions of the country;

(2) from historically underrepresented populations in the fields of science, technology, engineering, and mathematics; and

(3) who graduate from or intend to carry out research at a variety of types of institutions of higher education, including—

(A) historically Black colleges and universities;

(B) Tribal Colleges and Universities;

(C) minority-serving institutions;

(D) institutions of higher education that are not among the top 50 institutions in annual Federal funding for research; and

(E) EPSCoR institutions.

(d) SPECIAL CONSIDERATION.—The Director of the National Science Foundation shall give special consideration and priority to an application from an individual who graduated from or is intending to carry out research at an institution of the type specified in subsection (c)(3).

(e) REPORTS FROM FELLOWS.—Not later than 180 days after the end of the pilot program under this section, each early-career investigator who receives an award under the pilot program shall submit to the Director of the National Science Foundation a report that describes how the early-career investigator used the award funds.

(f) REPORT FROM THE DIRECTOR.—Not later than 90 days after the conclusion of the second year of the pilot program, the Director of the National Science Foundation

shall submit to Congress a report that includes the following:

(1) A summary of the uses of award funds under this section and the impact of the pilot program under this section.

(2) Statistical summary data on fellowship awardees disaggregated by race, ethnicity, sex, geography, age, years since completion of doctoral degree, and institution type.

(3) If determined effective, a plan for permanent implementation of the pilot program.

SEC. 10602. AUTHORIZATION OF APPROPRIATIONS.

There is authorized to be appropriated to the Director of the National Science Foundation $250,000,000 for each of fiscal years 2023 through 2024 to carry out the activities in this subtitle.

Subtitle B—National Science and Technology Strategy

SEC. 10611. NATIONAL SCIENCE AND TECHNOLOGY STRATEGY.

Section 206 of the National Science and Technology Policy, Organization, and Priorities Act of 1976 (42 U.S.C. 6615) is amended to read as follows:

"SEC. 206. NATIONAL SCIENCE AND TECHNOLOGY STRATEGY.

"(a) IN GENERAL.—Not later than December 31 of the year immediately after the calendar year in which a review under section 206B is completed, the Director of the Office of Science and Technology Policy shall, in coordination with the National Science and Technology Council, develop and submit to Congress a comprehensive national science and technology strategy of the United States to meet national research and development objectives for the following 4-year period (in this section referred to as 'the national science and technology strategy').

"(b) REQUIREMENTS.—In developing each national science and technology strategy described in subsection (a), the Director of the Office of Science and Technology Policy shall—

"(1) consider—

"(A) the recommendations and priorities developed by the review under section 206B;

"(B) the most recently published interim or final national security strategy report submitted pursuant to section 108 of the National Security Act of 1947 (50 U.S.C. 3043);

"(C) other relevant national plans, reports, and strategies; and

"(D) the strategic plans of relevant Federal departments and agencies; and

"(2) include a description of—

"(A) strategic objectives and research priorities necessary to maintain and advance—

"(i) the leadership of the United States in science and technology, including in the key technology focus areas, including near-term, medium-term, and long-term economic competitiveness; and

"(ii) the leadership of the United States in technologies required to address societal and national challenges, including a transition to a circular economy;

"(B) programs, policies, and activities that the President recommends across all Federal departments and agencies to achieve the strategic objectives and research priorities described in subparagraph (A);

"(C) plans to promote sustainability practices and strategies for increasing jobs in the United States;

"(D) global trends in science and technology, including potential threats to the leadership of the United States in science and tech-

nology and opportunities for international collaboration in science and technology; and

"(E) plans to foster the development of international partnerships to reinforce domestic policy actions, build new markets, engage in collaborative research, and create an international environment that reflects United States values and protects United States interests.

"(c) CONSULTATION.—The Director of the Office of Science and Technology Policy shall consult as necessary with the Office of Management and Budget and other appropriate elements of the Executive Office of the President to ensure that the recommendations and priorities delineated in the science and technology strategy are incorporated in the development of annual budget requests.

"(d) BI-ANNUAL BRIEFING TO CONGRESS.—The Director of the Office of Science and Technology Policy shall provide on a bi-annual basis, after each release of the national science and technology strategy, a briefing to the relevant congressional committees, which may include updates on the following:

"(1) The status and development of the national science and technology strategy, including any significant changes.

"(2) The implementation of the national science and technology strategy.

"(3) Any other information about the national science and technology strategy, as determined by the Director of the Office of Science and Technology Policy.

"(e) PUBLICATION.—The Director of the Office of Science and Technology Policy shall, consistent with the protection of national security and other sensitive matters to the maximum extent practicable, make each national science and technology strategy publicly available on an internet website of the Office. Each report may include a classified annex if the Director of the Office of Science and Technology Policy determines such is appropriate.

"(f) TERMINATION.—This section terminates on the date that is ten years after the date of the enactment of this section.".

SEC. 10612. STRATEGY AND REPORT ON THE NATION'S ECONOMIC SECURITY, SCIENCE, RESEARCH, AND INNOVATION TO SUPPORT THE NATIONAL SECURITY STRATEGY.

(a) DEFINITIONS.—In this section:

(1) FOREIGN COUNTRY OF CONCERN.—The term "foreign country of concern" means the People's Republic of China, the Democratic People's Re-

public of Korea, the Russian Federation, the Islamic Republic of Iran, or any other country determined to be a country of concern by the Department of State.

(2) FOREIGN ENTITY OF CONCERN.—The term ''foreign entity of concern'' means a foreign entity that is—

(A) designated as a foreign terrorist organization by the Secretary of State under section 219(a) of the Immigration and Nationality Act (8 U.S.C. 1189(a));

(B) included on the list of specially designated nationals and blocked persons maintained by the Office of Foreign Assets Control of the Department of the Treasury (commonly known as the SDN list);

(C) owned by, controlled by, or subject to the jurisdiction or direction of a government of a foreign country that is a covered nation (as such term is defined in section 4872 of title 10, United States Code);

(D) alleged by the Attorney General to have been involved in activities for which a conviction was obtained under—

(i) chapter 37 of title 18, United States Code (commonly known as the Espionage Act);

(ii) section 951 or 1030 of title 18, United States Code;

(iii) chapter 90 of title 18, United States Code (commonly known as the Economic Espionage Act of 1996);

(iv) the Arms Export Control Act (22 U.S.C. 2751 et seq.);

(v) section 224, 225, 226, 227, or 236 of the Atomic Energy Act of 1954 (42 U.S.C. 2274, 2275, 2276, 2277, and 2284);

(vi) the Export Control Reform Act of 2018 (50 U.S.C. 4801 et seq.); or

(vii) the International Emergency Economic Powers Act (50 U.S.C. 1701 et seq.); or

(E) determined by the Secretary of Commerce, in consultation with the Secretary of Defense and the Director of National Intelligence, to be engaged in unauthorized conduct that is detrimental to the national security or foreign policy of the United States.

(3) NATIONAL SECURITY STRATEGY.—The term ''national security strategy'' means the national security strategy required under section 108 of the National Security Act of 1947 (50 U.S.C. 3043).

(b) STRATEGY AND REPORT.—

(1) IN GENERAL.—Not later than 90 days after the transmission of each national security strategy under section 108(a) of the National Security Act of 1947 (50 U.S.C. 3043(a)), the President, acting through the Director of the Office of Science and Technology Policy, shall, in coordination with the National Science and Technology Council, the National Security Council, the Director of the National Economic Council, and the heads of such other relevant Federal agencies as the Director of the Office of Science and Technology Policy considers appropriate and in consultation with such nongovernmental partners as the Director of the Office of Science and Technology Policy considers appropriate—

(A) review such strategy, including the national defense strategy under subsection (g) of section 113 of title 10, United States Code, and the national science and technology strategy under section 206 of the National Science and

Technology Policy, Organization, and Priorities Act of 1976 (42 U.S.C. 6615), programs, and resources as the Director of the Office of Science and Technology Policy determines pertain to United States' national competitiveness in science, technology, research, innovation, and technology transfer activities, including patenting and licensing, that support the national security strategy;

(B) develop or revise a national strategy to improve the national competitiveness of United States science, technology, research, and innovation to support the national security strategy; and

(C) submit to Congress—

(i) a report on the findings of the Director of the Office of Science and Technology Policy with respect to the review conducted pursuant to subparagraph (A); and

(ii) the strategy developed or revised pursuant to subparagraph (B).

(2) TERMINATION.—This subsection terminates on the date that is 5 years after the date of the enactment of this Act.

(c) ELEMENTS.—

(1) REPORT.—Each report submitted under subsection (b)(1)(C)(i) shall include the following:

(A) An assessment of the efforts of the United States Government to preserve United States leadership in key emerging technologies and prevent United States strategic competitors from leveraging advanced technologies to gain strategic military or economic advantages over the United States.

(B) An assessment of public and private investment in science and technology relevant to national security purposes, and the implications of such for the geostrategic position of the United States.

(C) A description of the prioritized economic security interests and objectives.

(D) An assessment of global trends in science and technology, including potential threats to the national security of the United States in science and technology.

(E) An assessment of the national debt and its implications for the economic and national security of the United States.

(F) An assessment of how regional innovation capacity efforts in STEM fields are contributing and could contribute to the national security the United States, including programs run by State and local governments.

(G) An assessment of the following:

(i) Workforce needs for competitiveness in technology areas identified in the national security strategy.

(ii) Any efforts needed to expand pathways into technology fields to achieve the goals of the national security strategy.

(H) An assessment of barriers to the development, evolution, or competitiveness of start-ups, small and mid-sized business entities, and industries that are critical to national security.

(I) An assessment of the effectiveness of the Federal Government, federally funded research and development centers, and national laboratories in supporting and promoting the technology commercialization and technology transfer of technologies critical to national security.

(J) An assessment of manufacturing capacity, logistics, and supply chain dynamics of

major export sectors that are critical to national security, including access to a skilled workforce, physical infrastructure, and broadband network infrastructure.

(K) An assessment of how the Federal Government is increasing the participation of underrepresented populations in science, research, innovation, and manufacturing.

(L) An assessment of public-private partnerships in technology commercialization in support of national security, including—

(i) the structure of current defense technology research and commercialization arrangements with regard to public-private partnerships; and

(ii) the extent to which intellectual property developed with Federal defense funding—

(I) is being used to manufacture in the United States rather than in other countries; and

(II) is being used by foreign business entities that are majority owned or controlled (as such term is defined in section 800.208 of title 31, Code of

Federal Regulations, or a successor regulation), or minority owned greater than 25 percent by—

(aa) any governmental organization of a foreign country of concern; or

(bb) any other entity that is—

(AA) known to be owned or controlled by any governmental organization of a foreign country of concern; or

(BB) organized under, or otherwise subject to, the laws of a foreign country of concern.

(M) Recommendations to enhance the ability of the Federal Government to recruit into Federal service and retain in such service individuals with critical skills relevant to national security.

(N) Recommendations for policies to protect United States leadership and the allies of the United States in critical areas relevant to

national security through targeted export controls, investment screening, and counterintelligence activities.

(O) Informed by the interagency process established under section 1758 of the Export Control Reform Act of 2018, a technology annex, which may be classified, describing an integrated and enduring approach to the identification, prioritization, development, and fielding of emerging technologies relevant to national security.

(2) STRATEGY.—Each strategy submitted under subsection (b)(1)(C)(ii) shall, to the extent practicable, include the following:

(A) A plan to utilize available tools to address or minimize the leading threats and challenges and to take advantage of the leading opportunities, particularly in regards to technologies central to international competition in science and technology relevant to national security purposes, including the following:

(i) Specific objectives, tasks, metrics, and milestones for each relevant Federal agency.

(ii) Strategic objectives and priorities necessary to maintain the leadership of the United States in science and technology relevant to national security purposes, including near-term, medium-term, and long-term research priorities.

(iii) Specific plans to safeguard research and technology funded, as appropriate, in whole or in part, by the Federal Government, including in technologies critical to national security, from theft or exfiltration by foreign entities of concern.

(iv) Specific plans to support public and private sector investment in research, technology development, education and workforce development, and domestic manufacturing supportive of the national security of the United States and to foster the use of public-private partnerships.

(v) A description of the following:

(I) How the strategy submitted under subsection (b)(1)(C)(ii) supports the national security strategy.

(II) How the strategy submitted under such subsection is integrated

and coordinated with the most recent—

(aa) national defense strategy under subsection (g) of section 113 of title 10, United States Code; and

(bb) national science and technology strategy under section 206 of the National Science and Technology Policy, Organization, and Priorities Act of 1976 (42 U.S.C. 6615).

(vi) A plan to encourage the governments of countries that are allies or partners of the United States to cooperate with the execution of such strategy, where appropriate.

(vii) A plan for strengthening the industrial base of the United States.

(viii) A plan to remove or update overly burdensome or outdated Federal regulations, as appropriate.

(ix) A plan—

(I) to further incentivize industry participation in public-private partner-

ships for the purposes of accelerating technology research and commercialization in support of national security, including alternate ways of accounting for in-kind contributions and valuing partially manufactured products;

(II) to ensure that intellectual property developed with Federal funding is commercialized in the United States; and

(III) to ensure, to the maximum appropriate extent, that intellectual property developed with Federal funding is not being used by foreign business entities that are majority owned or controlled (as such term is defined in section 800.208 of title 31, Code of Federal Regulations, or a successor regulation), or minority owned greater than 25 percent by—

(aa) any governmental organization of a foreign country of concern; or

(bb) any other entity that is—

(AA) known to be owned or controlled by any governmental organization of a foreign country of concern; or

(BB) organized under, or otherwise subject to, the laws of a foreign country of concern.

(x) An identification of additional resources, administrative action, or legislative action recommended to assist with the implementation of such strategy.

(d) RESEARCH AND DEVELOPMENT FUNDING.—The Director of the Office of Science and Technology Policy shall, as the Director of the Office of Science and Technology Policy considers necessary, consult with the Director of the Office of Management and Budget and with the heads of such other elements of the Executive Office of the President as the Director of the Office of Science and Technology Policy considers appropriate to ensure the recommendations and priorities with respect to research and development funding relevant to national security, as ex-

pressed in the most recent report and strategy submitted under subsection (b)(1)(C) are incorporated into the development of annual budget requests for Federal research agencies.

(e) PUBLICATION.—The Director of the Office of Science and Technology Policy shall, consistent with the protection of national security and other sensitive matters and to the maximum extent practicable, make each report submitted under subsection (b)(1)(C)(i) publicly available on an internet website of the Office of Science and Technology Policy. Each such report may include a classified annex if the Director of the Office of Science and Technology Policy determines such is appropriate.

SEC. 10613. QUADRENNIAL SCIENCE AND TECHNOLOGY REVIEW.

The National Science and Technology Policy, Organization, and Priorities Act of 1976 (42 U.S.C. 6601 et seq.) is amended by inserting after section 206 the following new section:

"SEC. 206B. QUADRENNIAL SCIENCE AND TECHNOLOGY REVIEW.

"(a) REQUIREMENTS.—

"(1) QUADRENNIAL REVIEWS REQUIRED.—Not later than December 31, 2023, and every four years thereafter, the Director of the Office of Science and

Technology Policy shall complete a review of the science and technology enterprise of the United States (in this section referred to as the 'quadrennial science and technology review').

"(2) SCOPE.—The quadrennial science and technology review shall be a comprehensive examination of the science and technology strategy of the United States, including recommendations for maintaining global leadership in science and technology and advancing science and technology to address the societal and national challenges and guidance regarding the coordination of programs, assets, capabilities, budget, policies, and authorities across all Federal research and development programs.

"(3) CONSULTATION.—The Director of the Office of Science and Technology Policy shall conduct each quadrennial science and technology review in consultation with the following:

"(A) The National Science and Technology Council.

"(B) The President's Council of Advisors on Science and Technology.

"(C) The National Science Board.

"(D) The National Security Council.

"(E) The heads of other relevant Federal agencies.

"(F) Other relevant governmental and nongovernmental entities, including representatives from industry, institutions of higher education, nonprofit organizations, Members of Congress, and other policy experts.

"(4) COORDINATION.—The Director of the Office of Science and Technology Policy shall ensure that each quadrennial science and technology review is coordinated with other relevant statutorily required reviews, and to the maximum extent practicable incorporates information and recommendations from existing reviews to avoid duplication.

"(b) CONTENTS.—In each quadrennial science and technology review, the Director of the Office of Science and Technology Policy shall—

"(1) provide an integrated view of, and recommendations for, science and technology policy across the Federal Government, while considering economic and national security and other societal and national challenges;

"(2) assess and recommend priorities for research, development, and demonstration programs to maintain United States leadership in science and

technology, including in manufacturing and industrial innovation;

''(3) assess and recommend priorities for research, development, and demonstration programs to address societal and national challenges;

''(4) assess the global competition in science and technology and identify potential threats to the leadership of the United States in science and technology and opportunities for international collaboration;

''(5) assess and make recommendations on the science, technology, engineering, mathematics, and computer science workforce of the United States;

''(6) assess and make recommendations to improve regional innovation across the United States;

''(7) identify and assess sectors critical for the long-term resilience of United States innovation leadership across design, manufacturing, supply chains, and markets;

''(8) assess and make recommendations to improve translation of basic and applied research and the enhancement of technology transfer of federally funded research;

"(9) identify, assess, and make recommendations to address science and technology gaps that would not be met without Federal investment;

"(10) review administrative and legislative policies and funding opportunities that affect private sector science and technology activities, and identify and make recommendations regarding policies that maintain and grow the participation and competitiveness of small- and medium-sized businesses;

"(11) assess and identify the infrastructure and tools needed to maintain the leadership of the United States in science and technology and address other societal and national challenges; and

"(12) review administrative or legislative policies that affect the science and technology enterprise and identify and make recommendations regarding policies that hinder research and development in the United States.

"(c) REPORTING.—

"(1) IN GENERAL.—Not later than December 31 of the year in which a quadrennial science and technology review is conducted, the Director of the Office of Science and Technology Policy shall submit to Congress a report relating to such review.

"(2) PUBLICATION.—The Director of the Office of Science and Technology Policy shall, consistent with the protection of national security and other sensitive matters to the maximum extent practicable, make each report submitted under paragraph (1) publicly available on an internet website of the Office of Science and Technology Policy. Each report may include a classified annex if the Director of the Office of Science and Technology Policy determines such appropriate.

"(d) TERMINATION.—This section shall terminate on the date that is ten years after the date of the enactment of this section.".

Subtitle C—Regional Innovation

SEC. 10621. REGIONAL INNOVATION CAPACITY.

(a) IN GENERAL.—The Stevenson-Wydler Technology Innovation Act of 1980 (Public Law 96–480; 15 U.S.C. 3701 et seq.) is amended—

(1) by redesignating section 28 as section 30; and

(2) by inserting after section 27 the following:

"SEC. 28. REGIONAL TECHNOLOGY AND INNOVATION HUB PROGRAM.

"(a) DEFINITIONS.—In this section:

"(1) APPROPRIATE COMMITTEES OF CONGRESS.—The term 'appropriate committees of Congress' means—

"(A) the Committee on Commerce, Science, and Transportation, the Committee on Environment and Public Works, and the Committee on Appropriations of the Senate; and

"(B) the Committee on Science, Space, and Technology and the Committee on Appropriations of the House of Representatives.

"(2) COOPERATIVE EXTENSION SERVICES.—The term 'cooperative extension services' has the meaning given the term in section 1404 of the Food and Agriculture Act of 1977 (7 U.S.C. 3103).

"(3) SITE CONNECTIVITY INFRASTRUCTURE.—The term 'site connectivity infrastructure' means localized driveways and access roads to a facility as well as hookups to the new facility for drinking water, waste water, broadband, and other basic infrastructure services already present in the area.

"(4) TRIBAL GOVERNMENT.—The term 'Tribal Government' means the governing body of any Indian or Alaska Native Tribe, band, nation, pueblo, village, community, component band or component reservation, individually identified (including par-

enthetically) in the list published most recently as of the date of enactment of this Act pursuant to section 104 of the Federally Recognized Indian Tribe List Act of 1994 (25 U.S.C. 5131).

"(5) VENTURE DEVELOPMENT ORGANIZATION.—The term 'venture development organization' has the meaning given such term in section 27(a) of the Stevenson-Wydler Act of 1980 (15 U.S.C. 3722(a)).

"(6) COMMUNITY DEVELOPMENT FINANCIAL INSTITUTION.—The term 'community development financial institution' has the meaning given in section 103 of the Community Development Banking and Financial Institutions Act of 1994 (12 U.S.C. 4702).

"(7) MINORITY DEPOSITORY INSTITUTION.—The term 'minority depository institution' means an entity that is—

"(A) a minority depository institution, as defined in section 308 of the Financial Institutions Reform, Recovery, and Enforcement Act of 1989 (12 U.S.C. 1463 note); or

"(B) considered to be a minority depository institution by—

"(i) the appropriate Federal banking agency; or

"(ii) the National Credit Union Administration, in the case of an insured credit union.

"(8) LOW POPULATION STATE.—The term 'low population State' means a State without an urbanized area with a population greater than 250,000 as reported in the decennial census.

"(9) SMALL AND RURAL COMMUNITIES.—The term 'small and rural community' means a noncore area, a micropolitan area, or a small metropolitan statistical area with a population of not more than 250,000.

"(b) REGIONAL TECHNOLOGY AND INNOVATION HUB PROGRAM.—

"(1) IN GENERAL.—Subject to the availability of appropriations, the Secretary shall carry out a program—

"(A) to encourage new and constructive collaborations among local, State, Tribal, and Federal government entities, institutions of higher education, the private sector, economic development organizations, labor organizations, nonprofit organizations, and community organi-

zations that promote broad-based regional innovation initiatives;

"(B) to support eligible consortia in the development and implementation of regional innovation strategies;

"(C) to designate eligible consortia as regional technology and innovation hubs and facilitate activities by consortia designated as regional technology and innovation hubs in implementing their regional innovation strategies—

"(i) to enable United States leadership in technology and innovation sectors critical to national and economic security;

"(ii) to support regional economic development and resilience, including in small cities and rural areas, and promote increased geographic diversity of innovation across the United States;

"(iii) to promote the benefits of technology development and innovation for all Americans, including underserved communities and vulnerable communities;

"(iv) to support the modernization and expansion of United States manufac-

turing based on advances in technology and innovation;

"(v) to support domestic job creation and broad-based economic growth; and

"(vi) to improve the pace of market readiness, industry maturation, and overall commercialization and domestic production of innovative research;

"(D) to ensure that the regional technology and innovation hubs address the intersection of emerging technologies and either regional challenges or national challenges; and

"(E) to conduct ongoing research, evaluation, analysis, and dissemination of best practices for regional development and competitiveness in technology and innovation.

"(2) AWARDS.—The Secretary shall carry out the program required by paragraph (1) through the award of the following:

"(A) Strategy development grants or cooperative agreements to eligible consortia under subsection (e).

"(B) Strategy implementation grants or cooperative agreements to regional technology and innovation hubs under subsection (f).

"(3) ADMINISTRATION.—The Secretary shall carry out this section through the Assistant Secretary of Commerce for Economic Development in coordination with the Under Secretary of Commerce for Standards and Technology.

"(c) ELIGIBLE CONSORTIA.—For purposes of this section, an eligible consortium is a consortium that—

"(1) includes 1 or more of each of the following—

"(A) institutions of higher education, which may include Historically Black Colleges and Universities, Tribal Colleges or Universities, and minority-serving institutions;

"(B) State, territorial, local, or Tribal governments or other political subdivisions of a State, including State and local agencies, or a consortium thereof;

"(C) industry or firms in relevant technology, innovation, or manufacturing sectors;

"(D) economic development organizations or similar entities that are focused primarily on improving science, technology, innovation, entrepreneurship, or access to capital; and

"(E) labor organizations or workforce training organizations, which may include State

and local workforce development boards as established under sections 101 and 107 of the Workforce Investment and Opportunity Act (29 U.S.C. 3111; 3122); and

''(2) may include 1 or more—

''(A) economic development entities with relevant expertise, including a district organization (as defined in section 300.3 of title 13, Code of Federal Regulations, or successor regulation);

''(B) organizations that contribute to increasing the participation of underserved populations in science, technology, innovation, and entrepreneurship;

''(C) venture development organizations;

''(D) organizations that promote local economic stability, high-wage domestic jobs, and broad-based economic opportunities, such as employee ownership membership associations and State or local employee ownerships and cooperative development centers, financial institutions and investment funds, including community development financial institutions and minority depository institutions;

"(E) elementary schools and secondary schools, including area career and technical education schools (as defined in section 3 of the Carl D. Perkins Career and Technical Education Act of 2006 (29 U.S.C. 2302);

"(F) National Laboratories (as defined in section 2 of the Energy Policy Act of 2005 (42 U.S.C. 15801));

"(G) Federal laboratories;

"(H) Manufacturing extension centers;

"(I) Manufacturing USA institutes;

"(J) transportation planning organizations;

"(K) a cooperative extension services;

"(L) organizations that represent the perspectives of underserved communities in economic development initiatives; and

"(M) institutions receiving an award under section 10388 of the Research and Development, Competition, and Innovation Act.

"(d) DESIGNATION OF REGIONAL TECHNOLOGY AND INNOVATION HUBS.—

"(1) IN GENERAL.—In carrying out subsection (b)(1)(C), the Secretary shall use a competitive, merit-review process to designate eligible consortia as regional technology and innovation hubs.

"(2) DISTRIBUTION.—In conducting the competitive process under paragraph (1), the Secretary shall ensure geographic and demographic diversity in the designation of regional technology hubs by, subject to available appropriations, designating at least 20 technology hubs, and—

"(A) seeking to designate at least three technology hubs in each region covered by a regional office of the Economic Development Administration, while—

"(i) ensuring that not fewer than one-third of eligible consortia so designated as regional technology hubs significantly benefit a small and rural community, which may include a State or territory described in clauses (ii) and (iii);

"(ii) ensuring that not fewer than one-third of eligible consortia so designated as regional technology hubs include as a member of the eligible consortia at least 1 member that is a State or territory that is eligible to receive funding from the Established Program to Stimulate Competitive Research of the National Science Foundation; and

"(iii) ensuring that at least one eligible consortium so designated as a regional technology hub is headquartered in a low population State that is eligible to receive funding from the Established Program to Stimulate Competitive Research of the National Science Foundation;

"(B) seeking to designate an additional two regional technology hubs based on selection factors which shall include likelihood of success and may include regional factors such as the extent to which the regional technology and innovation hub significantly engages and benefits underserved communities in and near metropolitan areas;

"(C) encouraging eligible consortia to leverage institutions of higher education serving populations historically underrepresented in STEM, including historically Black Colleges and Universities, Tribal Colleges or Universities, and minority-serving institutions to significantly benefit an area or region; and

"(D) encouraging proposals from eligible consortia that would significantly benefit an area or region whose economy significantly re-

lies on or has recently relied on coal, oil, or natural gas production or development.

"(3) RELATION TO CERTAIN GRANT AWARDS.—The Secretary shall not require an eligible consortium to receive a grant or cooperative agreement under subsection (e) in order to be designated as a regional technology and innovation hub under paragraph (1) of this subsection.

"(e) STRATEGY DEVELOPMENT GRANTS AND COOPERATIVE AGREEMENTS.—

"(1) IN GENERAL.—The Secretary shall use a competitive, merit-review process to award grants or cooperative agreements to eligible consortia for the development of regional innovation strategies.

"(2) NUMBER OF RECIPIENTS.—Subject to availability of appropriations, the Secretary shall seek to award a grant or cooperative agreement under paragraph (1) to not fewer than 60 eligible consortia.

"(3) GEOGRAPHIC DIVERSITY AND REPRESENTATION.—

"(A) IN GENERAL.—The Secretary shall carry out paragraph (1) in a manner that ensures geographic diversity and representation from communities of differing populations.

"(B) AWARDS TO SMALL AND RURAL COMMUNITIES.—In carrying out paragraph (1), the Secretary shall—

"(i) award not fewer than one-third of the grants and cooperative agreements under such paragraph to eligible consortia that significantly benefit a small and rural community, which may include a State described in clause (ii); and

"(ii) award not fewer than one-third of the grants and cooperative agreements under such paragraph to eligible consortia that include as a member of the eligible consortia at least 1 member that is a State or territory that is eligible to receive funding from the Established Program to Stimulate Competitive Research of the National Science Foundation.

"(4) USE OF FUNDS.—

"(A) Use of funds under this grant shall include—

"(i) coordination of a locally defined planning processes, across jurisdictions and agencies, relating to developing a comprehensive regional technology strategy;

"(ii) identification of regional partnerships for developing and implementing a comprehensive regional technology strategy;

"(iii) implementation or updating of assessments to determine regional needs and capabilities;

"(iv) development or updating of goals and strategies to implement an existing comprehensive regional plan;

"(v) identification or implementation of planning and local zoning and other code changes necessary to implement a comprehensive regional technology strategy; and

"(vi) development of plans for promoting broad-based economic growth in a region.

"(B) Use of funds under this grant may include the formation of a workforce development strategy, according to the needs for a skilled and technical workforce at all skill and degree levels in the region proposed to be served by the eligible consortia. Any workforce develop-

ment strategy submitted pursuant to paragraph (1) should include—

"(i) how the eligible consortia will develop, offer, or improve educational or career training programs and curriculum for a skilled and technical workforce;

"(ii) the extent to which such programs developed and offered by the eligible consortia will meet the educational or career training needs of a skilled and technical workforce in the region to be served;

"(iii) how the eligible consortia will provide facilities for students to receive training under such programs developed and offered by the eligible consortia; and

"(iv) how the eligible consortia will enhance outreach and recruitment for such programs developed and offered by the eligible consortia to populations underrepresented in STEM.

"(5) FEDERAL SHARE.—The Federal share of the cost of an effort carried out using a grant or cooperative agreement awarded under this subsection may not exceed 80 percent—

"(A) where in-kind contributions may be used for all or part of the non-Federal share, but Federal funding from other government sources may not count towards the non-Federal share;

"(B) except in the case of an eligible consortium that represents all or part of a small and rural or other underserved community, the Federal share may be up to 90 percent of the total cost, subject to subparagraph (A); and

"(C) except in the case of an eligible consortium that is led by a Tribal government, the Federal share may be up to 100 percent of the total cost of the project.

"(f) STRATEGY IMPLEMENTATION GRANTS AND COOPERATIVE AGREEMENTS.—

"(1) IN GENERAL.—The Secretary shall use a competitive, merit-review process to award grants or cooperative agreements to regional technology and innovation hubs for the implementation of regional innovation strategies, including regional strategies for infrastructure and site development, in support of the regional innovation and technology and innovation hub's plans and programs. The Secretary should determine the size and number of awards

based on appropriations available to ensure the success of regional technology and innovation hubs as outlined in subsection (h).

"(2) USE OF FUNDS.—Grants or cooperative agreements awarded under paragraph (1) to a regional technology and innovation hub may be used by the regional technology and innovation hub to support any of the following activities, consistent with the most current regional innovation strategy of the regional technology and innovation hub, which may have been developed with or without financial assistance received under subsection (e) of this section:

"(A) WORKFORCE DEVELOPMENT ACTIVITIES.—Workforce development activities including activities relating to the following:

"(i) The creation of partnerships between industry, workforce, nonprofit, and educational institutions, which may include community colleges, to create and align technical training and educational programs, including for a skilled technical workforce.

"(ii) The design, development, and updating of educational and training cur-

riculum and programs, including training of trainers, teachers, or instructors tied to demonstrated regional skilled and technical workforce needs.

''(iii) The procurement of facilities and equipment, as required to train a skilled and technical workforce.

''(iv) The development and execution of programs, including traineeships and apprenticeships, to rapidly provide training and award certificates or credentials recognized by regional industries or other organizations.

''(v) The matching of regional employers with a potential new entrant, underemployed, underrepresented, reentering, or incumbent workforce, as well as the securing of commitments from employers to hire workers who successfully complete training programs, or who are awarded certificates or credentials.

''(vi) The expansion of successful training programs at a scale required by the region served by the regional technology and innovation hub, including

through the use of online education and mentoring.

"(vii) The development and expansion of programs with the goal of increasing the participation of persons historically underrepresented in STEM and manufacturing in the workforce development plans of the regional technology and innovation hub.

"(viii) The provision of support services for attendees of training programs developed, updated, or expanded pursuant to this subsection, including career counseling.

"(ix) The implementation of outreach and recruitment for training programs developed, updated, or expanded pursuant to this subsection, particularly at local educational institutions, including high schools and community colleges.

"(B) BUSINESS AND ENTREPRENEUR DEVELOPMENT ACTIVITIES.—Business and entrepreneur development activities, including activities relating to the following:

"(i) The development and growth of local and regional businesses and the train-

ing of entrepreneurs, which may include support for the expansion of employee owned businesses and cooperatives.

"(ii) The support of technology commercialization, including funding for activities relevant to the protection of intellectual property and for advancing potential ventures such as acceleration, incubation, early-stage production and other relevant programming.

"(iii) The development of local and regional capital networks and consortia to attract necessary private funding to businesses and entrepreneurs in the region.

"(iv) The development of local and regional networks for business and entrepreneur mentorship.

"(C) TECHNOLOGY DEVELOPMENT AND MATURATION ACTIVITIES.—Technology maturation activities, including activities relating to the following:

"(i) The development and deployment of technologies in sectors critical to the region served by the regional technology and innovation hub or to national and economic

security, including industry-university research cooperation, proof of concept, prototype development, testing, and scale-up for manufacturing.

"(ii) The development of programming to support the creation and transfer of intellectual property into private use, such as through startup creation.

"(iii) The provision of facilities for technology maturation, including incubators and production testbeds for collaborative development of technologies by private sector, academic, nonprofit, and other entities.

"(iv) Activities to provide or ensure access to capital for new business and business expansion, including by attracting new private, public, and philanthropic investment and by establishing local and regional venture and loan funds, community development financial institutions, and minority depository institutions.

"(D) INFRASTRUCTURE-RELATED ACTIVITIES.—The building of facilities and site connectivity infrastructure necessary to carry

out activities described in subparagraphs (A), (B), and (C), including activities relating to the following:

"(i) Establishing a center with required tools and instrumentation for workforce development.

"(ii) Establishing a facility for technology development, demonstration, and testing.

"(iii) Establishing collaborative incubators to support technology commercialization and entrepreneur training.

"(3) TERM.—

"(A) INITIAL PERFORMANCE PERIOD.—The term of an initial grant or cooperative agreement awarded under this subsection shall be for a period that the Secretary deems appropriate for the proposed activities but not less than 2 years.

"(B) SUBSEQUENT PERFORMANCE PERIOD.—The Secretary may renew a grant or cooperative agreement awarded to a regional technology and innovation hub under paragraph (1) for such period as the Secretary considers appropriate, if the Secretary determines that the

regional technology and innovation hub has made satisfactory progress towards the metrics agreed to under subsection (j).

"(C) FLEXIBLE APPROACH.—In renewing a grant or cooperative agreement under subparagraph (B), the Secretary and the eligible consortium may agree to new or additional uses of funds in order to meet changes in the needs of the region.

"(4) LIMITATION ON AMOUNT OF AWARDS.—

"(A) INITIAL PERFORMANCE PERIOD.—The amount of an initial grant or cooperative agreements awarded to a regional technology and innovation hub under paragraph (3)(A) shall be no more than $150,000,000.

"(B) SUBSEQUENT PERFORMANCE PERIOD.—Upon renewal of a grant or cooperative agreement under paragraph (3)(B), the Secretary may award funding in the amount that the Secretary considers appropriate, ensuring that no single regional technology and innovation hub receives more than 10 percent of the aggregate amount of the grants and cooperative agreements awarded under this subsection.

"(5) MATCHING REQUIRED.—

"(A) INITIAL PERFORMANCE PERIOD.—Except in the case of a regional technology and innovation hub described in subparagraph (C), the total amount of all grants awarded to a regional technology and innovation hub under this subsection in phase one shall not exceed 90 percent of the total operating costs of the regional technology and innovation hub during the initial performance period.

"(B) SUBSEQUENT PERFORMANCE PERIOD.—Except in the case of a regional technology and innovation hub described in subparagraph (C), the total amount of all grants awarded to a regional technology and innovation hub in subsequent performance periods shall not exceed 75 percent of the total operating costs of the regional technology and innovation hub in each year of the grant or cooperative agreement.

"(C) SMALL AND RURAL COMMUNITIES, UNDERSERVED COMMUNITIES, AND INDIAN TRIBES.—

"(i) IN GENERAL.—The total Federal financial assistance awarded in a given year to a regional technology and innova-

tion hub under this subsection shall not exceed amounts as follows:

"(I) In the case of a regional technology and innovation hub that primarily serves a small and rural community or other underserved community, in a fiscal year, 90 percent of the total funding of the regional technology and innovation hub in that fiscal year.

"(II) In the case of a regional technology and innovation hub that is led by a Tribal government, in a fiscal year, 100 percent of the total funding of the regional technology and innovation hub in that fiscal year.

"(ii) MINIMUM THRESHOLD OF RURAL REPRESENTATION.—For purposes of clause (i)(I), the Secretary shall establish a minimum threshold of rural representation in the regional technology and innovation hub.

"(D) IN-KIND CONTRIBUTIONS.—For purposes of this paragraph, in-kind contributions may be used for part of the non-Federal share

of the total funding of a regional technology and innovation hub in a fiscal year.

"(6) GRANTS FOR INFRASTRUCTURE.—Any grant or cooperative agreement awarded under this subsection to support the construction of facilities and site connectivity infrastructure shall be awarded pursuant to section 201 of the Public Works and Economic Development Act of 1965 (42 U.S.C. 3141) and subject to the provisions of such Act, except that subsection (b) of such section and sections 204 and 301 of such Act (42 U.S.C. 3144; 3161) shall not apply.

"(7) RELATION TO CERTAIN GRANT AWARDS.—The Secretary shall not require a regional technology and innovation hub to receive a grant or cooperative agreement under subsection (e) in order to receive a grant or cooperative agreement under this subsection.

"(g) APPLICATIONS.—An eligible consortium seeking designation as a regional technology and innovation hub under subsection (d) or a grant or cooperative agreement under subsection (e) or (f) shall submit to the Secretary an application therefore at such time, in such manner, and containing such information as the Secretary may specify.

"(h) CONSIDERATIONS FOR DESIGNATION AND AWARD OF STRATEGY IMPLEMENTATION GRANTS AND COOPERATIVE AGREEMENTS.—In selecting an eligible consortium that submitted an application under subsection (g) for designation under subsection (d) or for a grant or cooperative agreement under subsection (f), the Secretary shall consider the following:

"(1) The potential of the eligible consortium to advance the research, development, deployment, and domestic manufacturing of technologies in a key technology focus area, as described in section 10387 of the Research and Development, Competition, and Innovation Act or other technology or innovation sector critical to national security and economic competitiveness.

"(2) The likelihood of positive regional economic effect, including increasing the number of high wage domestic jobs, creating new economic opportunities for economically disadvantaged and underrepresented populations, and building and retaining wealth in the region.

"(3) How the eligible consortium plans to integrate with and leverage the resources of 1 or more federally funded research and development centers, National Laboratories, Federal laboratories, Manu-

facturing USA institutes, Hollings Manufacturing Extension Partnership centers, regional innovation engines or translation accelerators established under sections 10388 and 10389 of the Research and Development, Competition, and Innovation Act, test beds established and operated under section 10390 of such Act, or other Federal entities.

''(4) How the eligible consortium will engage with the private sector, including small- and medium-sized businesses and cooperatives, and employee-owned businesses and cooperatives, to commercialize new technologies and improve the resiliency and sustainability of domestic supply chains in a key technology focus area, or other technology or innovation sector critical to national security and economic competitiveness.

''(5) How the eligible consortium will carry out workforce development and skills acquisition programming, including through partnerships with entities that include State and local workforce development boards, institutions of higher education, including community colleges, historically Black colleges and universities, Tribal Colleges or Universities, and minority-serving institutions, labor organizations, nonprofit organizations, workforce devel-

opment programs, and other related activities authorized by the Secretary, to support the development of a skilled technical workforce for the regional technology and innovation hub, including key technology focus area or other technology or innovation sector critical to national security and economic competitiveness.

''(6) How the eligible consortium will improve or expand science, technology, engineering, and mathematics education programs and opportunities in the identified region in elementary and secondary school and higher education institutions located in the identified region to support the development of a key technology focus area or other technology or innovation sector critical to national security and economic competitiveness.

''(7) How the eligible consortium plans to develop partnerships with venture development organizations, community development financial institutions and minority depository institutions, and sources of private investment in support of private sector activity, including launching new or expanding existing companies in a key technology focus area or other technology or innovation sector critical to national security and economic competitiveness.

"(8) How the eligible consortium plans to organize the activities of regional partners across sectors in support of a regional technology and innovation hub.

"(9) How the eligible consortium considers opportunities to support local and regional businesses through procurement, including from minority-owned and women-owned businesses.

"(10) How the eligible consortium will ensure that growth in technology, innovation, and advanced manufacturing sectors produces opportunity across the identified region and for economically disadvantaged, minority, underrepresented and rural populations, including, as appropriate, consideration of how the eligible consortium takes into account the relevant impact of existing regional status and plans or may affect regional goals for affordable housing availability, local and regional transportation, high-speed internet access, and primary and secondary education.

"(11) How well the region's education institutions align their activities, including research, educational programs, training, with the proposed areas of focus.

"(12) The likelihood efforts served by the consortium will be sustained once Federal support ends.

"(13) How the eligible consortium will, as appropriate—

"(A) enhance the economic, environmental, and energy security of the United States by promoting domestic development, manufacture, and deployment of innovative clean technologies and advanced manufacturing practices; and

"(B) support translational research, technology development, manufacturing innovation, and commercialization activities relating to clean technology.

"(i) COORDINATION AND COLLABORATION.—

"(1) COORDINATION WITH REGIONAL INNOVATION PROGRAM.—The Secretary shall ensure the activities under this section do not duplicate activities or efforts under section 27.

"(2) COORDINATION AMONG HUBS.—The Secretary shall ensure eligible consortia that receive a grant or cooperative agreement under this section coordinate and share best practices for regional economic development.

"(3) COORDINATION WITH PROGRAMS OF THE NATIONAL INSTITUTE OF STANDARDS AND TECH-

NOLOGY.—The Secretary shall coordinate the activities of regional technology and innovation hubs designated under this section, the Hollings Manufacturing Extension Partnership, and the Manufacturing USA Program, as the Secretary considers appropriate, to maintain the effectiveness of a manufacturing extension center or a Manufacturing USA institute.

"(4) COORDINATION WITH DEPARTMENT OF ENERGY PROGRAMS.—The Secretary shall, in collaboration with the Secretary of Energy, coordinate the activities and selection of regional technology and innovation hubs designated under this section, as the Secretaries consider appropriate, to maintain the effectiveness of activities at the Department of Energy and the National Laboratories.

"(5) INTERAGENCY COLLABORATION.—In designating regional technology and innovation hubs under subsection (d) and awarding grants or cooperative agreements under subsection (f), the Secretary—

"(A) shall collaborate with Federal departments and agencies whose missions contribute to the goals of the regional technology and innovation hub;

"(B) shall consult with the Director of the National Science Foundation for the purpose of ensuring that the regional technology and innovation hubs are aligned with relevant science, technology, and engineering expertise; and

"(C) may accept funds from other Federal agencies to support grants, cooperative agreements, and activities under this section.

"(j) PERFORMANCE MEASUREMENT, TRANSPARENCY, AND ACCOUNTABILITY.—

"(1) METRICS, STANDARDS, AND ASSESSMENT.—For each grant and cooperative agreement awarded under subsection (f) for a regional technology and innovation hub, the Secretary shall—

"(A) in consultation with the regional technology and innovation hub, develop metrics, which may include metrics relating to domestic job creation, patent awards, increases in research funding, business formation and expansion, and participation of individuals or communities historically underrepresented in STEM, to assess the effectiveness of the activities funded in making progress toward the purposes set forth under subsection (b)(1);

"(B) establish standards for the performance of the regional technology and innovation hub that are based on the metrics developed under subparagraph (A); and

"(C) prior to any award made under a subsequent performance period in subsection (f) and every 2 years thereafter until Federal financial assistance under this section for the regional technology and innovation hub is discontinued, conduct an assessment of the regional technology and innovation hub to confirm whether the performance of the regional technology and innovation hub is meeting the standards for performance established under subparagraph (B) of this paragraph.

"(2) FINAL REPORTS BY RECIPIENTS OF STRATEGY IMPLEMENTATION GRANTS AND COOPERATIVE AGREEMENTS.—

"(A) IN GENERAL.—The Secretary shall require each eligible consortium that receives a grant or cooperative agreement under subsection (f) for activities of a regional technology and innovation hub, as a condition of receipt of such grant or cooperative agreement, to submit to the Secretary, not later than 120 days after

the last day of the term of the grant or cooperative agreement, a report on the activities of the regional technology and innovation hub supported by the grant or cooperative agreement.

"(B) CONTENTS OF REPORT.—Each report submitted by an eligible consortium under subparagraph (A) shall include the following:

"(i) A detailed description of the activities carried out by the regional technology and innovation hub using the grant or cooperative agreement described in subparagraph (A), including the following:

"(I) A description of each project the regional technology and innovation hub completed using such grant or cooperative agreement.

"(II) An explanation of how each project described in subclause (I) achieves a specific goal under this section in the region of the regional technology and innovation hub with respect to—

"(aa) the resiliency and sustainability of a supply chain;

"(bb) research, development, and deployment of a critical technology;

"(cc) workforce training and development;

"(dd) domestic job creation;

"(ee) entrepreneurship and company formation;

"(ff) commercialization;

"(gg) access to private capital; or

"(hh) participation of individuals or communities historically underrepresented in STEM.

"(ii) A discussion of any obstacles encountered by the regional technology and innovation hub in the implementation of the regional technology and innovation hub and how the regional technology and innovation hub overcame those obstacles.

"(iii) An evaluation of the success of the projects of the regional technology and innovation hub using the performance standards and measures established under paragraph (1), including an evaluation of

the planning process and how the project contributes to carrying out the regional innovation strategy of the regional technology and innovation hub.

"(iv) The effectiveness of the regional technology and innovation hub in ensuring that, in the region of the regional technology and innovation hub, growth in technology and innovation sectors produces broadly shared opportunity across the region, including for economic disadvantaged and underrepresented populations and rural areas.

"(v) Information regarding such other matters as the Secretary may require.

"(3) INTERIM REPORTS BY RECIPIENTS OF GRANTS AND COOPERATIVE AGREEMENTS.—In addition to requiring submittal of final reports under paragraph (2)(A), the Secretary may require a regional technology and innovation hub described in such paragraph to submit to the Secretary such interim reports as the Secretary considers appropriate.

"(4) ANNUAL REPORTS TO CONGRESS.—Not less frequently than once each year, the Secretary shall submit to the appropriate committees of Con-

gress an annual report on the results of the assessments conducted by the Secretary under paragraph (1)(C) during the period covered by the report.

"(k) AUTHORIZATION OF APPROPRIATIONS.—There is authorized to be appropriated to the Secretary—

"(1) $50,000,000 to award grants and cooperative agreements under subsection (e) for the period of fiscal years 2023 through 2027;

"(2) $2,950,000,000 to award grants and cooperative agreements under subsection (f) for the period of fiscal years 2023 and 2024; and

"(3) $7,000,000,000 to award grants and cooperative agreements under subsection (f) for the period of fiscal years 2025 through 2027.

"(l) ADMINISTRATION.—The Secretary may use funds made available to carry out this section for administrative costs under this section.

"SEC. 29. DISTRESSED AREA RECOMPETE PILOT PROGRAM.

"(a) IN GENERAL.—Within the program authorized under section 28, the Secretary is authorized to establish a pilot program, to be known as the 'Recompete Pilot Program', to provide grants to eligible recipients representing eligible areas or Tribal lands to alleviate persistent economic distress and support long-term comprehensive economic development and job creation in eligible areas.

"(b) STRATEGY DEVELOPMENT GRANTS AND COOPERATIVE AGREEMENTS.—Subject to available appropriations, the Secretary is authorized, on the application of an eligible recipient, to award up to one half of the number of grants under subsection (e) of section 28 to eligible recipients to develop a recompete plan and carry out related predevelopment activities.

"(c) STRATEGY IMPLEMENTATION GRANTS AND COOPERATIVE AGREEMENTS.—Subject to available appropriations and subsection (f) , the Secretary shall award, on the application of an eligible recipient, at least ten strategy implementation grants, in accordance with a recompete plan review and approved by the Secretary, to carry out coordinated and comprehensive economic development programs and activities in an eligible area, consistent with a recompete plan approved by the Secretary. Such activities may include—

"(1) workforce development activities of the kind described in section 28(f) or other job training and workforce outreach programs oriented to local employer needs, such as—

"(A) customized job training programs carried out by local community colleges and other training or educational organizations in partnership with local businesses;

"(B) workforce outreach programs located in, and targeted to, lower-income and under-employed neighborhoods; and

"(C) programs to embed job placement and training services in neighborhood institutions such as churches, housing projects, and community advocacy programs; and

"(D) job retention programs and activities, such as the provision of career coaches;

"(2) business and entrepreneur development activities of the kind described in section 28(f), technology development and maturation activities of the kind described in such section, or the provision of business advice and assistance to small and medium-sized local businesses and entrepreneurs. Such advice and assistance may include—

"(A) manufacturing extension services;

"(B) small business development centers;

"(C) centers to help businesses bid for Federal procurement contracts;

"(D) entrepreneurial assistance programs that link entrepreneurs with available public and private resources;

"(E) legal advice and resources; and

"(F) assistance in accessing capital;

"(3) infrastructure related activities of the kind described in section 28(f) or other land and site development programs, such as brownfield redevelopment, research and technology parks, business incubators, business corridor development, and other infrastructure activities related to supporting job creation and employment for residents, subject to the requirements of section 28(f)(6); and

"(4) additional planning, predevelopment, technical assistance, and other administrative activities as may be necessary for the ongoing implementation, administration, and operation of the programs and activities carried out with a grant or cooperative agreement under this section, including but not limited to economic development planning and evaluation.

"(d) TERM.—

"(1) INITIAL PERFORMANCE PERIOD.—The term of an initial grant or cooperative agreement awarded under subsection (c) shall be for a period that the Secretary deems appropriate for the proposed activities but not less than 2 years.

"(2) SUBSEQUENT PERFORMANCE PERIOD.—The Secretary may renew a grant or cooperative agreement awarded under subsection (c) for such pe-

riod, such amount, and such terms as the Secretary considers appropriate, if the Secretary determines that the recipient of an award under subsection (c) has made satisfactory progress towards metrics or benchmarking requirements established by the Secretary at time of award.

"(3) FLEXIBLE APPROACH.—In renewing a grant or cooperative agreement under subsection (c), the Secretary may approve new or additional uses of funds, consistent with the uses described in subsection (c), to meet changes in the needs of the region.

"(e) LIMITATIONS.—

"(1) LIMITATION ON ELIGIBLE AREAS.—An eligible area may not benefit from more than 1 grant or cooperative agreement described in subsection (b) and 1 grant or cooperative agreement described in subsection (c), provided that a renewal described in subsection (d)(2) shall not constitute an additional grant.

"(2) LIMITATION ON RECIPIENTS.—For purposes of the program under this section, an eligible recipient may not receive multiple grants described in subsection (c) on behalf of more than 1 eligible area.

"(f) AWARD AMOUNT.—

"(1) IN GENERAL.—In determining the amount of a grant that an eligible recipient may be awarded under subsection (c), the Secretary shall—

"(A) take into consideration the proposed activities and projected expenditures outlined in an approved recompete plan; and

"(B) award not more than the product obtained by multiplying—

"(i) the prime-age employment gap of the eligible area;

"(ii) the prime-age population of the eligible area; and

"(iii) either—

"(I) $70,585 for local labor markets; or

"(II) $53,600 for local communities.

"(2) MINIMUM AMOUNT.—The Secretary may not make an award that is less than $20,000,000 to an eligible recipient.

"(g) APPLICATIONS.—To be considered for a grant or cooperative agreement under—

"(1) subsection (b) of this section, an eligible recipient shall submit to the Secretary an application

at such time, in such manner, and containing such information as the Secretary determines to be appropriate; and

"(2) subsection (c) of this section, an eligible recipient shall submit to the Secretary an application at such time, in such manner, and containing such information as the Secretary determines to be appropriate, including a recompete plan approved by the Secretary.

"(h) RELATION TO CERTAIN GRANT AWARDS.—The Secretary shall not require an eligible recipient to receive a grant or cooperative agreement under subsection (b) in order to receive a grant or cooperative agreement under subsection (c).

"(i) AUTHORIZATION OF APPROPRIATIONS.—There is authorized to be appropriated to the Secretary $1,000,000,000 to award grants and cooperative agreements under subsection (c) of this section, for the period of fiscal years 2022 through 2026.

"(j) DEFINITIONS.—In this section:

"(1) ELIGIBLE AREA.—The term 'eligible area' means either of the following:

"(A) A local labor market that—

"(i) has a prime-age employment gap equal to not less than 2.5 percent; and

"(ii) meets additional criteria as the Secretary may establish.

"(B) A local community that—

"(i) has a prime-age employment gap equal to not less than 5 percent;

"(ii) is not located within an eligible local labor market that meets the criteria described in subparagraph (A);

"(iii) has a median annual household income of not more than $75,000; and

"(iv) meets additional criteria as the Secretary may establish.

"(2) ELIGIBLE RECIPIENT.—The term 'eligible recipient' means a specified entity that has been authorized in a manner as determined by the Secretary to represent and act on behalf of an eligible area for the purposes of this section.

"(3) LOCAL LABOR MARKET.—The term 'local labor market' means any of the following areas that contains 1 or more specified entities described in subparagraphs (A) through (D) of paragraph (6):

"(A) A metropolitan statistical area or micropolitan statistical area, excluding any area described in subparagraph (C).

"(B) A commuting zone, excluding any areas described in subparagraphs (A) and (C).

"(C) The Tribal land with a Tribal prime-age population represented by a Tribal government.

"(4) LOCAL COMMUNITY.—The term 'local community' means the area served by a general-purpose unit of local government that is located within, but does not cover the entire area of, a local labor market that does not meet the criteria described in paragraph (1)(A).

"(5) PRIME-AGE EMPLOYMENT GAP.—

"(A) IN GENERAL.—The term 'prime-age employment gap' means the difference (expressed as a percentage) between—

"(i) the national 5-year average prime-age employment rate; and

"(ii) the 5-year average prime-age employment rate of the eligible area.

"(B) CALCULATION.—For the purposes of subparagraph (A), an individual is prime-age if such individual between the ages of 25 years and 54 years.

"(6) RECOMPETE PLAN.—The term 'recompete plan' means a comprehensive multiyear economic development plan that—

"(A) includes—

"(i) proposed programs and activities to be carried out with a grant awarded under subsection (c) to address the economic challenges of the eligible area in a comprehensive manner that promotes long-term, sustained economic growth, lasting job creation, per capita wage increases, and reduction in the prime-age employment gap of the eligible area;

"(ii) projected costs and annual expenditures and proposed disbursement schedule;

"(iii) the roles and responsibilities of specified entities that may receive grant funds awarded under subsection (c); and

"(iv) other information as the Secretary determines appropriate;

"(B) is submitted to the Secretary for approval for an eligible recipient to be considered for a grant described in subsection (c); and

"(C) may be modified over the term of the grant by the eligible recipient, subject to the approval of the Secretary or at the direction of the Secretary, if the Secretary determines benchmarking requirements are repeatedly not met or if other circumstances necessitate a modification.

"(7) SPECIFIED ENTITY.—The term 'specified entity' means—

"(A) a unit of local government;

"(B) the District of Columbia;

"(C) a territory of the United States;

"(D) a Tribal government;

"(E) political subdivision of a State or other entity, including a special-purpose entity engaged in economic development activities;

"(F) a public entity or nonprofit organization, acting in cooperation with the officials of a political subdivision of a State or other entity described in subparagraph (E);

"(G) an economic development district (as defined in section 3 of the Public Works and Economic Development Act of 1965 (42 U.S.C. 3122); and

"(H) a consortium of any of the specified entities described in this paragraph which serve or are contained within the same eligible area.

"(8) TRIBAL GOVERNMENT.—The term 'Tribal government' means the recognized governing body of any Indian or Alaska Native Tribe, band, nation, pueblo, village, community, component band, or component reservation, individually identified (including parenthetically) in the list published by the Bureau of Indian Affairs on January 29, 2021, pursuant to section 104 of the Federally Recognized Indian Tribe List Act of 1994 (25 U.S.C. 5131).

"(9) TRIBAL LAND.—The term 'Tribal land' means any land—

"(A) located within the boundaries of an Indian reservation, pueblo, or rancheria; or

"(B) not located within the boundaries of an Indian reservation, pueblo, or rancheria, the title to which is held—

"(i) in trust by the United States for the benefit of an Indian Tribe or an individual Indian;

"(ii) by an Indian Tribe or an individual Indian, subject to restriction against

alienation under laws of the United States; or

"(iii) by a dependent Indian community.

"(10) TRIBAL PRIME-AGE POPULATION.—

"(A) IN GENERAL.—The term 'Tribal prime-age population' shall be equal to the sum obtained by adding—

"(i) the product obtained by multiplying—

"(I) the total number of individuals ages 25 through 54 residing on the Tribal land of the Tribal government; and

"(II) 0.65; and

"(ii) the product obtained by multiplying—

"(I) the total number of individuals ages 25 through 54 included on the membership roll of the Tribal government; and

"(II) 0.35

"(B) USE OF DATA.—A calculation under subparagraph (A) shall be determined based on data provided by the applicable Tribal govern-

ment to the Department of the Treasury under the Coronavirus State and Local Fiscal Recovery Fund programs under title VI of the Social Security Act (42 U.S.C. 801 et seq.).''.

(b) INITIAL DESIGNATIONS AND AWARDS.—

(1) COMPETITION REQUIRED.—Not later than 1 year after the date of the enactment of this Act, subject to the availability of appropriations, the Secretary of Commerce shall commence a competition under subsection (d)(1) of section 28 of the Stevenson-Wydler Technology Innovation Act of 1980 (as added by this section).

(2) DESIGNATION AND AWARD.—Not later than 18 months after the date of the enactment of this Act, if the Secretary has received at least 1 application under subsection (g) of section 28 of the Stevenson-Wydler Technology Innovation Act of 1980 (as added by this section) from an eligible consortium which the Secretary considers suitable for designation under subsection (d)(1) of such section 28, the Secretary shall—

(A) designate at least 1 regional technology and innovation hub under subsection (d)(1) of such section 28; and

(B) award a grant or cooperative agreement under subsection (f)(1) of such section 28 to each regional technology and innovation hub designated pursuant to subparagraph (A) of this paragraph.

(c) DISTRESSED AREA DESIGNATION AND AWARD.—Not later than 18 months after the date of the enactment of this section, subject to the availability of appropriations, if the Secretary has received applications under section 29 of the Stevenson-Wydler Technology Innovation Act of 1980 (as added by this section) from an eligible recipient which the Secretary considers suitable for award under such section 29, the Secretary shall award grants or cooperative agreement under subsections (b) and (c) of such section 29 to one or more eligible recipients.

SEC. 10622. REGIONAL CLEAN ENERGY INNOVATION PROGRAM.

Subtitle C of title IX of the Energy Independence and Security Act of 2007 is amended by adding at the end the following:

"SEC. 936. REGIONAL CLEAN ENERGY INNOVATION PROGRAM.

"(a) DEFINITIONS.—In this section:

"(1) REGIONAL CLEAN ENERGY INNOVATION PARTNERSHIP.—The term 'regional clean energy in-

novation partnership' means a group of one or more persons, including a covered consortium, who perform a collection of activities that are coordinated by such covered consortium to carry out the purposes of the program under subsection (c) in a region of the United States.

"(2) COVERED CONSORTIUM.—The term 'covered consortium' means an individual or group of individuals in partnership with a government entity, including a State, territorial, local, or tribal government or unit of such government, and at least 2 or more of the following additional entities—

"(A) an institution of higher education or a consortium of institutions of higher education, including community colleges;

"(B) a workforce development program;

"(C) a private sector entity or group of entities, including a trade or industry association;

"(D) a nonprofit organization;

"(E) a community group or community-based organization;

"(F) a labor organization or joint labor-management organization;

"(G) a National Laboratory;

"(H) a venture development organization;

"(I) a community development financial institution or minority depository institution;

"(J) a worker cooperative membership association or state or local employee ownership or cooperative development center;

"(K) an organization focused on clean energy technology innovation or entrepreneurship;

"(L) a business or clean energy accelerator or incubator;

"(M) an economic development organization;

"(N) a manufacturing facility or organization;

"(O) a multi-institutional collaboration; or

"(P) any other entity that the Secretary determines to be relevant.

"(3) PROGRAM.—The term 'program' means the Regional Clean Energy Innovation Program authorized in subsection (b).

"(4) INSTITUTION OF HIGHER EDUCATION.—The term 'institution of higher education' has the meaning given such term in section 101 or 102(a)(1)(B) of the Higher Education Act of 1965, as amended (20 U.S.C. 1001, 1002(a)(1)(B)).

"(5) NATIONAL LABORATORY.—The term 'National Laboratory' has the meaning given that term in section 2 of the Energy Policy Act of 2005 (42 2 U.S.C. 15801).

"(6) CLEAN ENERGY TECHNOLOGY.—The term 'clean energy technology' means a technology that significantly reduces energy use, increases energy efficiency, reduces greenhouse gas emissions, reduces emissions of other pollutants, or mitigates other negative environmental consequences of energy production, transmission or use.

"(7) COMMUNITY-BASED ORGANIZATION.—The term 'community-based organization' has the meaning given the term in section 3 of the Workforce Innovation and Opportunity Act (29 U.S.C. 3102).

"(8) COMMUNITY COLLEGE.—The term 'community college' means—

"(A) a public institution of higher education, including additional locations, at which the highest degree, or the predominantly awarded degree, is an associate degree; or

"(B) any Tribal college or university (as defined in section 316 of the Higher Education Act of 1965 (20 U.S.C. 1059c)).

"(9) WORKFORCE DEVELOPMENT PROGRAM.—The term 'workforce development program' has the meaning given the term in section 3 of the Workforce Innovation and Opportunity Act (29 U.S.C. 3102).

"(b) IN GENERAL.—The Secretary shall establish a Regional Clean Energy Innovation Program, a research, development, demonstration, and commercial application program designed to enhance the economic, environmental, and energy security of the United States and accelerate the pace of innovation of diverse clean energy technologies through the formation or support of regional clean energy innovation partnerships.

"(c) PURPOSES OF THE PROGRAM.—The purposes of the Program established under subsection (b) are to—

"(1) improve the competitiveness of United States' clean energy technology research, development, demonstration, and commercial application; and

"(2) support the development of tools and technologies best suited for use in diverse regions of the United States, including in rural, tribal, and low-income communities.

"(d) REGIONAL CLEAN ENERGY INNOVATION PARTNERSHIPS.—

"(1) IN GENERAL.—The Secretary shall competitively award grants to covered consortia to establish or support regional clean energy innovation partnerships that achieve the purposes of the Program in subsection (c).

"(2) PERMISSIBLE ACTIVITIES.—Grants awarded under this subsection shall be used for activities determined appropriate by the Secretary to achieve the purposes of the Program in subsection (c), including—

"(A) facilitating the commercial application of clean energy products, processes, and services, including through research, development, demonstration, or technology transfer;

"(B) planning among participants of a regional clean energy innovation partnership to improve the strategic and cost-effective coordination of the partnership;

"(C) improving stakeholder involvement in the development of goals and activities of a regional clean energy innovation partnership;

"(D) assessing different incentive mechanisms for clean energy development and commercial application in the region;

"(E) hosting events and conferences; and

"(F) establishing and updating roadmaps to measure progress on relevant goals, such as those relevant to metrics developed under subsection (g).

"(3) APPLICATIONS.—Each application submitted to the Secretary under paragraph (1) may include—

"(A) a list of members and roles of members of the covered consortia, as well as any other stakeholders supporting the activities of the regional clean energy innovation partnership;

"(B) an assessment of the relevant clean energy innovation assets needed in a region to achieve proposed outcomes, such as education and workforce development programs, research facilities, infrastructure or site development, access to capital, manufacturing capabilities, or other assets;

"(C) a description of proposed activities that the regional clean energy innovation partnership plans to undertake and how the proposed activities will achieve the purposes described in subsection (c);

"(D) a plan for attracting additional funds and identification of funding sources from non-Federal sources to deliver the proposed outcomes of the regional clean energy innovation partnership;

"(E) a plan for partnering and collaborating with community development financial institutions and minority depository institutions, labor organizations and community groups, worker cooperative membership associations, local and state employee ownership and cooperative development centers, and other local institutions in order to promote employee, community, and public ownership in the clean energy sector, and advance models of local economic development that build and retain wealth in the region;

"(F) a plan for sustaining activities of the regional clean energy innovation partnership after funds received under this program have been expended; and

"(G) a proposed budget, including financial contributions from non-Federal sources.

"(4) CONSIDERATIONS.—In selecting covered consortia for funding under the Program, the Secretary shall, to the maximum extent practicable—

"(A) give special consideration to applications from rural, tribal, and low-income communities; and

"(B) ensure that there is geographic diversity among the covered consortia selected to receive funding.

"(5) AWARD AMOUNT.—Grants given out under this Program shall be in an amount not greater than $10,000,000, with the total grant award in any year less than that in the previous year.

"(6) COST SHARE.—For grants that are disbursed over the course of three or more years, the Secretary shall require, as a condition of receipt of funds under this section, that a covered consortium provide not less than 50 percent of the funding for the activities of the regional clean energy partnership under this section for years 3, 4, and 5.

"(7) DURATION.—Each grant under paragraph shall be for a period of not longer than 5 years.

"(8) RENEWAL.—A grant awarded under this section may be renewed for a period of not more than 5 years, subject to a rigorous merit review

based on the progress of a regional clean energy innovation partnership towards achieving the purposes of the program in subsection (c) and the metrics developed under subsection (g).

"(9) TERMINATION.—Consistent with the existing authorities of the Department, the Secretary may terminate grant funding under this subsection to covered consortia during the performance period if the Secretary determines that the regional clean energy innovation partnership is underperforming.

"(10) ADMINISTRATIVE COSTS.—The Secretary may allow a covered consortium that receives funds under this section to allocate a portion of the funding received to be used for administrative or indirect costs.

"(11) FUNDING.—The Secretary may accept funds from other Federal agencies to support funding and activities under this section.

"(e) PLANNING FUNDS.—The Secretary may competitively award grants in an amount no greater than $2,000,000 for a period not longer than 2 years to an entity consisting of a government entity, including a State, territorial, local, or tribal government or unit of such government or any entity listed under subsection (a)(2) to plan a regional clean energy innovation partnership or es-

tablish a covered consortium for the purpose of applying for funds under subsection (b).

"(f) INFORMATION SHARING.—As part of the program, the Secretary shall support the gathering, analysis, and dissemination of information on best practices for developing and operating successful regional clean energy innovation partnerships.

"(g) METRICS.—In evaluating a grant renewal under subsection (d)(8), the Secretary shall work with program evaluation experts to develop and make publicly available metrics to assess the progress of a regional clean energy innovation partnership towards achieving the purposes of the program in subsection (c).

"(h) COORDINATION.—In carrying out the program, the Secretary shall coordinate with, and avoid unnecessary duplication of, the activities carried out under this section with the activities of other research entities of the Department or relevant programs at other Federal agencies.

"(i) CONFLICTS OF INTEREST.—In carrying out the program, the Secretary shall maintain conflict of interest procedures, consistent with the conflict of interest procedures of the Department.

"(j) EVALUATION BY COMPTROLLER GENERAL.—Not later than 3 years after the date of the enactment of the Research and Development, Competition, and Inno-

vation Act, and again 3 years later, the Comptroller General shall submit to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Energy and Natural Resources of the Senate an evaluation on the operation of the program during the most recent 3-year period, including—

"(1) an assessment of the progress made towards achieving the purposes specified in subsection (c) based on the metrics developed under subsection (g);

"(2) the short-term and long-term metrics used to determine the success of the program under subsection (g), and any changes recommended to the metrics used;

"(3) the regional clean energy innovation partnerships established or supported by covered consortia that have received grants under subsection (d); and

"(4) any recommendations on how the program may be improved.

"(k) NATIONAL LABORATORIES.—In supporting technology transfer activities at the National Laboratories, the Secretary shall encourage partnerships with entities that are located in the same region or State as the National Laboratory.

"(l) SECURITY.—In carrying out the activities under this section, the Secretary shall ensure proper security controls are in place to protect sensitive information, as appropriate.

"(m) NO FUNDS FOR CONSTRUCTION.—No funds provided to the Department of Energy under this section shall be used for construction.

"(n) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the Secretary to carry out this section $50,000,000 for each of fiscal years 2023 through 2027.".

Subtitle D—Research Security

SEC. 10631. REQUIREMENTS FOR FOREIGN TALENT RECRUITMENT PROGRAMS.

(a) PURPOSE.—The purpose of this subtitle is to direct actions to prohibit participation in any foreign talent recruitment program by personnel of Federal research agencies and to prohibit participation in a malign foreign talent recruitment program by covered individuals involved with research and development awards from those agencies.

(b) GUIDANCE.—Not later than 180 days after the date of the enactment of this Act, the Director of the Office of Science and Technology Policy, in coordination with the interagency working group established under section

1746 of the National Defense Authorization Act for Fiscal Year 2020 (42 U.S.C. 6601 note; Public Law 116–92), shall publish and widely distribute a uniform set of guidelines for Federal research agencies regarding foreign talent recruitment programs. Such policy guidelines shall—

(1) prohibit all personnel of each Federal research agency, including Federal employees, contract employees, independent contractors, individuals serving under the Intergovernmental Personnel Act of 1970 (42 U.S.C. 4701 et seq), Visiting Scientist, Engineering, and Educator appointments, and special government employees other than peer reviewers, from participating in a foreign talent recruitment program;

(2) as part of the requirements under section 223 of the William (Mac) Thornberry NDAA of Fiscal Year 2021 (10 U.S.C. 6605; Public Law 116–283), require covered individuals to disclose if such individuals are a party to a foreign talent recruitment program contract, agreement, or other arrangement;

(3) prohibit research and development awards from being made for any proposal in which a covered individual is participating in a malign foreign talent recruitment program; and

(4) to the extent practicable, require recipient institutions to prohibit covered individuals participating in malign foreign talent recruitment programs from working on projects supported by research and development awards.

(c) DEFINITION OF FOREIGN TALENT RECRUITMENT PROGRAMS.—As part of the guidance under subsection (b), the Director of the Office of Science and Technology Policy shall define and describe the characteristics of a foreign talent recruitment program.

(d) IMPLEMENTATION.—Not later than one year after the date of the enactment of this Act, each Federal research agency shall issue a policy utilizing the guidelines under subsection (b).

(e) CONSISTENCY.—The Director of the Office of Science and Technology Policy shall ensure that the policies issued by the Federal research agencies under subsection (d) are consistent to the greatest extent practicable.

SEC. 10632. MALIGN FOREIGN TALENT RECRUITMENT PROGRAM PROHIBITION.

(a) IN GENERAL.—Not later than 24 months after the date of enactment of this Act, each Federal research agency shall establish a policy that, as part of a proposal for a research and development award from the agency—

(1) each covered individual listed in such proposal certify that each such individual is not a party to a malign foreign talent recruitment program in the proposal submission of each such individual and annually thereafter for the duration of the award; and

(2) each institution of higher education or other organization applying for such an award certify that each covered individual who is employed by such institution of higher education or other organization has been made aware of the requirements under this section and complied with the requirement under paragraph (1).

(b) STAKEHOLDER INPUT.—In establishing a policy under subsection (a), Federal research agencies shall publish a description of the proposed policy in the Federal Register and provide an opportunity for submission of public comment for a period of not more than 60 days.

(c) COMPLIANCE WITH EXISTING LAW.—Each Federal research agency and recipient shall comply with title VI of the Civil Rights Act of 1964 (42 U.S.C. 2000d et seq.) in the establishment of policies pursuant to under subsection (a).

(d) INTERNATIONAL COLLABORATION.—Each policy developed under subsection (a) shall not prohibit, unless

such activities are funded, organized, or managed by an academic institution or a foreign talent recruitment program on the lists developed under paragraphs (8) and (9) of section 1286(c) of the John S. McCain National Defense Authorization Act for Fiscal Year 2019 (10 U.S.C. 4001 note; Public Law 115–232)—

(1) making scholarly presentations and publishing written materials regarding scientific information not otherwise controlled under current law;

(2) participation in international conferences or other international exchanges, research projects or programs that involve open and reciprocal exchange of scientific information, and which are aimed at advancing international scientific understanding and not otherwise controlled under current law;

(3) advising a foreign student enrolled at an institution of higher education or writing a recommendation for such a student, at such student's request; and

(4) other international activities determined appropriate by the Federal research agency head or designee.

(e) LIMITATION.—The certifications required under subsection (a) shall not apply retroactively to research and

development awards made or applied for prior to the establishment of the policy by the Federal research agency.

(f) TRAINING.—Each Federal research agency shall ensure that, as a requirement of an award from each such agency, recipient institutions provide training on the risks of malign foreign talent recruitment programs to covered individuals employed at such institutions, including those individuals who are participating in activities described in subsection (d).

SEC. 10633. REVIEW OF CONTRACTS AND AGREEMENTS.

(a) IN GENERAL.—In addition to existing authorities for preventing waste, fraud, abuse, and mismanagement of Federal funds, each Federal research agency shall have the authority to—

(1) require, upon request, the submission to such agency, by an institution of higher education or other organization applying for a research and development award, of supporting documentation, including copies of contracts, grants, or any other agreement specific to foreign appointments, employment with a foreign institution, participation in a foreign talent recruitment program and other information reported as current and pending support for all covered individuals in a research and development award application;

(2) require such institution of higher education or other organization to review any documents requested under paragraph (1) for compliance with the Federal research agency's award terms and conditions, including guidance on conflicts of interest and conflicts of commitment; and

(3) upon receipt and review of the information provided under paragraph (1) and in consultation with the institution of higher education or other organization submitting such information, initiate the substitution or removal of a covered individual from a research and development award, reduce the award funding amount, or suspend or terminate the award if the agency head determines such contracts, grants, or agreements include obligations that—

(A) interfere with the capacity for agency-supported activities to be carried out; or

(B) create duplication with agency-supported activities.

(b) LIMITATIONS.—In exercising the authorities under subsection (a), each Federal research agency shall—

(1) take necessary steps, as practicable, to protect the privacy of all covered individuals and other

parties specified in the documentation submitted under paragraph (1) of such subsection;

(2) endeavor to provide justification for requests for supporting documentation made under such paragraph;

(3) require that allegations be proven by a preponderance of evidence; and

(4) as practicable, afford subjects an opportunity to provide comments and rebuttal and an opportunity to appeal before final administrative action is taken.

SEC. 10634. RESEARCH SECURITY TRAINING REQUIREMENT FOR FEDERAL RESEARCH AWARD PERSONNEL.

(a) ANNUAL TRAINING REQUIREMENT.—

(1) IN GENERAL.—Not later than 12 months after the date of the enactment of this Act, each Federal research agency shall establish a requirement that, as part of an application for a research and development award from the agency—

(A) each covered individual listed on the application for a research and development award certify that each such individual has completed within one year of such application

research security training that meets the guidelines developed under subsection (b); and

(B) each institution of higher education or other organization applying for such an award certify that each covered individual who is employed by such institution or organization and listed on the application has completed such training.

(2) CONSISTENCY.—The Director of the Office of Science and Technology Policy shall ensure that the training requirements established by Federal research agencies pursuant to paragraph (1) are consistent.

(b) TRAINING GUIDELINES.—The Director of the Office of Science and Technology Policy, acting through the National Science and Technology Council and in accordance with the authority provided under section 1746(a) of the National Defense Authorization Act for Fiscal Year 2020 (Public Law 116–92; 42 U.S.C. 6601 note), shall, taking into consideration stakeholder input, develop guidelines for institutions of higher education and other organizations receiving Federal research and development funds to use in developing their own training programs to address the unique needs, challenges, and risk profiles of such institutions and other organizations, including adop-

tion of security training modules developed under subsection (c), to ensure compliance with National Security Presidential Memorandum–33 (relating to strengthening protections of the United States Government-supported research and development against foreign government interference and exploitation) or any successor documents.

(c) SECURITY TRAINING MODULES.—

(1) IN GENERAL.—Not later than 90 days after the date of the enactment of this Act, the Director of the Office of Science and Technology Policy, in coordination with the Director of the National Science Foundation, the Director of the National Institutes of Health, the Secretary of Energy, and the Secretary of Defense, and in consultation with the heads of relevant Federal research agencies, shall enter into an agreement or contract with a qualified entity for the development of online research security training modules for the research community and participants in the United States research and development enterprise to ensure compliance with National Security Presidential Memorandum–33 or successor documents, including modules—

(A) focused on cybersecurity, international collaboration and international travel, foreign interference, and rules for proper use of funds,

disclosure, conflict of commitment, and conflict of interest; and

(B) tailored to the unique needs of—

(i) covered individuals;

(ii) undergraduate students, graduate students, and postdoctoral researchers; and

(iii) applicants for awards under the SBIR and STTR programs (as such terms are defined in section 9(e) of the Small Business Act (15 U.S.C. 638(e)).

(2) STAKEHOLDER INPUT.—Prior to entering into the agreement under paragraph (1), the Director of the Office of Science and Technology Policy shall seek input from academic, private sector, intelligence, and law enforcement stakeholders regarding the scope and content of security training modules, including the diversity of needs across institutions of higher education and other recipients of different sizes and types, and recommendations for minimizing administrative burden on recipients and researchers.

(3) DEVELOPMENT.—The Director of the Office of Science and Technology Policy shall ensure that the entity referred to in paragraph (1)—

(A) develops security training modules that can be adapted and utilized across Federal research agencies; and

(B) develops and implements a plan for regularly updating such modules as needed.

SEC. 10635. RESEARCH FUNDS ACCOUNTING.

(a) STUDY PERIOD DEFINED.—In this section the term ''study period'' means the 5-year period ending on the date of the enactment of this Act.

(b) STUDY.—The Comptroller General of the United States shall conduct a study on Federal funding made available to foreign entities of concern for research, during the study period.

(c) MATTERS TO BE INCLUDED.—The study conducted under subsection (b) shall include, to the extent practicable with respect to the study period, an assessment of—

(1) the total amount of Federal funding made available to foreign entities of concern for research;

(2) the total number and types of foreign entities of concern to which such funding was made available;

(3) the requirements relating to the awarding, tracking, and monitoring of such funding;

(4) any other data available with respect to Federal funding made available to foreign entities of concern for research; and

(5) such other matters as the Comptroller General of the United States determines appropriate.

(d) BRIEFING ON AVAILABLE DATA.—Not later than 120 days after the date of the enactment of this Act, the Comptroller General of the United States shall brief the Committee on Commerce, Science, and Transportation, the Committee on Health, Education, Labor, and Pensions, and the Committee on Foreign Relations of the Senate and the Committee on Science, Space, and Technology, the Committee on Energy and Commerce, and the Committee on Foreign Affairs of the House of Representatives on the study conducted under subsection (b) and the data that is available with respect to Federal funding made available to foreign entities of concern for research.

(e) REPORT.—The Comptroller General of the United States shall submit to the congressional committees specified in subsection (d), by a date agreed upon by the Comptroller General and the committees on the date of the briefing under such subsection, a report on the findings of the study conducted under subsection (b).

SEC. 10636. PERSON OR ENTITY OF CONCERN PROHIBITION.

No person published on the list under section 1237(b) of the Strom Thurmond National Defense Authorization Act for Fiscal Year 1999 (Public Law 105–261; 50 U.S.C. 1701 note) or entity identified under section 1260h of the William M. (Mac) Thornberry National Defense Authorization Act for Fiscal Year 2021 (10 U.S.C. 113 note; Public Law 116–283) may receive or participate in any grant, award, program, support, or other activity under—

(1) the Directorate established in subtitle G of title III of this division;

(2) section 28(b)(1) of the Stevenson-Wydler Technology Innovation Act of 1980 (15 U.S.C. 3701 et seq.), as added by section 10621; or

(3) the Manufacturing USA Program, as improved and expanded under subtitle E of title II of this division.

SEC. 10637. NONDISCRIMINATION.

In carrying out requirements under this subtitle, each Federal research agency shall ensure that policies and activities developed and implemented pursuant to this subtitle are carried out in a manner that does not target, stigmatize, or discriminate against individuals on the basis of race, ethnicity, or national origin, consistent with title VI of the Civil Rights Act of 1964 (42 U.S.C. 2000d et seq.).

SEC. 10638. DEFINITIONS.

In this subtitle:

(1) COVERED INDIVIDUAL.—The term ''covered individual'' means an individual who—

(A) contributes in a substantive, meaningful way to the scientific development or execution of a research and development project proposed to be carried out with a research and development award from a Federal research agency; and

(B) is designated as a covered individual by the Federal research agency concerned.

(2) FOREIGN COUNTRY OF CONCERN.—The term ''foreign country of concern'' means the People's Republic of China, the Democratic People's Republic of Korea, the Russian Federation, the Islamic Republic of Iran, or any other country determined to be a country of concern by the Secretary of State.

(3) FOREIGN ENTITY OF CONCERN.—The term ''foreign entity of concern'' means a foreign entity that is—

(A) designated as a foreign terrorist organization by the Secretary of State under section 219(a) of the Immigration and Nationality Act (8 U.S.C. 1189(a));

(B) included on the list of specially designated nationals and blocked persons maintained by the Office of Foreign Assets Control of the Department of the Treasury (commonly known as the SDN list);

(C) owned by, controlled by, or subject to the jurisdiction or direction of a government of a foreign country that is a covered nation (as such term is defined in section 4872 of title 10, United States Code);

(D) alleged by the Attorney General to have been involved in activities for which a conviction was obtained under—

(i) chapter 37 of title 18, United States Code (commonly known as the Espionage Act);

(ii) section 951 or 1030 of title 18, United States Code;

(iii) chapter 90 of title 18, United States Code (commonly known as the Economic Espionage Act of 1996);

(iv) the Arms Export Control Act (22 U.S.C. 2751 et seq.);

(v) section 224, 225, 226, 227, or 236 of the Atomic Energy Act of 1954 (42

U.S.C. 2274, 2275, 2276, 2277, and 2284);

(vi) the Export Control Reform Act of 2018 (50 U.S.C. 4801 et seq.); or

(vii) the International Emergency Economic Powers Act (50 U.S.C. 1701 et seq.); or

(E) determined by the Secretary of Commerce, in consultation with the Secretary of Defense and the Director of National Intelligence, to be engaged in unauthorized conduct that is detrimental to the national security or foreign policy of the United States.

(4) MALIGN FOREIGN TALENT RECRUITMENT PROGRAM.—The term ''malign foreign talent recruitment program'' means—

(A) any program, position, or activity that includes compensation in the form of cash, in-kind compensation, including research funding, promised future compensation, complimentary foreign travel, things of non de minimis value, honorific titles, career advancement opportunities, or other types of remuneration or consideration directly provided by a foreign country at any level (national, provincial, or local) or their

designee, or an entity based in, funded by, or affiliated with a foreign country, whether or not directly sponsored by the foreign country, to the targeted individual, whether directly or indirectly stated in the arrangement, contract, or other documentation at issue, in exchange for the individual—

(i) engaging in the unauthorized transfer of intellectual property, materials, data products, or other nonpublic information owned by a United States entity or developed with a Federal research and development award to the government of a foreign country or an entity based in, funded by, or affiliated with a foreign country regardless of whether that government or entity provided support for the development of the intellectual property, materials, or data products;

(ii) being required to recruit trainees or researchers to enroll in such program, position, or activity;

(iii) establishing a laboratory or company, accepting a faculty position, or undertaking any other employment or ap-

pointment in a foreign country or with an entity based in, funded by, or affiliated with a foreign country if such activities are in violation of the standard terms and conditions of a Federal research and development award;

(iv) being unable to terminate the foreign talent recruitment program contract or agreement except in extraordinary circumstances;

(v) through funding or effort related to the foreign talent recruitment program, being limited in the capacity to carry out a research and development award or required to engage in work that would result in substantial overlap or duplication with a Federal research and development award;

(vi) being required to apply for and successfully receive funding from the sponsoring foreign government's funding agencies with the sponsoring foreign organization as the recipient;

(vii) being required to omit acknowledgment of the recipient institution with which the individual is affiliated, or the

Federal research agency sponsoring the research and development award, contrary to the institutional policies or standard terms and conditions of the Federal research and development award;

(viii) being required to not disclose to the Federal research agency or employing institution the participation of such individual in such program, position, or activity; or

(ix) having a conflict of interest or conflict of commitment contrary to the standard terms and conditions of the Federal research and development award; and

(B) a program that is sponsored by—

(i) a foreign country of concern or an entity based in a foreign country of concern, whether or not directly sponsored by the foreign country of concern;

(ii) an academic institution on the list developed under section 1286(c)(8) of the John S. McCain National Defense Authorization Act for Fiscal Year 2019 (10 U.S.C. 2358 note; Public Law 115-232); or

(iii) a foreign talent recruitment program on the list developed under section 1286(c)(9) of the John S. McCain National Defense Authorization Act for Fiscal Year 2019 (10 U.S.C. 2358 note; Public Law 115-232).

Subtitle E—Coastal and Ocean Acidification Research and Innovation

SEC. 10641. SHORT TITLE.

This subtitle may be cited as the ''Coastal and Ocean Acidification Research and Innovation Act of 2021''.

SEC. 10642. PURPOSES.

(a) IN GENERAL.—Section 12402(a) of the Federal Ocean Acidification Research and Monitoring Act of 2009 (33 U.S.C. 3701(a)) is amended—

(1) in paragraph (1)—

(A) in the matter preceding subparagraph (A), by striking ''development and coordination'' and inserting ''development coordination and implementation'';

(B) in subparagraph (A), by striking ''acidification on marine organisms'' and inserting ''acidification and coastal acidification on marine organisms''; and

(C) in subparagraph (B), by striking ''establish'' and all that follows through the semicolon and inserting ''maintain and advise an interagency research, monitoring, and public outreach program on ocean acidification and coastal acidification;'';

(2) in paragraph (2), by striking ''establishment'' and inserting ''maintenance'';

(3) in paragraph (3), by inserting ''and coastal acidification'' after ''ocean acidification''; and

(4) in paragraph (4), by striking ''techniques for'' and all that follows through the period and inserting ''mitigating the impacts of ocean and coastal acidification and related co-stressors on marine ecosystems.''.

(b) TECHNICAL AND CONFORMING AMENDMENT.—Section 12402 of the Federal Ocean Acidification Research and Monitoring Act of 2009 (33 U.S.C. 3701(a)) is amended by striking ''(a) PURPOSES.—''.

SEC. 10643. DEFINITIONS.

Section 12403 of the Federal Ocean Acidification Research and Monitoring Act of 2009 (33 U.S.C. 3702) is amended—

(1) in paragraph (1), by striking ''of the Earth's oceans'' and all that follows before the pe-

riod at the end and inserting ''and changes in the water chemistry of the Earth's oceans, coastal estuaries, marine waterways, and Great Lakes caused by carbon dioxide from the atmosphere and the breakdown of organic matter'';

(2) in paragraph (3), by striking ''Joint Subcommittee on Ocean Science and Technology of the National Science and Technology Council'' and inserting ''National Science and Technology Council Subcommittee on Ocean Science and Technology'';

(3) by redesignating paragraphs (1), (2), and (3) as paragraphs (2), (3), and (4), respectively;

(4) by inserting before paragraph (2), as so redesignated, the following:

''(1) COASTAL ACIDIFICATION.—The term 'coastal acidification' means the decrease in pH and changes in the water chemistry of coastal oceans, estuaries, and Great Lakes from atmospheric pollution, freshwater inputs, and excess nutrient run-off from land.''; and

(5) by adding at the end the following:

''(5) STATE.—The term 'State' means each State of the United States, the District of Columbia, the Commonwealth of Puerto Rico, American Samoa, Guam, the Commonwealth of the Northern

Mariana Islands, the Virgin Islands of the United States, and any other territory or possession of the United States.

''(6) TRIBAL GOVERNMENT.—The term 'Tribal government' means the recognized governing body of any Indian or Alaska Native tribe, band, nation, pueblo, village, community, component band, or component reservation, individually identified (including parenthetically) in the list published most recently as of the date of enactment of this paragraph pursuant to section 104 of the Federally Recognized Indian Tribe List Act of 1994 (25 U.S.C. 5131).''.

SEC. 10644. INTERAGENCY WORKING GROUP.

Section 12404 of the Federal Ocean Acidification Research and Monitoring Act of 2009 (33 U.S.C. 3703) is amended—

(1) in the heading, by striking ''**SUBCOMMITTEE**'' and inserting ''**WORKING GROUP**'';

(2) in subsection (a)—

(A) in paragraph (1), by striking ''Joint Subcommittee on Ocean Science and Technology of the National Science and Technology Council shall coordinate Federal activities on ocean acidification and establish'' and insert ''Subcommittee shall coordinate Federal activi-

ties on ocean and coastal acidification and establish and maintain''; (B) in paragraph (2), by striking ''Wildlife Service,'' and inserting ''Wildlife Service, the Bureau of Ocean Energy Management, the Environmental Protection Agency, the Department of Agriculture, the Department of State, the Department of Energy, the Department of the Navy, the National Park Service, the Bureau of Indian Affairs, the National Institute of Standards and Technology, the Smithsonian Institution,''; and

(C) in paragraph (3), in the heading, by striking ''CHAIRMAN'' and inserting ''CHAIR'';

(3) in subsection (b)—

(A) in paragraph (2)—

(i) in subparagraph (A), by inserting ''and coastal acidification'' after ''ocean acidification''; and

(ii) in subparagraph (B), by inserting ''and coastal acidification'' after ''ocean acidification'';

(B) in paragraph (4), by striking ''; and'' and inserting a semicolon; and

(C) in paragraph (5)—

(i) by inserting ‘‘, and contribute to as appropriate,’’ after ‘‘designate’’;

(ii) by striking ‘‘developed’’ and inserting ‘‘and coastal acidification developed’’; and

(iii) by striking the period at the end and inserting ‘‘and coastal acidification; and’’.

(4) in subsection (c)—

(A) in paragraph (2)—

(i) by inserting ‘‘until 2032’’ after ‘‘every 2 years thereafter’’;

(ii) by inserting ‘‘, and to the Office of Management and Budget,’’ after ‘‘House of Representatives’’; and

(iii) in subparagraph (B), by striking ‘‘the interagency research’’ and inserting ‘‘interagency strategic research’’;

(B) in paragraph (3), by inserting ‘‘until 2031’’ after ‘‘at least once every 5 years’’; and

(C) in paragraph (4), by inserting ‘‘until 2032’’ after ‘‘and every 6 years thereafter’’;

(5) by redesignating subsection (c) as subsection (e); and

(6) by inserting after subsection (b) the following:

"(c) ADVISORY BOARD.—

"(1) ESTABLISHMENT.—The Chair of the Subcommittee shall establish an Ocean Acidification Advisory Board.

"(2) DUTIES.—The Advisory Board shall—

"(A) maintain a process for reviewing and making recommendations to the Subcommittee on—

"(i) the biennial report specified in subsection (d)(2); and

"(ii) the strategic research plan in subsection (d)(3);

"(B) provide ongoing advice to the Subcommittee and the interagency working group on matters related to Federal activities on ocean and coastal acidification, including impacts and mitigation of ocean and coastal acidification; and

"(C) advise the Subcommittee and the interagency working group on—

"(i) efforts to coordinate research and monitoring activities related to ocean acidification and coastal acidification; and

"(ii) the best practices for the standards developed for data archiving under section 12406(d).

"(3) MEMBERSHIP.—The Advisory Board shall consist of 25 members as follows:

"(A) Two representatives of the shellfish, lobster, or crab industry.

"(B) One representative of the finfish industry.

"(C) One representative of seafood processors.

"(D) Three representatives from academia, including both natural and social sciences.

"(E) One representative of recreational fishing.

"(F) One representative of a relevant nongovernmental organization.

"(G) Six representatives from relevant State and local governments with policy or regulatory authorities related to ocean acidification and coastal acidification.

"(H) One representative from the Alaska Ocean Acidification Network or a subsequent entity that represents the same geographical region and has a similar purpose.

"(I) One representative from the California Current Acidification Network or a subsequent entity that represents the same geographical region and has a similar purpose.

"(J) One representative from the Northeast Coastal Acidification Network or a subsequent entity that represents the same geographical region and has a similar purpose.

"(K) One representative from the Southeast Coastal Acidification Network or a subsequent entity that represents the same geographical region and has a similar purpose.

"(L) One representative from the Gulf of Mexico Coastal Acidification Network or a subsequent entity that represents the same geographical region and has a similar purpose.

"(M) One representative from the Mid-Atlantic Coastal Acidification Network or a subsequent entity that represents the same geographical region and has a similar purpose.

"(N) One representative from the Pacific Islands Ocean Observing System or a subsequent entity that represents the island territories and possessions of the United States in

the Pacific Ocean, and the State of Hawaii and has a similar purpose.

"(O) One representative from the Caribbean Regional Association for Coastal Ocean Observing or a subsequent entity that represents Puerto Rico and the United States Virgin Islands and has a similar purpose.

"(P) One representative from the National Oceanic and Atmospheric Administration Olympic Coast Ocean Acidification Sentinel Site or a subsequent entity that represents the same geographical representation.

"(Q) One representative from the National Oceanic and Atmospheric Administration shall serve as an ex-officio member of the Advisory Board without a vote.

"(4) APPOINTMENT OF MEMBERS.—The Chair of the Subcommittee shall—

"(A) appoint members to the Advisory Board (taking into account the geographical interests of each individual to be appointed as a member of the Advisory Board to ensure that an appropriate balance of geographical interests are represented by the members of the Advisory Board) who—

"(i) represent the interest group for which each seat is designated;

"(ii) demonstrate expertise on ocean acidification or coastal acidification and its scientific, economic, industry, cultural, and community impacts; and

"(iii) have a record of distinguished service with respect to ocean acidification or coastal acidification, and such impacts;

"(B) give consideration to nominations and recommendations from the members of the interagency working group and the public for such appointments; and

"(C) ensure that an appropriate balance of scientific, industry, State and local resource managers, and geographical interests are represented by the members of the Advisory Board.

"(5) TERM OF MEMBERSHIP.—Each member of the Advisory Board—

"(A) shall be appointed for a 5-year term; and

"(B) may be appointed to no more than two terms.

"(6) CHAIR.—The Chair of the Subcommittee shall appoint one member of the Advisory Board to serve as the Chair of the Advisory Board.

"(7) MEETINGS.—Not less than once each calendar year, the Advisory Board shall meet at such times and places as may be designated by the Chair of the Advisory Board, in consultation with the Chair of the Subcommittee and the Chair of the interagency working group.

"(8) BRIEFING.—The Chair of the Advisory Board shall brief the Subcommittee and the interagency working group on the progress of the Advisory Board as necessary or at the request of the Subcommittee.

"(9) TRIBAL GOVERNMENT ENGAGEMENT AND COORDINATION.—

"(A) IN GENERAL.—The Advisory Board shall maintain mechanisms for coordination, and engagement with Tribal governments.

"(i) RULE OF CONSTRUCTION.—Nothing in subparagraph (A) may be construed as affecting any requirement to consult with Indian Tribes under Executive Order 13175 (25 U.S.C. 5301 note; relating to consultation and

coordination with Tribal governments) or any other applicable law or policy.

"(10) FEDERAL ADVISORY COMMITTEE ACT.—Section 14 of the Federal Advisory Committee Act shall not apply to the Advisory Board for 10 years from the date of enactment of this Act.

"(d) PRIZE COMPETITIONS.—

"(1) IN GENERAL.—Any Federal agency with a representative serving on the interagency working group established under this section may, either individually or in cooperation with one or more agencies, carry out a program to award prizes competitively under section 24 of the Stevenson-Wydler Technology Innovation Act of 1980 (15 U.S.C. 3719). An agency seeking to carry out such a program shall carry out such program in coordination with the chair of such interagency working group.

"(2) PURPOSES.—Any prize competition carried out under this subsection shall be for the purpose of stimulating innovation to advance our Nation's ability to understand, research, or monitor ocean acidification or its impacts, or to develop management or adaptation options for responding to ocean and coastal acidification.

"(3) PRIORITY PROGRAMS.—Priority shall be given to establishing programs under this section that address communities, environments, or industries that are in distress due to the impacts of ocean and coastal acidification.".

SEC. 10645. STRATEGIC RESEARCH PLAN.

Section 12405 of the Federal Ocean Acidification Research and Monitoring Act of 2009 (33 U.S.C. 3704) is amended—

(1) in subsection (a)—

(A) by striking "acidification" each place it appears and inserting "acidification and coastal acidification";

(B) in the first sentence—

(i) by inserting ", and not later than every 5 years following the publication of each subsequent strategic research plan until 2035" after "the date of enactment of this Act";

(ii) by inserting "address the socioeconomic impacts of ocean acidification and coastal acidification and to" after "mitigation strategies to"; and

(iii) by striking ''marine ecosystems'' each place it appears and inserting ''ecosystems''; and

(C) in the second sentence, by striking ''National Academy of Sciences in the review of the plan required under subsection (d)'', and inserting ''Advisory Board established in section 12404(c)'';

(2) in subsection (b)—

(A) in paragraph (1), by inserting ''and social sciences'' after ''among the ocean sciences'';

(B) in paragraph (2)—

(i) in subparagraph (B)—

(I) by striking ''improve the ability to assess the'' and inserting ''assess the short-term and long-term''; and

(II) by striking ''; and'' at the end and inserting a semicolon;

(ii) by amending subparagraph (C) to read as follows:

''(C) provide information for the development of adaptation and mitigation strategies to address—

"(i) socioeconomic impacts of ocean acidification and coastal acidification;

"(ii) conservation of marine organisms and ecosystems;

"(iii) assessment of the effectiveness of such adaptation and mitigation strategies; and"; and

(iii) by adding at the end the following new subparagraph:

"(D) improve research on—

"(i) ocean acidification and coastal acidification;

"(ii) the interactions between and effects of ocean and coastal acidification and multiple combined stressors including changes in water chemistry, changes in sediment delivery, hypoxia, and harmful algal blooms, on ocean acidification and coastal acidification; and

"(iii) the effect or effects of clauses (i) and (ii) on marine resources and ecosystems;";

(C) in paragraph (3)—

(i) in subparagraph (F), by striking ''database development'' and inserting ''data management'';

(ii) in subparagraph (H) by striking ''and'' at the end; and

(iii) by adding at the end the following new subparagraphs:

''(J) assessment of adaptation and mitigation strategies; and

''(K) education and outreach activities;'';

(D) in paragraph (4), by striking ''set forth'' and inserting ''ensure an appropriate balance of contribution in establishing'';

(E) in paragraph (5), by striking ''reports'' and inserting ''the best available peer-reviewed scientific reports'';

(F) in paragraph (6)—

(i) by inserting ''and coastal acidification'' after ''ocean acidification''; and

(ii) by striking ''of the United States'' and inserting ''within the United States'';

(G) in paragraph (8)—

(i) by inserting ''and coastal acidification'' after ''ocean acidification'' each place it appears;

(ii) by striking ''its'' and inserting ''their''; and

(iii) by striking ''; and'' at the end and inserting a semicolon;

(H) in paragraph (9), by striking ''and'' at the end

(I) in paragraph (10), by striking the period at the end and inserting a semicolon; and

(J) by adding at the end the following:

''(11) describe monitoring needs necessary to support potentially affected industry members, coastal stakeholders, fishery management councils and commissions, Tribal governments, non-Federal resource managers, and scientific experts on decision-making and adaptation related to ocean acidification and coastal acidification; and

''(12) describe the extent to which the Subcommittee incorporated feedback from the Advisory Board established in section 12404(c).'';

(3) in subsection (c)—

(A) in paragraph (1)(C), by striking ''surface'';

(B) in paragraph (2), by inserting ''and coastal acidification'' after ''ocean acidification'' each place it appears;

(C) in paragraph (3)—

(i) by striking ''input, and'' and inserting ''inputs,'';

(ii) by inserting '', marine food webs,'' after ''marine ecosystems''; and

(iii) by inserting '', and modeling that supports fisheries management'' after ''marine organisms'';

(D) in paragraph (5), by inserting ''and coastal acidification'' after ''ocean acidification''; and

(E) by adding at the end the following new paragraph:

''(8) Research to understand related and cumulative stressors and other biogeochemical processes occurring in conjunction with ocean acidification and coastal acidification.''; and

(4) by striking subsections (d) and (e) and inserting the following:

''(d) PUBLICATION.—Concurrent with the submission of the plan to Congress, the Subcommittee shall publish the plan on a public website.''.

SEC. 10646. NOAA OCEAN ACIDIFICATION ACTIVITIES.

Section 12406 of the Federal Ocean Acidification Research and Monitoring Act of 2009 (33 U.S.C. 3705) is amended—

(1) in subsection (a)—

(A) in the matter preceding paragraph (1), by inserting ''coordination,'' after ''research, monitoring,'';

(B) in paragraph (1)—

(i) in subparagraph (B), by inserting ''including leveraging, as appropriate, the Integrated Ocean Observing System and the ocean observing assets of other Federal, State, and Tribal agencies,'' after ''ocean observing assets,'';

(ii) by redesignating subparagraphs (C), (D), (E), and (F) as subparagraphs (E), (G), (H), and (I), respectively;

(iii) by inserting after subparagraph (B) the following new subparagraphs:

''(C) prioritization of the location of monitoring instruments, assets, and projects to maximize the efficiency of resources and agency and department missions;

''(D) an optimization of understanding of socioeconomic impacts and ecosystem health''.

(iv) in subparagraph (E), as so redesignated, by striking ''adaptation'' and inserting ''adaptation and mitigation'';

(v) by inserting after subparagraph (E), as so redesignated, the following new subparagraph:

''(F) technical assistance to socioeconomically vulnerable States, local governments, Tribal governments, communities, and industries impacted by ocean and coastal acidification to support their development of ocean and coastal acidification mitigation strategies;''.

(vi) in subparagraph (H), as so redesignated—

(I) by striking ''its impacts'' and inserting ''their respective impacts'';

(II) by striking ''and'' at the end;

(vii) in subparagraph (I), as so redesignated—

(I) by striking ''monitoring and impacts research'' and inserting ''research, monitoring, and adaptation and mitigation strategies''; and

(II) by striking the period at the end and inserting a semicolon; and

(viii) by adding at the end the following new subparagraphs:

''(J) research to improve understanding of—

''(i) the impact of ocean acidification and coastal acidification; and

''(ii) how multiple environmental stressors may contribute to and exacerbate ocean and coastal acidification on living marine resources and coastal ecosystems; and

''(K) research to support the development of adaptation and mitigation strategies to address the socioeconomic impacts of ocean and coastal acidification on coastal communities;'';

(C) in paragraph (2), by striking ''critical research projects that explore'' and inserting ''critical research, education, and outreach projects that explore and communicate''; and

(D) in paragraphs (1) and (2), by striking ''acidification'' each place it appears and inserting ''acidification and coastal acidification''; and

(2) by adding at the end the following new subsections:

"(c) RELATIONSHIP TO INTERAGENCY WORKING GROUP.—The National Oceanic and Atmospheric Administration shall serve as the lead Federal agency responsible for coordinating the Federal response to ocean and coastal acidification. The Administration may enter into Memoranda of Understanding to—

"(1) coordinate monitoring and research efforts among Federal agencies in cooperation with State, local, and Tribal governments and international partners; this may include analysis and synthesis of the results of monitoring and research;

"(2) maintain an Ocean Acidification Information Exchange described under section 12404(b)(5) to allow for information to be electronically accessible, including information—

"(A) on ocean acidification developed through or used by the ocean acidification program described under subsection (a); or

"(B) that would be useful to State governments, local governments, Tribal governments, resource managers, policymakers, researchers, and other stakeholders in mitigating or adapt-

ing to the impacts of ocean acidification and coastal acidification; and

"(3) establishing and maintaining the data archive system under subsection (d).

"(d) DATA ARCHIVE SYSTEM.—

"(1) IN GENERAL.—The Secretary, in coordination with the members of the interagency working group, shall support the long-term stewardship of, and access to, data relating to ocean and coastal acidification through providing the data on a publicly accessible data archive system. To the extent possible, this data archive system shall collect and provide access to ocean and coastal acidification data—

"(A) from relevant federally funded research;

"(B) provided by a Federal, State, or local government, academic scientist, citizen scientist, or industry organization;

"(C) voluntarily submitted by Tribes or Tribal governments; and

"(D) from existing global or national data assets that are currently maintained within Federal agencies.

"(2) DATA STANDARDS.—The Secretary to, the extent possible, shall ensure all such data adheres to data and metadata standards to support the public findability, accessibility, interoperability, and reusability of such data.".

SEC. 10647. NSF OCEAN ACIDIFICATION ACTIVITIES.

Section 12407 of the Federal Ocean Acidification Research and Monitoring Act of 2009 (33 U.S.C. 3706) is amended—

(1) by striking "ocean acidification" each place it appears and inserting "ocean acidification and coastal acidification";

(2) in subsection (a)—

(A) in the matter preceding paragraph (1), by striking "its impacts" and inserting "their respective impacts";

(B) in paragraph (3), by striking "and its impacts" and inserting "and their respective impacts";

(C) in paragraph (4), by striking the period at the end and inserting "; and"; and

(D) by adding at the end the following new paragraph:

"(5) adaptation and mitigation strategies to address socioeconomic effects of ocean acidification and coastal acidification."; and

(3) by adding at the end the following:

"(d) REQUIREMENT.—Recipients of grants from the National Science Foundation under this subtitle that collect data described under section 12406(d) shall—

"(1) collect data in accordance with the standards, protocols, or procedures established pursuant to section 12406(d); and

"(2) submit such data to the Director and the Secretary after publication, in accordance with any rules promulgated by the Director or the Secretary.".

SEC. 10648. NASA OCEAN ACIDIFICATION ACTIVITIES.

Section 12408 of the Federal Ocean Acidification Research and Monitoring Act of 2009 (33 U.S.C. 3707) is amended—

(1) by striking "ocean acidification" each place it appears and inserting "ocean acidification and coastal acidification";

(2) in subsection (a), by striking "its impacts" and inserting "their respective impacts"; and

(3) by adding at the end the following new subsection:

"(d) REQUIREMENT.—Researchers from the National Aeronautics and Space Administration under this subtitle that collect data described under section 12406(d) shall—

"(1) collect such data in accordance with the standards, protocols, or procedures established pursuant to section 12406(d); and

"(2) submit such data to the Administrator and the Secretary, in accordance with any rules promulgated by the Administrator or the Secretary.".

SEC. 10649. AUTHORIZATION OF APPROPRIATIONS.

Section 12409 of the Federal Ocean Acidification Research and Monitoring Act of 2009 (33 U.S.C. 3708) is amended—

(1) in subsection (a), by striking "subtitle—" and all that follows through paragraph (4) and inserting the following: "subtitle—

"(1) $20,500,000 for fiscal year 2023;

"(2) $22,000,000 for fiscal year 2024;

"(3) $24,000,000 for fiscal year 2025;

"(4) $26,000,000 for fiscal year 2026; and

"(5) $28,000,000 for fiscal year 2027."; and

(2) in subsection (b), by striking "subtitle—" and all that follows through paragraph (4) and inserting the following: "subtitle, $20,000,000 for each of the fiscal years 2023 through 2027.".

Subtitle F—Interagency Working Group

SEC. 10651. INTERAGENCY WORKING GROUP.

(a) ESTABLISHMENT.—The Director of the Office of Science and Technology Policy, acting through the National Science and Technology Council, shall establish or designate an interagency working group to coordinate the activities specified in subsection (c).

(b) COMPOSITION.—The interagency working group shall be composed of the following members (or their designees), who may be organized into subcommittees, as appropriate:

(1) The Secretary of Commerce.

(2) The Director of the National Science Foundation.

(3) The Secretary of Energy.

(4) The Secretary of Defense.

(5) The Director of the National Economic Council.

(6) The Director of the Office of Management and Budget.

(7) The Secretary of Health and Human Services.

(8) The Administrator of the National Aeronautics and Space Administration.

(9) The Secretary of Agriculture.

(10) The Director of National Intelligence.

(11) The Director of the Federal Bureau of Investigation.

(12) Such other Federal officials as the Director of the Office of Science and Technology Policy considers appropriate, including members of the National Science and Technology Council Committee on Technology.

(c) COORDINATION.—The interagency working group shall seek to ensure that the activities of different Federal agencies enhance and complement, but, as appropriate, do not duplicate, efforts being carried out by another Federal agency, with a focus on the following:

(1) The activities of the National Science Foundation Technology, Innovation, and Partnerships Directorate in the key technology focus areas, such as within the Regional Innovation Engines under section 10388 and test beds under section 10390.

(2) The activities of the Department of Commerce under this division, including regional technology hubs under section 28 of the Stevenson-Wydler Act of 1980 (15 U.S.C. 13701 et seq.), as added by section 10621, the Manufacturing USA Program established under section 34(b)(1) of the

National Institute of Standards and Technology Act (15 U.S.C. 278s(b)(1)), and the Hollings Manufacturing Extension Partnership (15 U.S.C. 278k).

(3) The activities of the Department of Energy in the key technology focus areas, including at the national laboratories, and at Federal laboratories, as defined in section 4 of the Stevenson-Wydler Technology Innovation Act of 1980 (15 U.S.C. 3703), and facilities and user facilities operated in partnership with such national laboratories or the Department of Energy.

(4) Any other program that the Director of the Office of Science and Technology Policy determines involves research and development with respect to the key technology focus areas.

(d) REPORT.—The interagency working group shall—

(1) by not later than 180 days after the date of enactment of this division—

(A) conduct an initial review of Federal programs and resources with respect to the key technology focus areas identified pursuant to section 10387(a)(2), in order to—

(i) assess current level of efforts and characterize existing research infrastructure, as of the date of the review;

(ii) identify potential areas of overlap or duplication with respect to the key technology focus areas; and

(iii) identify potential cross-agency collaborations and joint funding opportunities; and

(B) submit a report regarding the review described in subparagraph (A) to Congress; and

(C) seek stakeholder input and recommendations in the course of such review; and

(2) shall carry out the annual reviews and updates required under section 10387(e).

(e) CONFLICTS.—If any conflicts between Federal agencies arise while carrying out the activities under this section, the President shall make the final decision regarding resolution of the conflict.

Subtitle G—Quantum Networking and Communications

SEC. 10661. QUANTUM NETWORKING AND COMMUNICATIONS.

(a) DEFINITIONS.—In this section:

(1) DIRECTOR.—The term ''Director'' means the Director of the National Science Foundation.

(2) APPROPRIATE COMMITTEES OF CONGRESS.—The term ''appropriate committees of Congress'' has the meaning given such term in section 2 of the National Quantum Initiative Act (15 U.S.C. 8801).

(3) Q2WORK PROGRAM.—The term ''Q2Work Program'' means the Q2Work Program supported by the Foundation.

(b) QUANTUM NETWORKING WORKING GROUP REPORT ON QUANTUM NETWORKING AND COMMUNICATIONS.—

(1) REPORT.—Section 103 of the National Quantum Initiative Act (15 U.S.C. 8813) is amended by adding the following at the end the following new subsection:

''(h) REPORT ON QUANTUM NETWORKING AND COMMUNICATIONS.—

''(1) IN GENERAL.—Not later than January 1, 2026, the Quantum Networking Working Group within the Subcommittee on Quantum Information Science of the National Science and Technology Council, in coordination with the Subcommittee on the Economic and Security Implications of Quantum

Information Science, shall submit to the appropriate committees of Congress a report detailing a plan for the advancement of quantum networking and communications technology in the United States, building on the report entitled *A Strategic Vision for America's Quantum Networks and A Coordinated Approach for Quantum Networking Research*.

"(2) REQUIREMENTS.—The report under paragraph (1) shall include the following:

"(A) An update to the report entitled *Coordinated Approach to Quantum Networking Research Report* focusing on a framework for interagency collaboration regarding the advancement of quantum networking and communications research.

"(B) A plan for Federal Government partnership with the private sector and interagency collaboration regarding engagement in international standards for quantum networking and communications technology, including a list of Federal priorities for standards relating to such networking and technology.

"(C) A proposal for the protection of national security interests relating to the advance-

ment of quantum networking and communications technology.

"(D) An assessment of the relative position of the United States with respect to other countries in the global race to develop, demonstrate, and utilize quantum networking and communications technology.

"(E) Recommendations to Congress for legislative action relating to the matters considered under subparagraphs (A), (B), (C), and (D).

"(F) Such other matters as the Quantum Network Working Group considers necessary to advance the security of communications and network infrastructure, remain at the forefront of scientific discovery in the quantum information science domain, and transition quantum information science research into the emerging quantum technology economy.".

(c) QUANTUM NETWORKING AND COMMUNICATIONS RESEARCH AND STANDARDIZATION.—

(1) RESEARCH.—Subsection (a) of section 201 of the National Quantum Initiative Act (15 U.S.C. 8831) is amended by—

(A) redesignating paragraphs (3) and (4) as paragraphs (6) and (7), respectively; and

(B) inserting after paragraph (2) the following new paragraphs:

''(3) shall carry out research to facilitate the development and standardization of quantum cryptography and post-quantum classical cryptography;

''(4) shall carry out research to facilitate the development and standardization of quantum networking, communications, and sensing technologies and applications;

''(5) for quantum technologies determined by the Director of the National Institute of Standards and Technology to be at a readiness level sufficient for standardization, shall provide technical review and assistance to such other Federal agencies as the Director considers appropriate for the development of quantum networking infrastructure standards;''.

(2) AUTHORIZATION OF APPROPRIATIONS.—There is authorized to be appropriated to the Scientific and Technical Research and Services account of the National Institute of Standards and Technology to carry out paragraphs (3) through (5) of subsection (a) of section 201 of the National Quantum Initiative Act (as inserted pursuant to the

amendments made by paragraph (1) of this subsection) $15,000,000 for each of fiscal years 2023 through 2027.

(d) QUANTUM INFORMATION SCIENCE WORKFORCE EVALUATION AND ACCELERATION.—

(1) IN GENERAL.—Not later than 180 days after the date of the enactment of this Act, the Director shall enter into an agreement with the National Academies of Sciences, Engineering, and Medicine to conduct a study to evaluate and make recommendations for the quantum information science workforce. The study shall—

(A) characterize the quantum information science workforce, including by—

(i) describing what constitutes a quantum information science qualified worker across sectors, including academia, the Federal Government, and industry; and

(ii) describing the size and makeup of the quantum information science workforce, including an assessment of current and future trends;

(B) identify near- and long-term quantum information science workforce needs across gov-

ernment, academia, and industry sectors, including identifying the cross-disciplinary academic degrees or academic courses necessary to—

(i) prepare students for multiple career pathways in quantum information sciences and related fields;

(ii) ensure the United States is competitive in the field of quantum information science while preserving national security; and

(iii) support the development of quantum applications;

(C) assess the state of quantum information science education and skills training at all education levels and identify gaps in meeting current and future workforce needs, including with respect to—

(i) elementary, middle, and high-school student access to foundational courses, age-appropriate quantum concepts, and hands-on learning opportunities;

(ii) elementary, middle, and high-school teacher professional development

and access to resources, materials, lesson plans, modules, and curricula;

(iii) career pivot and skills training opportunities, including professional certificates and internships; and

(iv) higher education curricula, laboratory experiences in academia, the Federal Government, and industry settings, and cross-discipline degree programs aligned with workforce needs; and

(D) make recommendations for developing a diverse, flexible, and sustainable quantum information science workforce that meets the evolving needs of academia, the Federal Government, and industry.

(2) REPORT.—Not later than two years after the date of the enactment of this Act, the National Academies of Science, Engineering, and Medicine shall submit to Congress and the Director a report containing the results of the study conducted pursuant to paragraph (1).

(e) INCORPORATING QISE INTO STEM CURRICULUM.—

(1) IN GENERAL.—Section 301 of the National Quantum Initiative Act (15 U.S.C. 8841) is amended by adding the following at the end:

"(d) INCORPORATING QISE INTO STEM CURRICULUM.—

"(1) IN GENERAL.—The Director of the National Science Foundation shall, through programs carried out or supported by the National Science Foundation, seek to increase the integration of quantum information science and engineering (referred to in this subsection as 'QISE') into the STEM curriculum at all education levels, including community colleges, as considered appropriate by the Director.

"(2) CURRICULUM INTEGRATION.—The curriculum integration under paragraph (1) may include the following:

"(A) Methods to conceptualize QISE for elementary, middle, and high school curricula.

"(B) Methods for strengthening foundational mathematics and science curricula.

"(C) Methods for integrating students who are underserved or historically underrepresented groups in STEM.

"(D) Age-appropriate materials that apply the principles of quantum information science in STEM fields.

"(E) Recommendations for the standardization of key concepts, definitions, and curriculum criteria across government, academia, and industry.

"(F) Materials that specifically address the findings and outcomes of the study to evaluate and make recommendations for the quantum information science workforce pursuant to subsection (d) of section 10661 of the Research and Development, Competition, and Innovation Act and strategies to account for the skills and workforce needs identified through such study.

"(3) COORDINATION.—In carrying out this subsection, the Director shall coordinate with relevant Federal agencies, and consult with nongovernmental entities with expertise in QISE, as appropriate, which may include institutions eligible to participate in the Established Program to Stimulate Competitive Research (EPSCoR).

"(4) DEFINITION.—In this subsection, the term 'STEM' means the academic and professional dis-

ciplines of science, technology, engineering, and mathematics, including computer science.''.

(f) QUANTUM EDUCATION PILOT PROGRAM.—

(1) IN GENERAL.—Not later than one year after the date of the enactment of this Act, the Director, building on the National Science Foundation's role in the National Q–12 Education Partnership and programs such as Q2Work Program, shall make awards to institutions of higher education, non-profit organizations, or consortia thereof to carry out a pilot program, to be known as the ''Next Generation Quantum Leaders Pilot Program'' (in this subsection referred to as the ''Program''), for the education and training of the next generation of students and teachers in the fundamental principles of quantum mechanics.

(2) REQUIREMENTS.—

(A) IN GENERAL.—In carrying out the Program, the Director shall—

(i) encourage awardees to coordinate with educational service agencies (as such term ''educational service agency'' is defined in section 602(5) of the Individuals with Disabilities Education Improvement Act of 2004 (20 U.S.C. 1401(5))), associa-

tions that support STEM educators or local educational agencies, and partnerships through the Q–12 Education Partnership, to encourage elementary schools, middle schools, and secondary schools, and State educational agencies to participate in the Program;

(ii) require that awardees partner with elementary schools, middle schools, or secondary schools, or consortia thereof, and State educational agencies, to carry out activities under the Program;

(B) USE OF FUNDS.—In carrying out the Program, the Director shall make competitive, merit-reviewed awards to—

(i) support testing, evaluation, dissemination, and implementation of age-appropriate quantum information sciences curricula and resources, including the integration of quantum information science and engineering into the STEM curriculum pursuant to subsection (d) of section 301 of the National Quantum Initiative Act (15 U.S.C. 8841), as added by subsection (e);

(ii) support opportunities for informal education on quantum concepts, including informal hands-on learning opportunities;

(iii) support opportunities for students to further explore quantum information science education and related careers;

(iv) develop and implement training, research, and professional development programs for teachers, including innovative pre-service and in-service programs, in quantum information science and related fields; and

(v) carry out such other activities as the Director determines appropriate.

(C) DISTRIBUTION.—In carrying out the Program and to the extent practicable, the Director shall ensure there is a wide, equitable distribution of Program participants across diverse geographic areas and that the Program includes a diverse representation of students, including students from groups historically underrepresented in STEM.

(3) CONSULTATION.—The Director shall carry out the Program in consultation with the QIS Workforce Working Group of the Subcommittee on Quan-

tum Information Science of the National Science and Technology Council and the Advancing Informal STEM Learning Program.

(4) REPORTING.—Not later than four years after the date of the enactment of this section, the Director shall submit to Congress a report that includes the following:

(A) An assessment, that includes feedback from a wide range of stakeholders in academia, K-12 education, and the private sector, of the effectiveness of the Program in scaling up implementation of effective quantum education and training innovations.

(B) If determined to be effective, a plan for integrating the Program into existing programs, including the feasibility and advisability of expanding the scope of the Program to include additional technology areas, grade levels, and educational institutions beyond those originally selected to participate in the Program.

(5) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the Director $8,000,000 for each of fiscal years 2023 through 2026 to carry out this section.

(6) TERMINATION.—This subsection shall terminate on the date that is four years after the date of the enactment of this Act.

Subtitle H—Blockchain Specialist

SEC. 10671. ESTABLISHMENT OF BLOCKCHAIN AND CRYPTOCURRENCY SPECIALIST POSITION WITHIN OSTP.

The Director of the Office of Science and Technology Policy shall establish or designate a blockchain and cryptocurrencies advisory specialist position within the Office to coordinate Federal activities and advise the President on matters of research and development relating to blockchain, cryptocurrencies, and distributed ledger technologies.

Subtitle I—Partnerships for Energy Security and Innovation

SEC. 10691. FOUNDATION FOR ENERGY SECURITY AND INNOVATION.

(a) DEFINITIONS.—In this section:

(1) BOARD.—The term ''Board'' means the Board of Directors described in subsection (b)(2)(A).

(2) DEPARTMENT.—The term ''Department'' means the Department of Energy.

(3) EXECUTIVE DIRECTOR.—The term ''Executive Director'' means the Executive Director described in subsection (b)(5)(A).

(4) FOUNDATION.—The term ''Foundation'' means the Foundation for Energy Security and Innovation established under subsection (b)(1).

(5) HISTORICALLY BLACK COLLEGE OR UNIVERSITY.—The term ''historically Black college or university'' has the meaning given the term ''part B institution'' in section 322 of the Higher Education Act of 1965 (20 U.S.C. 1061).

(6) INDIVIDUAL LABORATORY-ASSOCIATED FOUNDATION.—The term ''Individual Laboratory-Associated Foundation'' means a Laboratory Foundation established by an operating contractor of a National Laboratory.

(7) MINORITY-SERVING INSTITUTION.—The term ''minority serving institution'' means a Hispanic-serving institution as defined in section 502 of the Higher Education Act of 1965 (20 U.S.C. 1101a), an Alaska Native-serving institution and a Native Hawaiian-serving institution as defined in section in 317 of the Higher Education Act of 1965 (20 U.S.C. 1059d), or a Predominantly Black Institution, Asian American and Native American Pacific

Islander-serving institution, or a Native American-serving nontribal institution as defined in section 371 of the Higher Education Act of 1965 (20 U.S.C. 1067q).

(8) NATIONAL LABORATORY.—The term ''National Laboratory'' has the meaning given the term in section 2 of the Energy Policy Act of 2005 (42 U.S.C. 15801).

(9) SECRETARY.—The term ''Secretary'' means the Secretary of Energy.

(10) TRIBAL COLLEGE OR UNIVERSITY.—The term ''Tribal College or University'' has the meaning given in section 316 of the Higher Education Act of 1965 (20 U.S.C. 1059c).

(b) FOUNDATION FOR ENERGY SECURITY AND INNOVATION.—

(1) ESTABLISHMENT.—

(A) IN GENERAL.—Not later than 180 days after the date of enactment of this Act, the Secretary shall establish a nonprofit corporation to be known as the ''Foundation for Energy Security and Innovation''.

(B) MISSION.—The mission of the Foundation shall be—

(i) to support the mission of the Department; and

(ii) to advance collaboration with energy researchers, institutions of higher education, industry, and nonprofit and philanthropic organizations to accelerate the commercialization of energy technologies.

(C) LIMITATION.—The Foundation shall not be an agency or instrumentality of the Federal Government.

(D) TAX-EXEMPT STATUS.—The Board shall take all necessary and appropriate steps to ensure that the Foundation is an organization that is described in section 501(c) of the Internal Revenue Code of 1986 and exempt from taxation under section 501(a) of that Code.

(E) COLLABORATION WITH EXISTING ORGANIZATIONS.—The Secretary may collaborate with 1 or more organizations to establish the Foundation and carry out the activities of the Foundation.

(2) BOARD OF DIRECTORS.—

(A) ESTABLISHMENT.—The Foundation shall be governed by a Board of Directors.

(B) COMPOSITION.—

(i) IN GENERAL.—The Board shall be composed of the ex officio nonvoting members described in clause (ii) and the appointed voting members described in clause (iii).

(ii) EX OFFICIO MEMBERS.—The ex officio members of the Board shall be the following individuals or designees of those individuals:

(I) The Secretary.

(II) The Under Secretary for Science.

(III) The Under Secretary for Nuclear Security.

(IV) The Chief Commercialization Officer.

(iii) APPOINTED MEMBERS.—

(I) INITIAL MEMBERS.—The Secretary and the other ex officio members of the Board shall—

(aa) seek to enter into an agreement with the National Academies of Sciences, Engineering, and Medicine to develop a

list of individuals to serve as members of the Board who are well-qualified and will meet the requirements of subclauses (II) and (III); and

(bb) appoint the initial members of the Board from that list, if applicable, in consultation with the National Academies of Sciences, Engineering, and Medicine.

(II) REPRESENTATION.—The appointed members of the Board shall reflect a broad cross-section of stakeholders from academia, National Laboratories, industry, nonprofit organizations, State or local governments, the investment community, and the philanthropic community.

(III) EXPERIENCE.—The Secretary shall ensure that a majority of the appointed members of the Board—

(aa)(AA) has experience in the energy sector;

(BB) has research experience in the energy field; or

(CC) has experience in technology commercialization or foundation operations; and

(bb) to the extent practicable, represents diverse regions, sectors, and communities.

(C) CHAIR AND VICE CHAIR.—

(i) IN GENERAL.—The Board shall designate from among the members of the Board—

(I) an individual to serve as Chair of the Board; and

(II) an individual to serve as Vice Chair of the Board.

(ii) TERMS.—The term of service of the Chair and Vice Chair of the Board shall end on the earlier of—

(I) the date that is 3 years after the date on which the Chair or Vice Chair of the Board, as applicable, is designated for the position; and

(II) the last day of the term of service of the member, as determined

under subparagraph (D)(i), who is designated to be Chair or Vice Chair of the Board, as applicable.

(iii) REPRESENTATION.—The Chair and Vice Chair of the Board—

(I) shall not be representatives of the same area of subject matter expertise, or entity, as applicable, under subparagraph (B)(iii)(II); and

(II) shall not be representatives of any area of subject matter expertise, or entity, as applicable, represented by the immediately preceding Chair and Vice Chair of the Board.

(D) TERMS AND VACANCIES.—

(i) TERMS.—

(I) IN GENERAL.—The term of service of each appointed member of the Board shall be not more than 5 years.

(II) INITIAL APPOINTED MEMBERS.—Of the initial members of the Board appointed under subparagraph (B)(iii)(I), half of the members shall serve for 4 years and half of the mem-

bers shall serve for 5 years, as determined by the Chair of the Board.

(ii) VACANCIES.—Any vacancy in the membership of the appointed members of the Board—

(I) shall be filled in accordance with the bylaws of the Foundation by an individual capable of representing the same area or entity, as applicable, as represented by the vacating board member under subparagraph (B)(iii)(II);

(II) shall not affect the power of the remaining appointed members to execute the duties of the Board; and

(III) shall be filled by an individual selected by the Board.

(E) MEETINGS; QUORUM.—

(i) INITIAL MEETING.—Not later than 60 days after the Board is established, the Secretary shall convene a meeting of the ex officio and appointed members of the Board to incorporate the Foundation.

(ii) QUORUM.—A majority of the appointed members of the Board shall con-

stitute a quorum for purposes of conducting the business of the Board.

(F) DUTIES.—The Board shall—

(i) establish bylaws for the Foundation in accordance with subparagraph (G);

(ii) provide overall direction for the activities of the Foundation and establish priority activities;

(iii) carry out any other necessary activities of the Foundation;

(iv) evaluate the performance of the Executive Director; and

(v) actively solicit and accept funds, gifts, grants, devises, or bequests of real or personal property to the Foundation, including from private entities.

(G) BYLAWS.—

(i) IN GENERAL.—The bylaws established under subparagraph (F)(i) may include—

(I) policies for the selection of Board members, officers, employees, agents, and contractors of the Foundation;

(II) policies, including ethical standards, for—

(aa) the acceptance, solicitation, and disposition of donations and grants to the Foundation, including appropriate limits on the ability of donors to designate, by stipulation or restriction, the use or recipient of donated funds; and

(bb) the disposition of assets of the Foundation;

(III) policies that subject all employees, fellows, trainees, and other agents of the Foundation (including ex officio and appointed members of the Board) to conflict of interest standards; and

(IV) the specific duties of the Executive Director.

(ii) REQUIREMENTS.—The Board shall ensure that the bylaws of the Foundation and the activities carried out under those bylaws shall not—

(I) reflect unfavorably on the ability of the Foundation to carry out activities in a fair and objective manner; or

(II) compromise, or appear to compromise, the integrity of any governmental agency or program, or any officer or employee employed by, or involved in, a governmental agency or program.

(H) COMPENSATION.—

(i) IN GENERAL.—No member of the Board shall receive compensation for serving on the Board.

(ii) CERTAIN EXPENSES.—In accordance with the bylaws of the Foundation, members of the Board may be reimbursed for travel expenses, including per diem in lieu of subsistence, and other necessary expenses incurred in carrying out the duties of the Board.

(I) RESTRICTION ON MEMBERSHIP.—No employee of the Department shall be appointed as a member of the Board of Directors.

(3) PURPOSES.—The purposes of the Foundation are—

(A) to support the Department in carrying out the mission of the Department to ensure the security and prosperity of the United States by addressing energy and environmental challenges through transformative science and technology solutions; and

(B) to increase private and philanthropic sector investments that support efforts to create, characterize, develop, test, validate, and deploy or commercialize innovative technologies that address crosscutting national energy challenges, including those affecting minority, rural, and other underserved communities, by methods that include—

(i) fostering collaboration and partnerships with researchers from the Federal Government, State governments, institutions of higher education, including historically Black colleges or universities, Tribal Colleges or Universities, and minority-serving institutions, federally funded research and development centers, industry, and nonprofit organizations for the research,

development, or commercialization of transformative energy and associated technologies;

(ii) strengthening and sharing best practices relating to regional economic development through scientific and energy innovation, including in partnership with an Individual Laboratory-Associated Foundation;

(iii) promoting new product development that supports job creation;

(iv) administering prize competitions—

(I) to accelerate private sector competition and investment; and

(II) that complement the use of prize authority by the Department;

(v) supporting programs that advance technology maturation, especially where there may be gaps in Federal or private funding in advancing a technology to deployment or commercialization from the prototype stage to a commercial stage;

(vi) supporting efforts to broaden participation in energy technology develop-

ment among individuals from historically underrepresented groups or regions; and

(vii) facilitating access to Department facilities, equipment, and expertise to assist in tackling national challenges.

(4) ACTIVITIES.—

(A) STUDIES, COMPETITIONS, AND PROJECTS.—The Foundation may conduct and support studies, competitions, projects, and other activities that further the purposes of the Foundation described in paragraph (3).

(B) FELLOWSHIPS AND GRANTS.—

(i) IN GENERAL.—The Foundation may award fellowships and grants for activities relating to research, development, demonstration, maturation, or commercialization of energy and other Department-supported technologies.

(ii) FORM OF AWARD.—A fellowship or grant under clause (i) may consist of a stipend, health insurance benefits, funds for travel, and funds for other appropriate expenses.

(iii) SELECTION.—In selecting a recipient for a fellowship or grant under clause (i), the Foundation—

(I) shall make the selection based on the technical and commercialization merits of the proposed project of the potential recipient; and

(II) may consult with a potential recipient regarding the ability of the potential recipient to carry out various projects that would further the purposes of the Foundation described in paragraph (3).

(iv) NATIONAL LABORATORIES.—A National Laboratory that applies for or accepts an award under clause (i) shall not be considered to be engaging in a competitive process.

(C) ACCESSING FACILITIES AND EXPERTISE.—The Foundation may work with the Department—

(i) to leverage the capabilities and facilities of National Laboratories to commercialize technology; and

(ii) to assist with resources, including by providing information on the assets of each National Laboratory that may enable the deployment and commercialization of technology.

(D) TRAINING AND EDUCATION.—The Foundation may support programs that provide training to researchers, scientists, other relevant personnel at National Laboratories and institutions of higher education, and previous or current recipients of or applicants for Department funding to help research, develop, demonstrate, deploy, and commercialize federally funded technology.

(E) MATURATION FUNDING.—The Foundation shall support programs that provide maturation funding to researchers to advance the technology of those researchers for the purpose of moving products from a prototype stage to a commercial stage.

(F) STAKEHOLDER ENGAGEMENT.—The Foundation shall convene, and may consult with, representatives from the Department, institutions of higher education, National Laboratories, the private sector, and commercialization

organizations to develop programs for the purposes of the Foundation described in paragraph (3) and to advance the activities of the Foundation.

(G) INDIVIDUAL AND FEDERAL LABORATORY-ASSOCIATED FOUNDATIONS.—

(i) DEFINITION OF COVERED FOUNDATION.—In this subparagraph, the term ''covered foundation'' means each of the following:

(I) An Individual Laboratory-Associated Foundation.

(II) A Federal Laboratory- Associated Foundation established pursuant to subsection (c)(1).

(ii) SUPPORT.—The Foundation shall provide support to and collaborate with covered foundations.

(iii) GUIDELINES AND TEMPLATES.—For the purpose of providing support under clause (ii), the Secretary shall establish suggested guidelines and templates for covered foundations, including—

(I) a standard adaptable organizational design for responsible management;

(II) standard and legally tenable bylaws and money-handling procedures; and

(III) a standard training curriculum to orient and expand the operating expertise of personnel employed by covered foundations.

(iv) AFFILIATIONS.—Nothing in this subparagraph requires—

(I) an existing Individual Laboratory-Associated Foundation to modify current practices or affiliate with the Foundation; or

(II) a covered foundation to be bound by charter or corporate bylaws as permanently affiliated with the Foundation.

(H) SUPPLEMENTAL PROGRAMS.—The Foundation may carry out supplemental programs—

(i) to conduct and support forums, meetings, conferences, courses, and train-

ing workshops consistent with the purposes of the Foundation described in paragraph (3);

(ii) to support and encourage the understanding and development of data that promotes the translation of technologies from the research stage, through the development and maturation stage, and ending in the market stage;

(iii) for writing, editing, printing, publishing, and vending books and other materials relating to research carried out under the Foundation and the Department; and

(iv) to conduct other activities to carry out and support the purposes of the Foundation described in paragraph (3).

(I) EVALUATIONS.—The Foundation shall support the development of an evaluation methodology, to be used as part of any program supported by the Foundation, that shall—

(i) consist of qualitative and quantitative metrics; and

(ii) include periodic third party evaluation of those programs and other activities of the Foundation.

(J) COMMUNICATIONS.—The Foundation shall develop an expertise in communications to promote the work of grant and fellowship recipients under subparagraph (B), the commercialization successes of the Foundation, opportunities for partnership with the Foundation, and other activities.

(K) SOLICITATION AND USE OF FUNDS.—The Foundation may solicit and accept gifts, grants, and other donations, establish accounts, and invest and expend funds in support of the activities and programs of the Foundation.

(L) AUTHORITY OF THE FOUNDATION.—The Foundation shall be the sole entity responsible for carrying out the activities described in this paragraph.

(5) ADMINISTRATION.—

(A) EXECUTIVE DIRECTOR.—The Board shall hire an Executive Director of the Foundation, who shall serve at the pleasure of the Board. Subject to the compliance with the policies and bylaws established pursuant to paragraph (2)(G), the Executive Director shall be responsible for the daily operations of the

Foundation in carrying the activities described in paragraph (4).

(B) COMPENSATION.—The rate of compensation of the Executive Director shall be fixed by the Board.

(C) ADMINISTRATIVE CONTROL.—No member of the Board, officer or employee of the Foundation or of any program established by the Foundation, or participant in a program established by the Foundation, shall exercise administrative control over any Federal employee.

(D) STRATEGIC PLAN.—Not later than 1 year after the date of enactment of this Act, the Foundation shall submit to the Committee on Energy and Natural Resources of the Senate and the Committee on Science, Space, and Technology of the House of Representatives a strategic plan that contains—

(i) a plan for the Foundation to become financially self-sustaining in fiscal year 2023 and thereafter (except for the amounts provided each fiscal year under paragraph (11)(A)(iii));

(ii) a forecast of major crosscutting energy challenge opportunities, including

short- and long-term objectives, identified by the Board, with input from communities representing the entities and areas of subject matter expertise, as applicable, described in paragraph (2)(B)(iii)(II);

(iii) a description of the efforts that the Foundation will take to be transparent in the processes of the Foundation, including processes relating to—

(I) grant awards, including selection, review, and notification;

(II) communication of past, current, and future research priorities; and

(III) solicitation of and response to public input on the opportunities identified under clause (ii);

(iv) a description of the financial goals and benchmarks of the Foundation for the following 10 years;

(v) a description of the efforts undertaken by the Foundation to engage historically underrepresented groups or regions, including through collaborations with historically Black colleges and universities,

Tribal Colleges or Universities, minority-serving institutions, and minority-owned and women-owned business, and;

(vi) a description of the efforts undertaken by the Foundation to ensure maximum complementarity and minimum redundancy with investments made by the Department.

(E) ANNUAL REPORT.—Not later than 1 year after the date on which the Foundation is established, and every years thereafter, the Foundation shall submit to the Committee on Energy and Natural Resources of the Senate, the Committee on Science, Space, and Technology of the House of Representatives, and the Secretary a report that, for the year covered by the report—

(i) describes the activities of the Foundation and the progress of the Foundation in furthering the purposes of the Foundation described in paragraph (3);

(ii) provides a specific accounting of the source and use of all funds made available to the Foundation to carry out those activities to ensure transparency in the

alignment of Department missions and policies with national security;

(iii) describes how the results of the activities of the Foundation could be incorporated into the procurement processes of the General Services Administration; and

(iv) includes a summary of each evaluation conducted using the evaluation methodology described in paragraph (4)(I).

(F) EVALUATION BY COMPTROLLER GENERAL.—Not later than 5 years after the date on which the Foundation is established, the Comptroller General of the United States shall submit to the Committee on Energy and Natural Resources of the Senate and the Committee on Science, Space, and Technology of the House of Representatives—

(i) an evaluation of—

(I) the extent to which the Foundation is achieving the mission of the Foundation; and

(II) the operation of the Foundation; and

(ii) any recommendations on how the Foundation may be improved.

(G) AUDITS.—The Foundation shall—

(i) provide for annual audits of the financial condition of the Foundation; and

(ii) make the audits, and all other records, documents, and papers of the Foundation, available to the Secretary and the Comptroller General of the United States for examination or audit.

(H) SEPARATE FUND ACCOUNTS.—The Board shall ensure that any funds received under paragraph (11)(A) are held in a separate account from any other funds received by the Foundation.

(I) INTEGRITY.—

(i) IN GENERAL.—To ensure integrity in the operations of the Foundation, the Board shall develop and enforce procedures relating to standards of conduct, financial disclosure statements, conflicts of interest (including recusal and waiver rules), audits, and any other matters determined appropriate by the Board.

(ii) FINANCIAL CONFLICTS OF INTEREST.—To mitigate conflicts of interest and risks from malign foreign influence, any

individual who is an officer, employee, or member of the Board is prohibited from any participation in deliberations by the Foundation of a matter that would directly or predictably affect any financial interest of—

(I) the individual;

(II) a relative (as defined in section 109 of the Ethics in Government Act of 1978 (5 U.S.C. App.)) of that individual; or

(III) a business organization or other entity in which the individual has an interest, including an organization or other entity with which the individual is negotiating employment.

(J) INTELLECTUAL PROPERTY.—The Board shall adopt written standards to govern the ownership and licensing of any intellectual property rights developed by the Foundation or derived from the collaborative efforts of the Foundation.

(K) LIABILITY.—

(i) IN GENERAL.—The United States shall not be liable for any debts, defaults, acts, or omissions of—

(I) the Foundation;

(II) a Federal entity with respect to an agreement of that Federal entity with the Foundation; or

(III) an Individual Laboratory-Associated Foundation with respect to an agreement of that Federal entity with the Foundation.

(ii) FULL FAITH AND CREDIT.—The full faith and credit of the United States shall not extend to any obligations of the Foundation.

(L) NONAPPLICABILITY OF FACA.—The Federal Advisory Committee Act (5 U.S.C. App.) shall not apply to the Foundation or an Individual Laboratory-Associated Foundation.

(6) DEPARTMENT COLLABORATION.—

(A) NATIONAL LABORATORIES.—The Secretary shall collaborate with the Foundation to develop a process to ensure collaboration and coordination between the Department, the Foundation, and National Laboratories—

(i) to streamline contracting processes between National Laboratories and the Foundation, including by—

(I) streamlining the ability of the Foundation to transfer equipment and funds to National Laboratories;

(II) standardizing contract mechanisms to be used by the Foundation in engaging with National Laboratories; and

(III) streamlining the ability of the Foundation to fund endowed positions at National Laboratories;

(ii) to allow a National Laboratory or site of a National Laboratory—

(I) to accept and perform work for the Foundation, consistent with provided resources, notwithstanding any other provision of law governing the administration, mission, use, or operations of the National Laboratory or site, as applicable; and

(II) to perform that work on a basis equal to other missions at the National Laboratory; and

(iii) to permit the director of any National Laboratory or site of a National Laboratory to enter into a cooperative research and development agreement or negotiate a licensing agreement with the Foundation pursuant to section 12 of the Stevenson-Wydler Technology Innovation Act of 1980 (15 U.S.C. 3710a).

(B) DEPARTMENT LIAISONS.—The Secretary shall appoint liaisons from across the Department to collaborate and coordinate with the Foundation, including not less than 1 liaison from the Office of Technology Transitions, who shall ensure that the Foundation works in conjunction with and does not duplicate existing activities and programs carried out by the Department, including the Technology Commercialization Fund of the Department.

(C) ADMINISTRATION.—The Secretary shall leverage appropriate arrangements, contracts, and directives to carry out the process developed under subparagraph (A).

(7) NATIONAL SECURITY.—Nothing in this subsection exempts the Foundation from any national security policy of the Department.

(8) SUPPORT SERVICES.—The Secretary may provide facilities, utilities, and support services to the Foundation if it is determined by the Secretary to be advantageous to the research programs of the Department.

(9) PREEMPTION OF AUTHORITY.—This subsection shall not preempt any authority or responsibility of the Secretary under any other provision of law.

(10) TRANSFER FUNDS.—The Foundation may transfer funds to the Department, which shall be subject to all applicable Federal limitations relating to federally funded research.

(11) AUTHORIZATION OF APPROPRIATIONS.—

(A) IN GENERAL.—There is authorized to be appropriated—

(i) not less than $1,500,000 shall be for the Secretary for fiscal year 2023 to establish the Foundation;

(ii) not less than $30,000,000 shall be for the Foundation for fiscal year 2024 to carry out the activities of the Foundation; and

(iii) not less than $3,000,000 shall be for the Foundation for each of the fiscal

years 2025 through 2027 for administrative and operational costs.

(B) LIMITATION.—None of the funds authorized to be appropriated to the Secretary by subparagraph (A)(i) of this paragraph shall be used for construction.

(C) COST SHARE.—Funds made available under subparagraph (A)(ii) shall be required to be cost- shared by a partner of the Foundation other than the Department or a National Laboratory.

(c) NATIONAL ENERGY TECHNOLOGY LABORATORY-ASSOCIATED FOUNDATION.—

(1) ESTABLISHMENT.—

(A) IN GENERAL.—The National Energy Technology Laboratory may establish, or enter into an agreement with a nonprofit organization to establish, a Federal Laboratory-Associated Foundation (referred to in this subsection as a ''Laboratory Foundation'') to support the mission of the National Energy Technology Laboratory.

(B) NOT AGENCY OR INSTRUMENTALITY.—A Laboratory Foundation shall not be

an agency or instrumentality of the Federal Government.

(C) GOVERNANCE STRUCTURE.—A Laboratory Foundation established under subparagraph (A) shall have a separate governance structure from, and shall be managed independently of, the National Energy Technology Laboratory.

(2) ACTIVITIES.—Activities of a Laboratory Foundation may include—

(A) conducting support studies, competitions, projects, research, and other activities that further the purpose of the Laboratory Foundation;

(B) carrying out programs to foster collaboration and partnership among researchers from the Federal Government, State governments, institutions of higher education, federally funded research and development centers, and industry and nonprofit organizations relating to the research, development, and commercialization of federally supported technologies;

(C) carrying out programs to leverage technologies to support new product develop-

ment that supports regional economic development;

(D) administering prize competitions—

(i) to accelerate private sector competition and investment; and

(ii) that complement the use of prize authority by the Department;

(E) providing fellowships and grants to research and development personnel at, or affiliated with, federally funded centers, in accordance with paragraph (3);

(F) carrying out programs—

(i) that allow scientists from foreign countries to serve in research capacities in the United States or other countries in association with the National Energy Technology Laboratory;

(ii) that provide opportunities for employees of the National Energy Technology Laboratory to serve in research capacities in foreign countries;

(iii) to conduct studies, projects, or research in collaboration with national and international nonprofit and for-profit organizations, which may include the provision

of stipends, travel, and other support for personnel;

(iv)(I) to hold forums, meetings, conferences, courses, and training workshops that may include undergraduate, graduate, post- graduate, and post-doctoral accredited courses; and

(II) for the accreditation of those courses by the Laboratory Foundation at the State and national level for college degrees or continuing education credits;

(v) to support and encourage teachers and students of science at all levels of education;

(vi) to promote an understanding of science amongst the general public;

(vii) for writing, editing, printing, publishing, and vending of relevant books and other materials; and

(viii) for the conduct of other activities to carry out and support the purpose of the Laboratory Foundation; and

(G) receiving, administering, soliciting, accepting, and using funds, gifts, devises, or bequests, either absolutely or in trust of real or

personal property or any income therefrom, or other interest or equity therein for the benefit of, or in connection with, the mission of the applicable Federal laboratory, in accordance with paragraph (4).

(3) FELLOWSHIPS AND GRANTS.—

(A) SELECTION.—Recipients of fellowships and grants described in paragraph (2)(E) shall be selected—

(i) by a Laboratory Foundation and the donors to a Laboratory Foundation;

(ii) subject to the agreement of the head of the agency the mission of which is supported by a Laboratory Foundation; and

(iii) in the case of a fellowship, based on the recommendation of the employees of the National Energy Technology Laboratory at which the fellow would serve.

(B) EXPENSES.—Fellowships and grants described in paragraph (2)(E) may include stipends, travel, health insurance, benefits, and other appropriate expenses.

(4) GIFTS.—An amount of funds, a gift, a devise, or a bequest described in paragraph (2)(G)

may be accepted by a Laboratory Foundation regardless of whether it is encumbered, restricted, or subject to a beneficial interest of a private person if any current or future interest of the funds, gift, devise, or bequest is for the benefit of the research and development activities of the National Energy Technology Laboratory.

(5) OWNERSHIP BY FEDERAL GOVERNMENT.—A contribution, gift, or any other transfer made to or for the use of a Laboratory Foundation shall be regarded as a contribution, gift, or transfer to or for the use of the Federal Government.

(6) LIABILITY.—The United States shall not be liable for any debts, defaults, acts, or omissions of a Laboratory Foundation.

(7) TRANSFER OF FUNDS.—Notwithstanding any other provision of law, a Laboratory Foundation may transfer funds to the National Energy Technology Laboratory and the National Energy Technology Laboratory may accept that transfer of funds.

(8) OTHER LAWS.—This subsection shall not alter or supersede any other provision of law governing the authority, scope, establishment, or use of nonprofit organizations by a Federal agency.

Subtitle J—Energizing Technology Transfer

SEC. 10701. DEFINITIONS.

In this subtitle:

(1) CLEAN ENERGY TECHNOLOGY.—The term ''clean energy technology'' means a technology that significantly reduces energy use, increases energy efficiency, reduces greenhouse gas emissions, reduces emissions of other pollutants, or mitigates other negative environmental consequences of energy production, transmission or use.

(2) DEPARTMENT.—The term ''Department'' means the Department of Energy.

(3) DIRECTOR.—The term ''Director'' means the Director of each National Laboratory and the Director of each Department of Energy single-purpose research facility.

(4) ECONOMICALLY DISTRESSED AREA.—The term ''economically distressed area'' has the meaning described in section 301(a) of the Public Works and Economic Development Act of 1965 (42 U.S.C. 3161(a)).

(5) GRANT.—The term ''grant'' means a grant award, cooperative agreement award, or any other fi-

nancial assistance arrangement that the Secretary of Energy determines to be appropriate.

(6) INSTITUTION OF HIGHER EDUCATION.—The term ''institution of higher education'' has the meaning given such term in section 101 of the Higher Education Act of 1965, as amended (20 U.S.C. 1001).

(7) NATIONAL LABORATORY.—The term ''National Laboratory'' has the meaning given that term in section 2 of the Energy Policy Act of 2005 (42 U.S.C. 15801).

(8) SECRETARY.—The term ''Secretary'' means the Secretary of Energy.

PART 1—NATIONAL CLEAN ENERGY TECHNOLOGY TRANSFER PROGRAMS

SEC. 10713. NATIONAL CLEAN ENERGY INCUBATOR PROGRAM.

(a) CLEAN ENERGY INCUBATOR DEFINED.—In this section, the term ''clean energy incubator''—

(1) means any entity that is designed to accelerate the commercial application of clean energy technologies by providing—

(A) physical workspace, labs, and prototyping facilities to support clean energy

startups or established clean energy companies; or

(B) companies developing such technologies with support, resources, and services, including—

(i) access to business education and counseling;

(ii) mentorship opportunities; and

(iii) other services rendered for the purpose of aiding the development and commercial application of a clean energy technology; and

(2) may include a program within or established by a National Laboratory, an institution of higher education or a State, territorial, local, or tribal government.

(b) PROGRAM ESTABLISHMENT.—Not later than 180 days after the enactment of this Act, the Secretary, acting through the Chief Commercialization Officer established in section 1001(a) of the Energy Policy Act of 2005 (42 U.S.C. 16391(a)), shall establish a Clean Energy Incubator Program (herein referred to as the ''program'') to competitively award grants to clean energy incubators.

(c) CLEAN ENERGY INCUBATOR SELECTION.—In awarding grants to clean energy incubators under sub-

section (b), the Secretary shall, to the maximum extent practicable, prioritize funding clean energy incubators that—

(1) partner with entities that carry out activities relevant to the activities of such incubator and that operate at the local, State, and regional levels;

(2) support the commercial application activities of startup companies focused on physical hardware, computational, or integrated hardware and software technologies;

(3) are located in geographically diverse regions of the United States, such as the Great Lakes region;

(4) are located in, or partner with entities located in, economically-distressed areas;

(5) support the development of entities focused on expanding clean energy tools and technologies to rural, Tribal, and low-income communities;

(6) support the commercial application of technologies being developed by clean energy entrepreneurs from underrepresented backgrounds; and

(7) have a plan for sustaining activities of the incubator after grant funds received under this program have been expended.

(d) AWARD LIMITS.—The Secretary shall not award more than $4,000,000 to one or more incubators in one given State, per fiscal year.

(e) DURATION.—Each grant under subsection (b) shall be for a period of no longer than 5 years, subject to the availability of appropriations.

(f) USE OF FUNDS.—An entity receiving a grant under this section may use grant amounts for operating expenses.

(g) RENEWAL.—An award made to a clean energy incubator under this section may be renewed for a period of not more than 3 years, subject to merit review.

(h) EVALUATION.—In accordance with section 9007 of division Z of the Consolidated Appropriations Act, 2021 (Public Law 116–260), the Secretary shall submit to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Energy and Natural Resources of the Senate an evaluation of the program established under this section that includes analyses of the performance of the clean energy incubators.

(i) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the Secretary to carry out this section $15,000,000 for each of fiscal years 2023 through 2027.

SEC. 10714. CLEAN ENERGY TECHNOLOGY UNIVERSITY PRIZE COMPETITION.

(a) DEFINITIONS.—In this section:

(1) ELIGIBLE ENTITY.—The term ''eligible entity'' means a nonprofit entity, an institution of higher education, or an entity working with one or more institutions of higher education.

(2) MINORITY-SERVING INSTITUTION.—The term ''minority-serving institution'' means an institution described in section 371(a) of the Higher Education Act of 1965 (20 U.S.C. 1067q(a)).

(b) IN GENERAL.—The Secretary shall establish a program, known as the ''Clean Energy Technology University Prize'', to award funding for eligible entities to carry out regional and one national clean energy technology prize competitions, under section 24 of the Stevenson-Wydler Technology Innovation Act of 1980 (15 U.S.C. 3719). In carrying out such prize competitions, students shall compete to develop a business model for furthering the commercial application of an innovative clean energy technology.

(c) TRAINING FUNDING.—In carrying out this program, the Secretary may provide funding to train participating students in skills needed for the successful commercial application of clean energy technologies, including through virtual training sessions.

(d) PRIORITIZATION.—In awarding grants under this section, the Secretary shall prioritize awarding grants to eligible entities that work with students at minority-serving institutions.

(e) COORDINATION.—In carrying out this program, the Secretary shall coordinate and partner with other clean energy technology prize competitions. In doing so, the Secretary may develop and disseminate best practices for administering prize competitions under this section.

(f) REPORT.—In accordance with section 9007 of division Z of the Consolidated Appropriations Act, 2021 (Public Law 116–260), the Secretary shall report annually on the progress and implementation of the program established under section (b).

(g) EVALUATION.—In accordance with section 9007 of division Z of the Consolidated Appropriations Act, 2021 (Public Law 116–260), the Secretary shall submit to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Energy and Natural Resources of the Senate an evaluation on the long-term outcomes of the program established under this section and the progress towards achieving the purposes of the program in subsection (b).

(h) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the Secretary to carry

out the activities authorized in this section $1,000,000 for each of fiscal years 2023 through 2027.

SEC. 10715. CLEAN ENERGY TECHNOLOGY TRANSFER COORDINATION.

(a) IN GENERAL.—The Secretary, acting through the Chief Commercialization Officer established in section 1001 (a) of the Energy Policy Act of 2005 (42 U.S.C. 16391 (a)), shall support the coordination of relevant technology transfer programs that advance the commercial application of clean energy technologies nationally and across all energy sectors. In particular, the Secretary may support activities to—

(1) facilitate the sharing of information on best practices for successful operation of clean energy technology transfer programs;

(2) coordinate resources and improve cooperation among clean energy technology transfer programs;

(3) facilitate connections between entrepreneurs and start-up companies and the variety of programs related to clean energy technology transfer under the Department; and

(4) facilitate the development of metrics to measure the impact of clean energy technology transfer programs on—

(A) advancing the development, demonstration, and commercial application of clean energy technologies;

(B) increasing the competitiveness of United States in the clean energy sector, including in manufacturing; and

(C) commercial application of clean energy technologies being developed by entrepreneurs from under-represented backgrounds.

(b) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the Secretary to carry out the activities in this section $3,000,000 for each of fiscal years 2023 through 2027.

PART 2—SUPPORTING TECHNOLOGY DEVELOPMENT AT THE NATIONAL LABORATORIES

SEC. 10716. LAB PARTNERING SERVICE PILOT PROGRAM.

Section 9002 of division Z of the Consolidated Appropriations Act, 2021 (Public Law 116–260) is amended by adding at the end the following:

"(h) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the Secretary $2,000,000 for each of fiscal years 2023 through 2025 to carry out subsections (a), (b), and (c), and $1,700,000 for each of fiscal years 2023 through 2025 for National

Laboratory employees to provide services under subsection (d).''.

SEC. 10717. LAB-EMBEDDED ENTREPRENEURSHIP PROGRAM.

(a) IN GENERAL.—The Secretary shall competitively award grants to National Laboratories for the purpose of establishing or supporting Lab-Embedded Entrepreneurship Programs.

(b) PURPOSES.—The purposes of such programs are to provide entrepreneurial fellows with access to National Laboratory research facilities, National Laboratory expertise, and mentorship to perform research and development and gain expertise that may be required or beneficial for the commercial application of research ideas.

(c) ENTREPRENEURIAL FELLOWS.—An entrepreneurial fellow participating in a program described in subsection (a) shall be provided with—

(1) opportunities for entrepreneurial training, professional development, and exposure to leaders from academia, industry, government, and finance who may serve as advisors to or partners of the fellow;

(2) financial and technical support for research, development, and commercial application activities;

(3) fellowship awards to cover costs of living, health insurance, and travel stipends for the duration of the fellowship; and

(4) any other resources determined appropriate by the Secretary.

(d) PROGRAM ACTIVITIES.—Each National Laboratory that receives funding under this section shall support entrepreneurial fellows by providing—

(1) access to facilities and expertise within the National Laboratory;

(2) engagement with external stakeholders; and

(3) market and customer development opportunities.

(e) ADMINISTRATION.—National Laboratories that receive grants under this section shall prioritize the support and success of the entrepreneurial fellow with regards to professional development and development of a relevant technology.

(f) PARTNERSHIPS.—In carrying out a Lab-Embedded Entrepreneurship Program, a National Laboratory may partner with an external entity, including—

(1) a nonprofit organization;

(2) an institution of higher education;

(3) a federally-owned corporation; or

(4) a consortium of 2 or more entities described in paragraphs (1) through (3).

(g) METRICS.—The Secretary shall support the development of short-term and long-term metrics to assess the effectiveness of programs receiving a grant under subsection (a) in achieving the purposes of the program in subsection (a).

(h) EVALUATION.—In accordance with section 9007 of division Z of the Consolidated Appropriations Act, 2021 (Public Law 116–260), the Secretary shall submit to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Energy and Natural Resources of the Senate an evaluation of the effectiveness of the programs under subsection (a) based on the metrics developed pursuant to subsection (g).

(i) COORDINATION.—The Secretary shall oversee the planning and coordination of grants under subsection (a) and shall identify and disseminate best practices for achieving the purposes of subsection (a) to National Laboratories that receive grants under this section.

(j) INTERAGENCY COLLABORATION.—The Secretary shall collaborate with other executive branch agencies, including the Department of Defense and other agencies with Federal laboratories, regarding opportunities to part-

ner with National Laboratories receiving a grant under subsection (a).

(k) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the Secretary to carry out the activities authorized in this section $25,000,000 for each of fiscal years 2023 through 2027.

SEC. 10718. SMALL BUSINESS VOUCHER PROGRAM.

Section 1003 of the Energy Policy Act of 2005 (42 U.S.C. 16393) is amended—

(1) in subsection (a)—

(A) in the matter preceding paragraph (1), by striking ", and may require the Director of a single-purpose research facility," and inserting "(as defined in section 2) and the Director of each single-purpose research facility";

(B) in paragraph (1)—

(i) by striking "increase" and inserting "encourage"; and

(ii) by striking "collaborative research," and inserting "research, development, demonstration, and commercial application activities, including product development,";

(C) in paragraph (2), by striking ''procurement and collaborative research'' and inserting ''the activities described in paragraph (1)'';

(D) in paragraph (3)—

(i) by inserting ''facilities,'' before ''training''; and

(ii) by striking ''procurement and collaborative research activities'' and inserting ''the activities described in paragraph (1)''; and

(E) in paragraph (5), by striking ''for the program under subsection (b)'' and inserting ''and metrics for the programs under subsections (b) and (c)'';

(2) by redesignating subsections (c) and (d) as subsections (d) and (e), respectively;

(3) by inserting after subsection (b) the following:

''(c) SMALL BUSINESS VOUCHER PROGRAM.—

''(1) DEFINITIONS.—In this subsection:

''(A) DIRECTOR.—The term 'Director' means—

''(i) the Director of each National Laboratory; and

"(ii) the Director of each single-purpose research facility.

"(B) NATIONAL LABORATORY.—The term 'National Laboratory' has the meaning given the term in section 2.

"(C) PROGRAM.—The term 'program' means the program established under paragraph (2).

"(D) SMALL BUSINESS CONCERN.—The term 'small business concern' has the meaning given such term in section 3 of the Small Business Act (15 U.S.C. 632).

"(2) ESTABLISHMENT.—The Secretary, acting through the Chief Commercialization Officer appointed under section 1001(a), and in consultation with the Directors, shall establish a program to provide small business concerns with vouchers under paragraph (3)—

"(A) to achieve the goal described in subsection (a)(1); and

"(B) to improve the products, services, and capabilities of small business concerns in the mission space of the Department.

"(3) VOUCHERS.—Under the program, the Directors are authorized to provide to small business

concerns vouchers to be used at National Laboratories and single-purpose research facilities for—

"(A) research, development, demonstration, technology transfer, skills training and workforce development, or commercial application activities; or

"(B) any other activities that the applicable Director determines appropriate.

"(4) EXPEDITED APPROVAL.—The Secretary, working with the Directors, shall establish a streamlined approval process for financial assistance agreements signed between—

"(A) small business concerns selected to receive a voucher under the program; and

"(B) the National Laboratories and single-purpose research facilities.

"(5) COST-SHARING REQUIREMENT.—In carrying out the program, the Secretary shall require cost-sharing in accordance with section 988.

"(6) REPORT.—In accordance with section 9007 of division Z of the Consolidated Appropriations Act, 2021 (Public Law 116–260), the Secretary shall report annually on the progress and implementation of the small business voucher program established under this section, including the number

and locations of small businesses that received grants under this program.''; and

(4) in subsection (e) (as so redesignated), by striking ''for activities under this section'' and inserting ''for activities under subsection (b)'' and inserting before the period at the end ''and for activities under subsection (c) $25,000,000 for each of fiscal years 2023 through 2027''.

SEC. 10719. ENTREPRENEURIAL LEAVE PROGRAM.

(a) IN GENERAL.—The Secretary shall delegate to Directors the authority to carry out an entrepreneurial leave program (referred to in this section as the ''program'') to allow National Laboratory employees to take a full leave of absence from their position, with the option to return to that or a comparable position up to 3 years later, or a partial leave of absence, to advance the commercial application of energy and related technologies relevant to the mission of the Department.

(b) TERMINATION AUTHORITY.—Directors shall retain the authority to terminate National Laboratory employees that participate in the program if such employees are found to violate terms prescribed by the National Laboratory at which such employee is employed.

(c) LICENSING.—To reduce barriers to participation in the program, the Secretary shall delegate to the Direc-

tors the requirement to establish streamlined mechanisms for facilitating the licensing of technology that is the focus of National Laboratory employees who participate in the program.

(d) REPORT.—In accordance with section 9007 of division Z of the Consolidated Appropriations Act, 2021 (Public Law 116–260), the Secretary shall report annually on the utilization of this authority at National Laboratories, including the number of employees who participate in this program at each National Laboratory and the number of employees who take a permanent leave from their positions at National Laboratories as a result of participating in this program.

(e) FEDERAL ETHICS.—Nothing in this section shall affect existing Federal ethics rules applicable to Federal personnel.

SEC. 10720. NATIONAL LABORATORY NON-FEDERAL EMPLOYEE OUTSIDE EMPLOYMENT AUTHORITY.

(a) IN GENERAL.—The Secretary shall delegate to Directors of National Laboratories the authority to allow their non-Federal employees—

(1) to engage in outside employment, including start-up companies based on licensing technologies developed at National Laboratories and consulting in

their areas of expertise, and receive compensation from such entities; and

(2) to engage in outside activities related to their areas of expertise at the National Laboratory and may allow employees, in their employment capacity at such outside employment, to access the National Laboratories under the same contracting mechanisms as non-Laboratory employees and entities, in accordance with appropriate conflict of interest protocols.

(b) REQUIREMENTS.—If a Director elects to use the authority granted by subsection (a) of this section, the Director, or their designee, shall—

(1) require employees to disclose to and obtain approval from the Director or their designee prior to engaging in any outside employment;

(2) develop and require appropriate conflict of interest protocols for employees that engage in outside employment;

(3) maintain the authority to terminate employees engaging in outside employment if they are found to violate terms, including conflict of interest protocols, mandated by the Director; and

(4) ensure that any such programs or activities are in conformance with the Department's research security policies, including DOE Order 486.1.

(c) ADDITIONAL RESTRICTIONS.—Employees engaging in outside employment may not—

(1) allow such activities to interfere with or impede their duties at the National Laboratory;

(2) engage in activities related to outside employment using National Laboratory government equipment, property, or resources, unless such activities are performed under National Laboratory contracting mechanisms, such as Cooperative Research and Development Agreements or Strategic Partnership Projects, whereby all conflicts of interest requirements apply; or

(3) use their position at a National Laboratory to provide an unfair competitive advantage to an outside employer or start-up activity.

(d) FEDERAL ETHICS.—Nothing in this section shall affect existing Federal ethics rules applicable to Federal personnel.

PART 3—DEPARTMENT OF ENERGY MODERNIZATION

SEC. 10722. OFFICE OF TECHNOLOGY TRANSITIONS.

Section 1001(a) of the Energy Policy Act of 2005 (42 U.S.C. 16391) is amended by adding at the end the following:

"(6) HIRING AND MANAGEMENT.—To carry out the program authorized in this section, the Under Secretary for Science may appoint personnel using the authorities in section 10726 of the Research and Development, Competition, and Innovation Act.

"(7) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to the Secretary to carry out the activities authorized in this section $20,000,000 for each of fiscal years 2023 through 2027.".

SEC. 10723. MANAGEMENT OF DEPARTMENT OF ENERGY DEMONSTRATION PROJECTS.

Section 41201 of the Infrastructure Investment and Jobs Act (42 U.S.C. 18861) is amended—

(1) in subsection (b), by inserting "including the Office of Technology Transitions, the Loan Program Office, and all applied program offices," after "Department,";

(2) in subsection (d), by inserting ", including by using the authorities in section 10726 of the Re-

search and Development, Competition, and Innovation Act,'' after ''personnel'';

(3) by redesignating subsections (e), (f), and (g) as subsections (g), (h), and (i), respectively;

(4) by adding after subsection (d) the following:

''(e) ADDITIONAL AUTHORITY.—The Secretary may solicit, select, and manage covered projects directly through the program.

''(f) PROJECT TERMINATION.—Should an ongoing covered project receive an unfavorable review under subsection (c)(5), the Secretary or their designee may cease funding the covered project and reallocate the remaining funds to new or existing covered projects carried out by that program office.''; and

(5) in subsection (h)(1) (as so redesignated), by striking ''The Secretary'' and inserting ''In accordance with section 9007 of division Z of the Consolidated Appropriations Act, 2021 (Public Law 116–260), the Secretary''.

SEC. 10724. STREAMLINING PRIZE COMPETITIONS.

(a) REPORTING.—Section 1008 of the Energy Policy Act of 2005 (42 U.S.C. 16396) is amended by adding at the end the following:

''(h) REPORT.—In accordance with section 9007 of division Z of the Consolidated Appropriations Act, 2021

(Public Law 116–260), the Secretary shall report annually on a description of any prize competitions carried out using the authority under this section, the total amount of prizes awarded along with any private sector contributions, the methods used for solicitation and evaluation, and a description of how each prize competition advanced the mission of the Department.''.

(b) TECHNICAL AMENDMENT.—Section 1008 of the Energy Policy Act of 2005 (42 U.S.C. 16396) is amended by redesignating the second subsection (e) (relating to authorization of appropriations) as subsection (f).

SEC. 10725. COST-SHARE WAIVER EXTENSION.

(a) IN GENERAL.—Section 988 of the Energy Policy Act of 2005 (42 U.S.C. 16352) is amended in subsection (b)(4)(B) by striking ''this paragraph'' and inserting ''the Research and Development, Competition, and Innovation Act''.

(b) REPORT.—Section 108(b) of the Department of Energy Research and Innovation Act is amended in subsection (b) by striking ''this Act'' each place it appears and inserting ''the Research and Development, Competition, and Innovation Act''.

SEC. 10726. SPECIAL HIRING AUTHORITY FOR SCIENTIFIC, ENGINEERING, AND PROJECT MANAGEMENT PERSONNEL.

(a) IN GENERAL.—The Under Secretary for Science shall have the authority to—

(1) make appointments of not more than 60 scientific, engineering, and professional personnel, without regard to civil service laws, to assist the Department in meeting specific project or research needs;

(2) fix the basic pay of any employee appointed under this section at a rate to be determined by the Under Secretary at rates not in excess of Level II of the Executive Schedule (EX–II) under section 5311 of title 5, United States Code without regard to the civil service laws; and

(3) pay any employee appointed under this section payments in addition to basic pay, except that the total amount of additional payments paid to an employee under this subsection for any 12-month period shall not exceed the lesser of the following amounts:

(A) $25,000.

(B) The amount equal to 25 percent of the annual rate of basic pay of that employee.

(C) The amount of the limitation that is applicable for a calendar year under section 5307(a)(1) of title 5, United States Code.

(b) TERM.—

(1) IN GENERAL.—The term of any employee appointed under this section shall not exceed 3 years unless otherwise authorized in law.

(2) TERMINATION.—The Under Secretary for Science shall have the authority to terminate any employee appointed under this section at any time based on performance or changing project or research needs of the Department.

SEC. 10727. TECHNOLOGY TRANSFER REPORTS AND EVALUATION.

Section 9007 of division Z of the Consolidated Appropriations Act, 2021 (Public Law 116–260) is amended as follows:

''(a) ANNUAL REPORT.—As part of the updated technology transfer execution plan required each year under section 1001(h)(2) of the Energy Policy Act of 2005 (42 U.S.C. 16391(h)(2)), the Secretary of Energy (in this section referred to as the 'Secretary') shall submit to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Energy and Natural Resources of the Senate a report on the

progress and implementation of programs established under sections 9001, 9002, 9003, 9004, and 9005 of this Act and under sections 10714, 10718, 10719, 10720, and 10723 of the Research and Development, Competition, and Innovation Act.

''(b) EVALUATION.—Not later than 3 years after the enactment of this Act and every 3 years thereafter the Secretary shall submit to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Energy and Natural Resources of the Senate an evaluation on the extent to which programs established under sections 9001, 9002, 9003, 9004, and 9005 of this Act and sections 10713, 10714, 10715, and 10717 of the Research and Development, Competition, and Innovation Act are achieving success based on relevant short-term and long-term metrics.''.

Subtitle K—Micro Act

SEC. 10731. MICROELECTRONICS RESEARCH FOR ENERGY INNOVATION.

(a) DEFINITIONS.—In this section:

(1) CENTER.—The term ''Center'' means a Microelectronics Science Research Center established pursuant to subsection (d).

(2) DEPARTMENT.—The term ''Department'' means the Department of Energy.

(3) DIRECTOR.—The term ''Director'' means the Director of the Office of Science.

(4) HISTORICALLY BLACK COLLEGE OR UNIVERSITY.—The term ''historically Black college or university'' has the meaning given the term ''part B institution'' in section 322 of the Higher Education Act of 1965 (20 U.S.C. 1061).

(5) INSTITUTION OF HIGHER EDUCATION.—The term ''institution of higher education'' has the meaning given the term in section 101(a) of the Higher Education Act of 1965 (20 U.S.C. 1001(a)).

(6) MICROELECTRONICS.—The term ''microelectronics'' means—

(A) a semiconductor and related materials;

(B) processing chemistries;

(C) design technologies;

(D) fabrication technologies;

(E) lithography technologies;

(F) packaging technologies;

(G) a sensor;

(H) a device;

(I) an integrated circuit;

(J) a processor;

(K) computing architecture;

(L) modeling and simulation;

(M) a software tool; and

(N) any other related technology.

(7) MINORITY-SERVING INSTITUTION.—The term ''minority-serving institution'' means—

(A) a Hispanic-serving institution (as defined in section 502(a) of the Higher Education Act of 1965 (20 U.S.C. 1101a(a)));

(B) an Alaska Native-serving institution (as defined in section 317(b) of the Higher Education Act of 1965 (20 U.S.C. 1059d(b)));

(C) a Native Hawaiian-serving institution (as defined in that section);

(D) a Predominantly Black Institution (as defined in section 371(c) of the Higher Education Act of 1965 (20 U.S.C. 1067q(c)));

(E) an Asian American and Native American Pacific Islander-serving institution (as defined in that section); and

(F) a Native American-serving nontribal institution (as defined in that section).

(8) NATIONAL LABORATORY.—The term ''National Laboratory'' has the meaning given the term in section 2 of the Energy Policy Act of 2005 (42 U.S.C. 15801).

(9) PROGRAM.—The term ''program'' means the program established under subsection (c)(1).

(10) SECRETARY.—The term ''Secretary'' means the Secretary of Energy.

(11) SKILLED TECHNICAL WORKFORCE.—The term ''skilled technical workforce'' has the meaning given the term in section 4(b)(3) of the Innovations in Mentoring, Training, and Apprenticeships Act (42 U.S.C. 1862p note; Public Law 115–402).

(12) TRIBAL COLLEGE OR UNIVERSITY.—The term ''Tribal College or University'' has the meaning given the term in section 316 of the Higher Education Act of 1965 (20 U.S.C. 1059c).

(13) WORK-BASED LEARNING.—The term ''work-based learning'' has the meaning given the term in section 3 of the Carl D. Perkins Career and Technical Education Act of 2006 (20 U.S.C. 2302).

(b) FINDINGS.—Congress finds that—

(1) the coming end of Moore's Law presents major technological challenges and opportunities for the United States and has important implications for national security, economic competitiveness, and scientific discovery;

(2) future progress and innovation in microelectronics, and the maintenance of a robust domestic

microelectronics supply chain, will require an approach that advances relevant materials science, electronic and photonic device technologies, processing and packaging technologies, manufacturing technologies, circuit, chip, and system architecture, and software system and algorithm development in a codesign fashion;

(3) the National Laboratories possess unique technical expertise and user facilities that are essential to—

(A) overcoming foundational research challenges relevant to the topics described in paragraph (2); and

(B) translating and transferring research outcomes to industry; and

(4) the expertise and user facilities of the National Laboratories described in paragraph (3) will enable the Department to drive advances in microelectronics that are essential to meeting future needs in areas critical to the missions of the Department and the future competitiveness of the domestic microelectronics industry, including high-performance computing, emerging data-centric computing approaches and energy-efficient computing, optical

sensors, sources, and wireless networks, and power electronics and electricity delivery systems.

(c) MICROELECTRONICS RESEARCH PROGRAM.—

(1) IN GENERAL.—The Secretary shall carry out a crosscutting program of research, development, and demonstration of microelectronics relevant to the missions of the Department to enable advances and breakthroughs that will—

(A) accelerate underlying research and development for design, development, and manufacturability of next-generation microelectronics; and

(B) ensure the global competitiveness of the United States in the field of microelectronics.

(2) RESEARCH PROJECTS.—

(A) IN GENERAL.—In carrying out the program, the Secretary shall provide financial assistance to eligible entities described in subparagraph (B) to carry out research projects in—

(i) foundational science areas, including—

(I) materials sciences, chemical sciences, and plasma science synthesis and fabrication;

(II) novel microelectronics devices, including emerging memory and storage technologies;

(III) diverse computing architectures and paradigms, including analog computing and edge computing;

(IV) data-driven modeling and simulation;

(V) integrated sensing, power harvesting, and communications;

(VI) component integration and subsystems;

(VII) photonic integration and packaging; and

(VIII) development of codesign frameworks for all stages of microelectronics design, development, fabrication, and application;

(ii) cybersecurity by design to result in trusted and resilient microelectronics;

(iii) methods for leveraging advanced simulation and artificial intelligence to en-

hance codesign and discovery in microelectronics;

(iv) in consultation with the National Institute of Standards and Technology, fabrication and processing science and metrology associated with microelectronics manufacturing, including lithography, patterning, surface deposition, etching, and cleaning;

(v) approaches for optimizing system-level energy efficiency of advanced computing systems, the electrical grid, power electronics, and other energy infrastructure;

(vi) approaches for enhancing the durability and lifetime of radiation-hardened electronics;

(vii) enhancement of microelectronics security, including the development of integrated devices, packages, and thermal management for severe environments and national security;

(viii) in coordination with other relevant initiatives of the Department, methods to improve the lifetime, maintenance,

recycling, reuse, and sustainability of microelectronics components and systems, including technologies and strategies that reduce the use of energy, water, critical materials, and other commodities that the Secretary determines are vulnerable to disruption; and

(ix) methods and techniques for domestic processing of materials for microelectronics and components of microelectronics.

(B) ELIGIBLE ENTITIES.—An eligible entity referred to in subparagraph (A) is—

(i) an institution of higher education, including a historically Black college or university, a Tribal College or University, and a minority-serving institution;

(ii) a nonprofit research organization;

(iii) a State research agency;

(iv) a National Laboratory;

(v) a private commercial entity;

(vi) a partnership or consortium of 2 or more entities described in clauses (i) through (v); and

(vii) any other entity that the Secretary determines appropriate.

(C) NOTIFICATION.—Not later than 30 days after the Secretary provides financial assistance to an eligible entity under subparagraph (A), the Secretary shall submit to the Committee on Energy and Natural Resources of the Senate and the Committee on Science, Space, and Technology of the House of Representatives a notification of the financial assistance provided, including—

(i) the criteria used by the Secretary to select the eligible entity receiving the financial assistance;

(ii) the manner in which the criteria described in clause (i) comport with the purposes of the program described in paragraph (1); and

(iii) a description of the research project that the eligible entity will carry out using the financial assistance.

(3) TECHNOLOGY TRANSFER.—In carrying out the program, the Secretary, in coordination with the Director of the Office of Technology Transitions and in consultation with the private sector, shall—

(A) support translational research and transfer of microelectronics technologies; and

(B) identify emerging research and development needs of industry and government for the benefit of United States economic competitiveness.

(4) WORKFORCE DEVELOPMENT.—In carrying out the program, the Secretary shall support—

(A) workforce development through existing authorities and mechanisms available to the Department, including internships, fellowships, individual investigator grants, and other activities the Secretary determines appropriate; and

(B) in consultation with the National Science Foundation, as appropriate, education and outreach activities—

(i) to disseminate information and promote understanding of microelectronics and related fields among students at elementary school, secondary school, high school, undergraduate, and graduate levels; and

(ii) that may include educational programming with an emphasis on experiential and project-based learning.

(5) OUTREACH.—The Secretary shall conduct outreach to recruit applicants to the program and engage participants from all regions of the United States, especially individuals from underserved communities and groups historically underrepresented in science, technology, engineering, and mathematics.

(6) COORDINATION.—In carrying out the program, the Secretary shall—

(A) coordinate across all relevant programs and offices of the Department; and

(B) coordinate the research carried out under the program relating to microelectronics with activities carried out by other Federal agencies and programs relating to microelectronics research, development, manufacturing, and supply chain security, including the programs authorized under subsections (c) through (f) of section 9906 of the William M. (Mac) Thornberry National Defense Authorization Act for Fiscal Year 2021 (15 U.S.C. 4656).

(7) REPORT.—Not later than 180 days after the date of enactment of this Act, the Secretary shall submit to the Committee on Energy and Natural Resources of the Senate and the Committee on Science, Space, and Technology of the House of

Representatives a report describing the goals, priorities, and anticipated outcomes of the program.

(8) FUNDING.—There are authorized to be appropriated to the Secretary to carry out this subsection—

(A) $75,000,000 for fiscal year 2023;

(B) $100,000,000 for fiscal year 2024;

(C) $100,000,000 for fiscal year 2025;

(D) $100,000,000 for fiscal year 2026; and

(E) $100,000,000 for fiscal year 2027.

(d) MICROELECTRONICS SCIENCE RESEARCH CENTERS.—

(1) IN GENERAL.—In carrying out the program, subject to the availability of appropriations, the Director shall establish not more than 4 Microelectronics Science Research Centers, each comprising 1 or more eligible entities—

(A) to conduct mission-driven research to address foundational challenges in the design, development, characterization, prototyping, demonstration, and fabrication of microelectronics; and

(B) to facilitate the translation of research results to industry.

(2) ELIGIBLE ENTITIES.—An eligible entity referred to in paragraph (1) is—

(A) a National Laboratory;

(B) an institution of higher education, including a historically Black college or university, a Tribal College or University, and a minority-serving institution;

(C) a private commercial entity;

(D) a research center;

(E) a partnership or consortium of 2 or more entities described in subparagraphs (A) through (D); and

(F) any other entity that the Secretary determines appropriate.

(3) ACTIVITIES.—The activities of a Center shall include research, development, and demonstration activities for—

(A) accelerating the development of new microelectronics science and technology, including materials, devices, circuits, systems, architectures, fabrication tools, processes, diagnostics, modeling, synthesis, and, in consultation with the National Institute of Standards and Technology, metrology;

(B) advancing the sustainability and energy efficiency of new microelectronics devices, packages, and systems;

(C) application-driven codesign and prototyping of novel devices to facilitate laboratory-to-fabrication transition;

(D) advancing knowledge and experimental capabilities in surface and materials science, plasma science, and computational and theoretical methods, including artificial intelligence, multiscale codesign, and advanced supercomputing capabilities to invent and manufacture revolutionary microelectronic devices;

(E) creating technology testbeds for prototyping platforms for validation and verification of new capabilities and sharing of ideas, intellectual property, and the unique facilities of the Department;

(F) supporting development of cybersecurity capabilities for computing architectures that measurably improve safety and security and are adaptable for existing and future applications; and

(G) supporting long-term and short-term workforce development in microelectronics.

(4) REQUEST FOR PROPOSALS; MERIT REVIEW.—

(A) IN GENERAL.—The Director shall, at such time, in such manner, and containing such information as the Director determines to be appropriate, issue a request for proposals from eligible entities described in paragraph (2) seeking to be designated as a Center.

(B) COMPETITIVE MERIT REVIEW.—The Director shall select eligible entities under subparagraph (A) through a competitive, merit-based process.

(5) OPERATION.—

(A) DURATION.—

(i) IN GENERAL.—Each Center shall operate for a period of not more than 5 years, unless renewed for an additional 5-year period in accordance with clause (ii).

(ii) RENEWAL.—

(I) INITIAL RENEWAL.—In the case of a Center that has operated for not more than 5 years, the Director may renew support for the Center on a merit-reviewed basis for a period of not more than 5 years.

(II) 10-YEAR OPERATION.—In the case of a Center that has operated for not less than 5 years but not more than 10 years, the Director may renew support for the Center on a competitive, merit-reviewed basis for a period of not more than 5 years.

(III) 15-YEAR OPERATION.—In the case of a Center that has operated for not less than 10 years but not more than 15 years, the Director may renew support for the Center on a merit-reviewed basis for a period of not more than 5 years.

(B) TERMINATION.—Consistent with the existing authorities of the Department, the Director may terminate an underperforming Center during the performance period.

(6) TECHNOLOGY TRANSFER.—The Director, in coordination with the Director of the Office of Technology Transitions, shall seek to enter into partnerships with industry groups to facilitate the translation and transfer of research results produced by the Centers.

(7) COORDINATION.—The Secretary shall—

(A) establish a coordinating network to coordinate cross-cutting research and foster communication and collaboration among the Centers; and

(B) ensure coordination, and avoid unnecessary duplication, of the activities of each Center with the activities of—

(i) other research entities of the Department, including—

(I) the Nanoscale Science Research Centers;

(II) the National Quantum Information Science Research Centers;

(III) the Energy Frontier Research Centers;

(IV) the Energy Innovation Hubs;

(V) the National Laboratories; and

(VI) other offices of the Department;

(ii) the National Semiconductor Technology Center established under section 9906(c)(1) of the William M. (Mac) Thornberry National Defense Authoriza-

tion Act for Fiscal Year 2021 (15 U.S.C. 4656(c)(1));

(iii) institutions of higher education;

(iv) industry; and

(v) relevant research activities carried out by other Federal agencies.

(8) WORKFORCE DEVELOPMENT.—Each Center shall support workforce development through—

(A) incorporation of undergraduate students, postdoctoral fellows, graduate students, and early career researchers, as well as elementary school, secondary school, and high school students, through opportunities such as dual-enrollment programs and work-based learning programs, as applicable;

(B) hands-on research and equipment training programs;

(C) technical training and certificate programs for the skilled technical workforce;

(D) facilitation of engagement among academic, industry, and laboratory researchers; and

(E) public outreach activities, including to students at elementary school, secondary school, high school, undergraduate, and graduate lev-

els, which may include educational programming with an emphasis on experiential and project-based learning.

(9) OUTREACH.—The Director shall support the workforce development of Centers under paragraph (8) by conducting outreach to recruit applicants and engage participants from all regions of the United States, especially individuals from underserved communities and groups historically underrepresented in science, technology, engineering, and mathematics.

(10) INTELLECTUAL PROPERTY.—The Secretary shall ensure that the intellectual property and value proposition created by the Centers are retained within the United States.

(11) NOTIFICATION.—

(A) DEFINITION OF COVERED DETERMINATION.—In this paragraph, the term ''covered determination'' means a determination of the Secretary—

(i) to establish a Center under paragraph (1);

(ii) to renew support for a Center under paragraph (5)(A)(ii); or

(iii) to terminate a Center under paragraph (5)(B).

(B) NOTIFICATION.—Not later than 30 days after the Secretary makes a covered determination, the Secretary shall submit to the Committee on Energy and Natural Resources of the Senate and the Committee on Science, Space, and Technology of the House of Representatives a notification of the covered determination, including—

(i) the criteria used by the Secretary to make the covered determination; and

(ii) the manner in which the criteria described in clause (i) comport with the purposes of the program described in paragraph (1).

(12) FUNDING.—Subject to the availability of appropriations, the Secretary shall use not more than $25,000,000 to fund each Center for each of fiscal years 2023 through 2027.

Subtitle L—National Nuclear University Research Infrastructure Reinvestment

SEC. 10741. SHORT TITLE.

This subtitle may be cited as the ''National Nuclear University Research Infrastructure Reinvestment Act of 2021''.

SEC. 10742. PURPOSES.

The purposes of this subtitle are—

(1) to upgrade the nuclear research capabilities of universities in the United States to meet the research requirements of advanced nuclear energy systems;

(2) to ensure the continued operation of university research reactors;

(3) to coordinate available resources to enable the establishment, including the start and efficient completion of construction, of new nuclear science and engineering facilities; and

(4) to support—

(A) workforce development critical to maintaining United States leadership in nuclear science and engineering and related disciplines; and

(B) the establishment or enhancement of nuclear science and engineering capabilities and other, related capabilities at historically Black colleges and universities, Tribal colleges or universities, minority-serving institutions, EPSCoR universities, junior or community colleges, and associate-degree-granting colleges.

SEC. 10743. UNIVERSITY INFRASTRUCTURE COLLABORATION.

Section 954(a) of the Energy Policy Act of 2005 (42 U.S.C. 16274(a)) is amended—

(1) in paragraph (2) by amending subparagraph (D) to read as follows:

"(D) promote collaborations, partnerships, and knowledge sharing between institutions of higher education, National Laboratories, other Federal agencies, industry, and associated labor unions; and".

(2) by amending paragraph (4) to read as follow:

"(4) STRENGTHENING UNIVERSITY RESEARCH AND TRAINING REACTORS AND ASSOCIATED INFRASTRUCTURE.—

"(A) IN GENERAL.—In carrying out the program under this subsection, the Secretary may support—

"(i) converting research reactors from high-enrichment fuels to low-enrichment fuels and upgrading operational instrumentation;

"(ii) revitalizing and upgrading existing nuclear science and engineering infrastructure that support the development of advanced nuclear technologies and applications;

"(iii) regional or subregional university-led consortia to—

"(I) broaden access to university research reactors;

"(II) enhance existing university-based nuclear science and engineering infrastructure; and

"(III) provide project management, technical support, quality engineering and inspections, manufacturing, and nuclear material support;

"(iv) student training programs, in collaboration with the United States nu-

clear industry, in relicensing and upgrading reactors, including through the provision of technical assistance; and

"(v) reactor improvements that emphasize research, training, and education, including through the Innovations in Nuclear Infrastructure and Education Program or any similar program.

"(B) Of any amounts appropriated to carry out the program under this subsection, there is authorized to be appropriated to the Secretary to carry out clauses (ii) and (iii) of subparagraph (A) $55,000,000 for each of fiscal years 2023 through 2027.".

SEC. 10744. ADVANCED NUCLEAR RESEARCH INFRASTRUCTURE ENHANCEMENT SUBPROGRAM.

Section 954(a) of the Energy Policy Act of 2005 (42 U.S.C. 16274(a)), as amended by section 3, is further amended—

(1) by redesignating paragraphs (5) through (8) as paragraphs (6) through (9), respectively;

(2) by inserting after paragraph (4) the following:

"(5) ADVANCED NUCLEAR RESEARCH INFRASTRUCTURE ENHANCEMENT.—

"(A) IN GENERAL.—The Secretary shall carry out a subprogram to be known as the Advanced Nuclear Research Infrastructure Enhancement Subprogram in order to—

"(i) demonstrate various advanced nuclear reactor and nuclear microreactor concepts;

"(ii) establish medical isotope production reactors or other specialized applications; and

"(iii) advance other research infrastructure that, in the determination of the Secretary, is consistent with the mission of the Department.

"(B) NEW NUCLEAR SCIENCE AND ENGINEERING FACILITIES.—In carrying out the subprogram, the Secretary shall establish—

"(i) not more than 4 new research reactors; and

"(ii) new nuclear science and engineering facilities, as required to address research demand and identified infrastructure gaps.

"(C) LOCATIONS.—New research reactors and facilities established under subparagraph (B) shall be established in a manner that—

"(i) supports the regional or sub-regional consortia described in paragraph (4)(C); and

"(ii) encourages the participation of—

"(I) historically Black colleges and universities;

"(II) Tribal colleges or universities;

"(III) minority-serving institutions;

"(IV) EPSCoR universities; and

"(V) junior or community colleges.

"(D) FUEL REQUIREMENTS.—New research reactors established under subparagraph (B) shall not use high-enriched uranium, as defined in section 2001 of division Z of the Consolidated Appropriations Act of 2021.

"(E) AUTHORIZATION OF APPROPRIATIONS.—Of any amounts appropriated to carry out the program under this section, there are authorized to be appropriated to the Secretary

to carry out the subprogram under this paragraph—

"(i) $45,000,000 for fiscal year 2023;

"(ii) $60,000,000 for fiscal year 2024;

"(iii) $65,000,000 for fiscal year 2025;

"(iv) $80,000,000 for fiscal year 2026; and

"(v) $140,000,000 for fiscal year 2027."; and

(3) by amending paragraph (9), as redesignated by paragraph (1) of this section, to read as follows:

"(9) DEFINITIONS.—In this subsection:

"(A) JUNIOR FACULTY.—The term 'junior faculty' means a faculty member who was awarded a doctorate less than 10 years before receipt of an award from the grant program described in paragraph (2)(B).

"(B) JUNIOR OR COMMUNITY COLLEGE.—The term 'junior or community college' means—

"(i) a public institution of high education, including additional locations, at which the highest awarded degree, or the

predominantly awarded degree, is an associate degree; or

"(ii) any Tribal college or university (as defined in section 316 of the Higher Education Act of 1965 (20 U.S.C. 1059c)).

"(C) EPSCOR UNIVERSITY.—The term 'EPSCoR university' means an institution of higher education located in a State eligible to participate in the program defined in section 502 of the America COMPETES Reauthorization Act of 2010 (42 U.S.C. 1862p note).

"(D) HISTORICALLY BLACK COLLEGE OR UNIVERSITY.—The term 'historically Black college or university' has the meaning given the term 'part B institution' in section 322 of the Higher Education Act of 1965 (20 U.S.C. 1061).

"(E) MINORITY-SERVING INSTITUTION.—The term 'minority-serving institution' means a Hispanic-serving institution, an Alaska Native-serving institution, a Native Hawaiian-serving institution, a Predominantly Black Institution, an Asian American and Native American Pacific Islander-serving institution, or a Native

American-serving nontribal institution as described in section 371 of the Higher Education Act of 1965 (20 U.S.C. 1067q(a)).

"(F) TRIBAL COLLEGE OR UNIVERSITY.—The term 'Tribal College or University' has the meaning given such term in section 316 of the Higher Education Act of 1965 (20 U.S.C. 1059c).".

SEC. 10745. SCIENCE EDUCATION AND HUMAN RESOURCES SCHOLARSHIPS, FELLOWSHIPS, AND RESEARCH AND DEVELOPMENT PROJECTS.

(a) IN GENERAL.—The purpose of this section is to support a diverse workforce for the complex landscape associated with effective and equitable development of advanced nuclear energy technologies, including interdisciplinary research to enable positive impacts and avoid potential negative impacts across the lifespan of nuclear energy technologies.

(b) NONTECHNICAL NUCLEAR RESEARCH.—Section 313 of the Omnibus Appropriations Act, 2009 (Public Law 111–8; 42 U.S.C. 16274a) is amended—

(1) in subsection (b)(2), after "engineering", by inserting ", which may include nontechnical nuclear research.";

(2) in subsection (c), by inserting after paragraph (2) the following:

"(3) NONTECHNICAL NUCLEAR RESEARCH.—The term 'nontechnical nuclear research' means research with specializations such as social sciences or law that can support an increase in community engagement, participation, and confidence in nuclear energy systems, including the navigation of the licensing required for advanced reactor deployment, aligned with the objectives in section 951(a)(2) of the Energy Policy Act of 2005 (42 U.S.C. 16271(a)(2)).''; and

(3) in subsection (d)(1), by striking ''$30,000,000'' and inserting ''$45,000,000''.

Subtitle M—Steel Upgrading Partnerships and Emissions Reduction

SEC. 10751. LOW-EMISSIONS STEEL MANUFACTURING RESEARCH PROGRAM.

(a) PROGRAM.—Subtitle D of title IV of the Energy Independence and Security Act of 2007 (42 U.S.C. 17111 et seq.) is amended by inserting after section 454 the following:

"SEC. 454A. LOW-EMISSIONS STEEL MANUFACTURING RESEARCH PROGRAM.

"(a) PURPOSE.—The purpose of this section is to encourage the research and development of innovative technologies aimed at—

"(1) increasing the technological and economic competitiveness of industry and manufacturing in the United States; and

"(2) achieving significant net nonwater greenhouse emissions reductions in the production processes for iron, steel, and steel mill products.

"(b) DEFINITIONS.—In this section:

"(1) COMMERCIALLY AVAILABLE STEELMAKING.—The term 'commercially available steelmaking' means the current production method of iron, steel, and steel mill products.

"(2) CRITICAL MATERIAL.—The term 'critical material' has the meaning given such term in section 7002 of division Z of the Consolidated Appropriations Act, 2021 (Public Law 116–260).

"(3) CRITICAL MINERAL.—The term 'critical mineral' has the meaning given such term in section 7002 of division Z of the Consolidated Appropriations Act, 2021 (Public Law 116–260).

"(4) ELIGIBLE ENTITY.—The term 'eligible entity' means—

"(A) an institution of higher education;

"(B) an appropriate State or Federal entity, including a federally funded research and development center of the Department;

"(C) a nonprofit research institution;

"(D) a private entity;

"(E) any other relevant entity the Secretary determines appropriate; and

"(F) a partnership or consortium of two or more entities described in subparagraphs (A) through (E).

"(5) INSTITUTION OF HIGHER EDUCATION.—The term 'institution of higher education' has the meaning given the term in section 101 of the Higher Education Act of 1965 (20 U.S.C. 1001).

"(6) LOW-EMISSIONS STEEL MANUFACTURING.—The term 'low-emissions steel manufacturing' means advanced or commercially available steelmaking with the reduction, to the maximum extent practicable, of net nonwater greenhouse gas emissions to the atmosphere from the production of iron, steel, and steel mill products.

"(c) IN GENERAL.—Not later than 180 days after the date of enactment of the Research and Development, Competition, and Innovation Act, the Secretary shall es-

tablish a program of research, development, demonstration, and commercial application of advanced tools, technologies, and methods for low-emissions steel manufacturing.

"(d) REQUIREMENTS.—In carrying out the program under subsection (c), the Secretary shall—

"(1) coordinate this program with the programs and activities authorized in title VI of division Z of the Consolidated Appropriations Act, 2021;

"(2) coordinate across all relevant program offices of the Department, including the Office of Science, Office of Energy Efficiency and Renewable Energy, the Office of Fossil Energy, and the Office of Nuclear Energy;

"(3) leverage, to the extent practicable, the research infrastructure of the Department, including scientific computing user facilities, x-ray light sources, neutron scattering facilities, and nanoscale science research centers; and

"(4) conduct research, development, and demonstration of low-emissions steel manufacturing technologies that have the potential to increase domestic production and employment in advanced and commercially available steelmaking.

"(e) STRATEGIC PLAN.—

"(1) IN GENERAL.—Not later than 180 days after the date of enactment of the Research and Development, Competition, and Innovation Act, the Secretary shall develop a 5-year strategic plan identifying research, development, demonstration, and commercial application goals for the program established in subsection (c). The Secretary shall submit this plan to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Energy and Natural Resources of the Senate.

"(2) CONTENTS.—The strategic plan submitted under paragraph (1) shall—

"(A) identify programs at the Department related to low-emissions steel manufacturing that support the research, development, demonstration, and commercial application activities described in this section, and the demonstration projects under subsection (h);

"(B) establish technological and programmatic goals to achieve the requirements of subsection (d); and

"(C) include timelines for the accomplishment of goals developed under the plan.

"(3) UPDATES TO PLAN.—Not less than once every two years, the Secretary shall submit to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Energy and Natural Resources of the Senate an updated version of the plan under paragraph (1).

"(f) FOCUS AREAS.—In carrying out the program established in subsection (c), the Secretary shall focus on—

"(1) medium- and high-temperature heat generation technologies used for low-emissions steel manufacturing, which may include—

"(A) alternative fuels, including hydrogen and biomass;

"(B) alternative reducing agents, including hydrogen;

"(C) renewable heat generation technology, including solar and geothermal;

"(D) electrification of heating processes, including through electrolysis; and

"(E) other heat generation sources;

"(2) carbon capture technologies for advanced and commercially available steelmaking processes, which may include—

"(A) combustion and chemical looping technologies;

"(B) use of slag to reduce carbon dioxide emissions;

"(C) pre-combustion technologies; and

"(D) post-combustion technologies;

"(3) smart manufacturing technologies and principles, digital manufacturing technologies, and advanced data analytics to develop advanced technologies and practices in information, automation, monitoring, computation, sensing, modeling, and networking to—

"(A) model and simulate manufacturing production lines;

"(B) monitor and communicate production line status; and

"(C) model, simulate, and optimize the energy efficiency of manufacturing processes;

"(4) technologies and practices that minimize energy and natural resource consumption, which may include—

"(A) designing products that enable reuse, refurbishment, remanufacturing, and recycling;

"(B) minimizing waste from advanced and commercially available steelmaking processes, including through the reuse of waste as re-

sources in other industrial processes for mutual benefit;

"(C) increasing resource efficiency; and

"(D) increasing the energy efficiency of advanced and commercially available steelmaking processes;

"(5) alternative materials and technologies that produce fewer emissions during production and result in fewer emissions during use, which may include—

"(A) innovative raw materials;

"(B) high-performance lightweight materials;

"(C) substitutions for critical materials and critical minerals; and

"(D) other technologies that achieve significant carbon emission reductions in low-emissions steel manufacturing, as determined by the Secretary; and

"(6) high-performance computing to develop advanced materials and manufacturing processes contributing to the focus areas described in paragraphs (1) through (5), including—

"(A) modeling, simulation, and optimization of the design of energy efficient and sustainable products; and

"(B) the use of digital prototyping and additive manufacturing to enhance product design.

"(g) TESTING AND VALIDATION.—The Secretary, in consultation with the Director of the National Institute of Standards and Technology, shall support the development of standardized testing and technical validation of advanced and commercially available steelmaking and low-emissions steel manufacturing through collaboration with one or more National Laboratories, and one or more eligible entities.

"(h) DEMONSTRATION.—

"(1) ESTABLISHMENT.—Not later than 180 days after the date of enactment of the Research and Development, Competition, and Innovation Act, the Secretary, in carrying out the program established in subsection (c), and in collaboration with industry partners, institutions of higher education, and the National Laboratories, shall support an initiative for the demonstration of low-emissions steel manufacturing, as identified by the Secretary, that uses either—

"(A) a single technology; or

"(B) a combination of multiple technologies.

"(2) SELECTION REQUIREMENTS.—Under the initiative established under paragraph (1), the Secretary shall select eligible entities to carry out demonstration projects and to the maximum extent practicable—

"(A) encourage regional diversity among eligible entities, including participation by rural States;

"(B) encourage technological diversity among eligible entities; and

"(C) ensure that specific projects selected—

"(i) expand on the existing technology demonstration programs of the Department; and

"(ii) prioritize projects that leverage matching funds from non-Federal sources.

"(3) REPORTS.—The Secretary shall submit to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Energy and Natural Resources of the Senate—

"(A) not less frequently than once every two years for the duration of the demonstration initiative under this subsection, a report describing the performance of the initiative; and

"(B) if the initiative established under this subsection is terminated, an assessment of the success of, and education provided by, the measures carried out by recipients of financial assistance under the initiative.

"(i) ADDITIONAL COORDINATION.—

"(1) MANUFACTURING U.S.A.—In carrying out this section the Secretary shall consider—

"(A) leveraging the resources of relevant existing Manufacturing USA Institutes described in section 34(d) of the National Institute of Standards and Technology Act (15 U.S.C. 278s(d));

"(B) integrating program activities into a relevant existing Manufacturing USA Institute; or

"(C) establishing a new institute focused on low-emissions steel manufacturing.

"(2) OTHER FEDERAL AGENCIES.—In carrying out this section, the Secretary shall coordinate with other Federal agencies that are carrying out re-

search and development initiatives to increase industrial competitiveness and achieve significant net nonwater greenhouse emissions reductions through low-emissions steel manufacturing, including the Department of Defense, Department of Transportation, and the National Institute of Standards and Technology.''.

(b) CLERICAL AMENDMENT.—Section 1(b) of the Energy Independence and Security Act of 2007 (42 U.S.C. 17001 note) is amended in the table of contents by inserting after the item relating to section 454 the following:

''Sec. 454A. Low-Emissions Steel Manufacturing Research Program.''.

Subtitle N—Applied Laboratories Infrastructure Restoration and Modernization

SEC. 10761. APPLIED LABORATORIES INFRASTRUCTURE RESTORATION AND MODERNIZATION.

(a) DEFINITION OF NATIONAL LABORATORY.—In this section, the term ''National Laboratory'' means—

(1) the National Renewable Energy Laboratory;

(2) the National Energy Technology Laboratory;

(3) the Idaho National Laboratory;

(4) the Savannah River National Laboratory;

(5) the Sandia National Laboratories;

(6) the Los Alamos National Laboratory; and

(7) the Lawrence Livermore National Laboratory.

(b) RESTORATION AND MODERNIZATION PROJECTS.—

(1) IN GENERAL.—The Secretary shall fund projects described in paragraph (2) as needed to address the deferred maintenance, critical infrastructure needs, and modernization of National Laboratories.

(2) PROJECTS DESCRIBED.—The projects referred to in paragraph (1) are, as determined by the Secretary—

(A) priority deferred maintenance projects at National Laboratories, including facilities sustainment for, upgrade of, and construction of research laboratories, administrative and support buildings, utilities, roads, power plants, and any other critical infrastructure; and

(B) lab modernization projects at National Laboratories, including projects relating to core infrastructure needed—

(i) to support existing and emerging science missions with new and specialized requirements for world-leading scientific

user facilities and computing capabilities; and

(ii) to maintain safe, efficient, reliable, and environmentally responsible operations, including pilot projects to demonstrate net-zero emissions with resilient operations.

(3) APPROACH.—In carrying out paragraph (1), the Secretary shall use all available approaches and mechanisms, as the Secretary determines to be appropriate, including—

(A) capital line items;

(B) minor construction projects;

(C) energy savings performance contracts;

(D) utility energy service contracts;

(E) alternative financing; and

(F) expense funding.

(c) SUBMISSION TO CONGRESS.—For each fiscal year through fiscal year 2027, at the same time as the annual budget submission of the President, the Secretary shall submit to the Committee on Appropriations and the Committee on Energy and Natural Resources of the Senate and the Committee on Appropriations and the Committee on Science, Space, and Technology of the House of Representatives a list of projects for which the Secretary will

provide funding under this section, including a description of each project and the funding profile for the project.

(d) AUTHORIZATION OF APPROPRIATIONS.—There is authorized to be appropriated to the Secretary to carry out the activities described in this section $800,000,000 for each of fiscal years 2023 through 2027, of which, in each fiscal year—

(1) $640,000,000 is authorized to be appropriated for projects at National Laboratories described in paragraphs (1) through (4) of subsection (a); and

(2) $160,000,000 is authorized to be appropriated for projects at National Laboratories described in paragraphs (5) through (7) of that subsection.

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

SEC. 10771. DEPARTMENT OF ENERGY RESEARCH, DEVELOPMENT, AND DEMONSTRATION ACTIVITIES.

For the purpose of carrying out research, development, and demonstration activities and addressing energy-related supply chain activities in the key technology focus areas (as described in section 10387), there are authorized to be appropriated the following amounts:

(1) OFFICE OF ENERGY EFFICIENCY AND RENEWABLE ENERGY.—In addition to amounts otherwise authorized to be appropriated or made available, there are authorized to be appropriated to the Secretary of Energy (referred to in this section as the ''Secretary''), acting through the Office of Energy Efficiency and Renewable Energy, for the period of fiscal years 2023 through 2026—

(A) $1,200,000,000 to carry out building technologies research, development, and demonstration activities;

(B) $1,200,000,000 to carry out sustainable transportation research, development, and demonstration activities;

(C) $1,000,000,000 to carry out advanced manufacturing research, development, and demonstration activities, excluding activities carried out pursuant to subparagraph (D);

(D) $1,000,000,000 to carry out section 454 of the Energy Independence and Security Act of 2007 (42 U.S.C. 17113);

(E) $600,000,000 to carry out advanced materials research, development, and demonstration activities, including relating to

upcycling, recycling, and biobased materials; and

(F) $800,000,000 to carry out renewable power research, development, and demonstration activities.

(2) OFFICE OF ELECTRICITY.—In addition to amounts otherwise authorized to be appropriated or made available, there is authorized to be appropriated to the Secretary, acting through the Office of Electricity, for the period of fiscal years 2023 through 2026, $1,000,000,000 to carry out electric grid modernization and security research, development, and demonstration activities.

(3) OFFICE OF CYBERSECURITY, ENERGY SECURITY, AND EMERGENCY RESPONSE.—In addition to amounts otherwise authorized to be appropriated or made available, there is authorized to be appropriated to the Secretary, acting through the Office of Cybersecurity, Energy Security, and Emergency Response, for the period of fiscal years 2023 through 2026, $800,000,000 to carry out cybersecurity and energy system physical security research, development, and demonstration activities.

(4) OFFICE OF NUCLEAR ENERGY.—In addition to amounts otherwise authorized to be appropriated

or made available, there is authorized to be appropriated to the Secretary, acting through the Office of Nuclear Energy, for the period of fiscal years 2023 through 2026, $400,000,000 to carry out advanced materials research, development, and demonstration activities.

(5) OFFICE OF ENVIRONMENTAL MANAGEMENT.—In addition to amounts otherwise authorized to be appropriated or made available, there is authorized to be appropriated to the Secretary, acting through the Office of Environmental Management, for the period of fiscal years 2023 through 2026, $200,000,000 to carry out research, development, and demonstration activities, including relating to artificial intelligence and information technology.

(6) OFFICE OF FOSSIL ENERGY AND CARBON MANAGEMENT.—In addition to amounts otherwise authorized to be appropriated or made available, there are authorized to be appropriated to the Secretary, acting through the Office of Fossil Energy and Carbon Management, for the period of fiscal years 2023 through 2026—

(A) $600,000,000 to carry out clean industrial technologies research, development, and demonstration activities pursuant to section

454 of the Energy Independence and Security Act of 2007 (42 U.S.C. 17113);

(B) $200,000,000 to carry out alternative fuels research, development, and demonstration activities; and

(C) $1,000,000,000 to carry out carbon removal research, development, and demonstration activities.

(7) ADVANCED RESEARCH PROJECTS AGENCY—ENERGY.—In addition to amounts otherwise authorized to be appropriated or made available, there is authorized to be appropriated to the Secretary, acting through the Director of the Advanced Research Projects Agency—Energy established under section 5012 of the America COMPETES Act (42 U.S.C. 16538), for the period of fiscal years 2023 through 2026, $1,200,852,898 to carry out activities of the Advanced Research Projects Agency—Energy.

Subtitle P—Fission for the Future

SEC. 10781. ADVANCED NUCLEAR TECHNOLOGIES FEDERAL RESEARCH, DEVELOPMENT, AND DEMONSTRATION PROGRAM.

(a) DEFINITIONS.—In this section:

(1) ADVANCED NUCLEAR REACTOR.—The term ''advanced nuclear reactor'' has the meaning given

the term in section 951(b) of the Energy Policy Act of 2005 (42 U.S.C. 16271(b)).

(2) ELIGIBLE ENTITY.—The term ''eligible entity'' means each of—

(A) a State;

(B) an Indian Tribe (as defined in section 4 of the Indian Self-Determination and Education Assistance Act (25 U.S.C. 5304));

(C) a Tribal organization (as defined in section 4 of the Indian Self-Determination and Education Assistance Act (25 U.S.C. 5304));

(D) a unit of local government;

(E) an electric utility (as defined in section 3 of the Federal Power Act (16 U.S.C. 796));

(F) a National Laboratory (as defined in section 2 of the Energy Policy Act of 2005 (42 U.S.C. 15801));

(G) an institution of higher education (as defined in section 101(a) of the Higher Education Act of 1965 (20 U.S.C. 1001(a))); and

(H) a private entity specializing in—

(i) advanced nuclear technology development;

(ii) nuclear supply chains; or

(iii) with respect to nuclear technologies and nonelectric applications of nuclear technologies, construction, project financing, contract structuring and risk allocation, or regulatory and licensing processes.

(3) PROGRAM.—The term ''program'' means the program established under subsection (b)(1).

(4) SECRETARY.—The term ''Secretary'' means the Secretary of Energy.

(b) ESTABLISHMENT OF PROGRAM.—

(1) IN GENERAL.—The Secretary shall establish a program to provide Federal financial assistance to eligible entities to support the research, development, and demonstration of advanced nuclear reactors.

(2) COMPETITIVE PROCEDURES.—To the maximum extent practicable, the Secretary shall carry out the program using a competitive, merit-based review process that is consistent with section 989 of the Energy Policy Act of 2005 (42 U.S.C. 16353).

(c) APPLICATIONS.—An eligible entity desiring Federal financial assistance under the program shall submit to the Secretary an application at such time, in such man-

ner, and containing such information as the Secretary may require.

(d) PRIORITY.—In selecting eligible entities to receive Federal financial assistance under the program, the Secretary shall give priority to eligible entities that—

(1) plan to carry out projects at or near the site of 1 or more fossil fuel electric generation facilities that are retired or scheduled to retire, including multi-unit facilities that are partially shut down—

(A) to support the productive reuse of fossil fuel electric generation facilities that are retired or scheduled to retire; and

(B) to sustain and revitalize communities impacted by the closure of fossil fuel electric generation facilities;

(2) plan to support nonelectric applications, including supplying heat for—

(A) energy storage;

(B) hydrogen or other liquid and gaseous fuel or chemical production;

(C) industrial processes;

(D) desalination technologies and processes;

(E) isotope production;

(F) district heating; and

(G) other applications, as the Secretary determines to be appropriate; and

(3) have implemented or demonstrated the ability to successfully implement workforce training or retraining programs to train workers to perform activities relating to the research, development, and demonstration of advanced nuclear reactors.

(e) COST SHARE.—Section 988 of the Energy Policy Act of 2005 (42 U.S.C. 16352) shall apply to Federal financial assistance provided under the program.

(f) AUTHORIZATION OF APPROPRIATIONS.—In addition to amounts otherwise available, there are authorized to be appropriated to the Secretary to carry out the program—

(1) $75,000,000 for fiscal year 2023;

(2) $100,000,000 for fiscal year 2024;

(3) $150,000,000 for fiscal year 2025;

(4) $225,000,000 for fiscal year 2026; and

(5) $250,000,000 for fiscal year 2027.

TITLE VII—NATIONAL AERONAUTICS AND SPACE ADMINISTRATION AUTHORIZATION ACT

SEC. 10801. SHORT TITLE.

This title may be cited as the ''National Aeronautics and Space Administration Authorization Act of 2022''.

SEC. 10802. DEFINITIONS.

In this title:

(1) ADMINISTRATION.—The term ''Administration'' means the National Aeronautics and Space Administration.

(2) ADMINISTRATOR.—The term ''Administrator'' means the Administrator of the National Aeronautics and Space Administration.

(3) APPROPRIATE COMMITTEES OF CONGRESS.—Except as otherwise expressly provided, the term ''appropriate committees of Congress'' means—

(A) the Committee on Commerce, Science, and Transportation of the Senate; and

(B) the Committee on Science, Space, and Technology of the House of Representatives.

(4) CISLUNAR SPACE.—The term ''cislunar space'' means the region of space beyond low-Earth

orbit out to and including the region around the surface of the Moon.

(5) DEEP SPACE.—The term ''deep space'' means the region of space beyond low-Earth orbit, including cislunar space.

(6) DEVELOPMENT COST.—The term ''development cost'' has the meaning given the term in section 30104 of title 51, United States Code.

(7) GOVERNMENT ASTRONAUT.—The term ''government astronaut'' has the meaning given the term in section 50902 of title 51, United States Code.

(8) ISS.—The term ''ISS'' means the International Space Station.

(9) LOW-ENRICHED URANIUM.—The term ''low-enriched uranium'' means uranium having an assay greater than the assay for natural uranium but less than 20 percent of the uranium–235 isotope.

(10) NASA.—The term ''NASA'' means the National Aeronautics and Space Administration.

(11) ORION.—The term ''Orion'' means the multipurpose crew vehicle described in section 303 of the National Aeronautics and Space Administration Authorization Act of 2010 (42 U.S.C. 18323).

(12) OSTP.—The term ''OSTP'' means the Office of Science and Technology Policy.

(13) SPACE FLIGHT PARTICIPANT.—The term ''space flight participant'' has the meaning given the term in section 50902 of title 51, United States Code.

(14) SPACE LAUNCH SYSTEM.—The term ''Space Launch System'' means the Space Launch System authorized under section 302 of the National Aeronautics and Space Administration Act of 2010 (42 U.S.C. 18322).

(15) UNMANNED AIRCRAFT; UNMANNED AIRCRAFT SYSTEM.—The terms ''unmanned aircraft'' and ''unmanned aircraft system'' have the meanings given those terms in section 44801 of title 49, United States Code.

Subtitle A—Exploration

SEC. 10811. MOON TO MARS.

(a) SENSE OF CONGRESS.—It is the sense of Congress that—

(1) advances in space technology and space exploration capabilities—

(A) ensure the long-term technological preeminence, economic competitiveness, STEM

workforce development, and national security of the United States; and

(B) offer profound inspirational value for future generations;

(2) the Artemis missions—

(A) will make further progress on advancing the human exploration roadmap to achieve human presence beyond low-Earth orbit to the surface of Mars, as required under section 432 of the National Aeronautics and Space Administration Transition Authorization Act of 2017 (Public Law 115–10; 51 U.S.C. 20302 note);

(B) should fulfill the goal of landing United States astronauts, including the first woman and the next man, on the Moon; and

(C) should seek collaboration with commercial and international partners to establish sustainable lunar exploration, and should fund any sustainable lunar activities not directly required for the advancement of a human mission to Mars separately;

(3) in carrying out the Artemis missions, the Administrator should ensure that the entire Artemis program is inclusive and representative of all people

of the United States, including women and minorities;

(4) safe and successful execution of the roadmap to achieve human presence on Mars, including the Artemis missions, requires—

(A) a clear strategic vision for achieving lunar and Mars exploration that is shared by NASA, international partners, nongovernmental partners, Congress, and the people of the United States;

(B) a well-developed and executable timeline, budget, and mission architecture, to inform decisions, including decisions relating to workforce and infrastructure needs and the development of technical and nontechnical skills;

(C) consistent NASA oversight of all relevant exploration activities, enabled by NASA leadership with authority, responsibility, and accountability for decisions and well-developed capabilities for systems engineering and integration;

(D) clearly defined roles for NASA, international partners, and nongovernmental partners, including criteria for determining whether

NASA should make, manage, or buy key capabilities; and

(E) mechanisms to ensure NASA insight into the activities of its international and non-governmental partners, as required to identify and mitigate risks to mission safety and success.

(b) MOON TO MARS OFFICE AND PROGRAM.—

(1) MOON TO MARS OFFICE.—Not later than 120 days after the date of the enactment of this Act, the Administrator shall establish within the Exploration Systems Development Mission Directorate a Moon to Mars Program Office (referred to in this section as the ''Office'') to lead and manage the Moon to Mars program established under paragraph (2), including Artemis missions and activities.

(2) MOON TO MARS PROGRAM.—

(A) ESTABLISHMENT.—Not later than 120 days after the date of the enactment of this Act, the Administrator shall establish a Moon to Mars Program (referred to in this section as the ''Program'') in accordance with sections 20302(b) and 70504 of title 51, United States Code, which shall include Artemis missions and

activities, to achieve the goal of human exploration of Mars.

(B) ELEMENTS.—The Program shall include the following elements:

(i) The Space Launch System under section 20302 of title 51, United States Code.

(ii) The Orion crew vehicle under such section.

(iii) Exploration Ground Systems.

(iv) An outpost in orbit around the Moon under section 70504 of such title.

(v) Human-rated landing systems.

(vi) Spacesuits.

(vii) Any other element needed to meet the requirements for the Program.

(C) DIRECTION.—The Administrator shall ensure that—

(i) each Artemis mission demonstrates or advances a technology or operational concept that will enable human missions to Mars;

(ii) the Program incorporates each such mission into the human exploration roadmap under section 432 of the National

Aeronautics and Space Administration Transition Authorization Act of 2017 (Public Law 115–10; 51 U.S.C. 20302 note); and

(iii) the Program includes cislunar space exploration activities that—

(I) use a combination of launches of the Space Launch System and space transportation services from United States commercial providers, as appropriate, for each such mission;

(II) plan for not fewer than 1 Space Launch System launch annually beginning after the first successful crewed launch of Orion on the Space Launch System, with a goal of 2 Space Launch System launches annually as soon as practicable; and

(III) establish an outpost in orbit around the Moon that—

(aa) demonstrates technologies, systems, and operational concepts directly applicable to the space vehicle that will

be used to transport humans to Mars;

(bb) has the capability for periodic human habitation; and

(cc) functions as a point of departure, return, or staging for missions to multiple locations on the lunar surface or other destinations.

(3) DIRECTOR.—

(A) IN GENERAL.—The Administrator shall appoint a Director for the Program, who shall lead the Office and report to the Associate Administrator of the Exploration Systems Development Mission Directorate.

(B) ACCOUNTABILITY.—The Director shall have accountability for risk management and shall have authority, as consistent with NASA Space Flight Program and Project Management requirements—

(i) to implement—

(I) Program-level requirements; and

(II) an architecture and program plan developed to meet such requirements;

(ii) to manage resources, personnel, and contracts necessary to implement the Program, as appropriate;

(iii) to manage cost, risk, schedule, and performance factors;

(iv) to direct and oversee a Program-wide systems engineering and integration and integrated risk management function; and

(v) to carry out other authorities, in accordance with Administration policies and procedures.

(C) RESPONSIBILITIES.—The Director shall be responsible for—

(i) developing and managing—

(I) an integrated master plan, integrated master schedule, and integrated risk management procedures for the Program;

(II) a Program-wide systems engineering and integration function as described in subsection (c);

(III) plans for technology and capabilities development;

(IV) logistics support, science data management, communications, and other plans that are relevant to the functions of the Office; and

(V) performance measures to assess the progress of the Program;

(ii) advising the Associate Administrator of the Exploration Systems Development Mission Directorate on the development of—

(I) Program-level requirements, including for a human Mars orbital mission and a human mission to the surface of Mars; and

(II) an architecture based on the requirements described in subclause (I); and

(iii) informing the Associate Administrator of the Administration on coordination among NASA centers, as required to most efficiently achieve the goals of the Program.

(c) SYSTEMS ENGINEERING AND INTEGRATION.—The Director of the Office shall—

(1) establish within the Office a Program-wide systems engineering and integration function; and

(2) appoint a manager for such function to manage systems engineering and integration activities across the Program, including with respect to the Program elements described in subsection (b)(2).

(d) IMPLEMENTATION.—In the implementation of the Program, the Administrator shall ensure that—

(1) for the purposes of reducing risk and complexity and making the maximum use of taxpayer investments to date, in conducting Artemis activities, the Administration does not take any action in regard to the design of the Exploration Upper Stage-enhanced Space Launch System that would preclude it from carrying an integrated human-rated lunar landing system for crewed lunar landing missions;

(2) the Program maintains a robust series of ground-based and in-flight testing activities, including, with respect to each crewed system design, not less than 1 uncrewed flight test, followed by a crewed flight test, as appropriate, prior to use of the design on a human-rated lunar landing system or Mars mission; and

(3) human lunar landing missions under the Program, including surface and in-space activities, are carried out solely by government astronauts.

(e) STUDY.—Not later than 180 days after the date of the enactment of this Act, the Administrator shall submit to the appropriate committees of Congress a report detailing—

(1) progress towards the establishment of—

(A) the Office, the Program, and the Program architecture; and

(B) the integrated master plan, integrated master schedule, and integrated risk management procedures for the Program;

(2) performance measures and milestones for the Program and any interim assessment with respect to such performance measures, as practicable;

(3) initial criteria for determining whether NASA should make, manage, or buy key capabilities within the Program or engage with international partners to access such capabilities;

(4) strategies to ensure consistent insight into the activities of NASA partners, including non-governmental partners, as required to identify and mitigate mission risks;

(5) progress towards the establishment of a systems engineering and integration function; and

(6) an annual budget profile for resources required to implement the Program during the 5-year period beginning on the date of the enactment of this Act.

SEC. 10812. SPACE LAUNCH SYSTEM CONFIGURATIONS.

(a) EXPLORATION GROUND SYSTEMS INFRASTRUCTURE.—The Administrator shall ensure that—

(1) the necessary elements of a ground system infrastructure are in place to enable the preparation and use of the Space Launch System, specifically the Block 1 (at least 70 mt), Block 1B (at least 105 mt), and Block 2 (at least 130 mt) variants of the Space Launch System; and

(2) not fewer than 2 bays of the vehicle assembly building of such ground system infrastructure are outfitted and dedicated to support Space Launch System stacking and preparations.

(b) FLIGHT RATE AND SAFETY.—After the first crewed lunar landing of the Administration's Moon to Mars activities, the Administrator shall, to the extent practicable, seek to carry out a flight rate of 2 integrated Space Launch System and Orion crew vehicle missions annually until the lunar activities needed to enable a human

mission to Mars are completed so as to maintain the critical human spaceflight production and operations skills necessary for the safety of human spaceflight activities in deep space.

(c) MOBILE LAUNCH PLATFORM.—

(1) IN GENERAL.—The Administrator is authorized to maintain 2 operational mobile launch platforms to enable the launch of multiple configurations of the Space Launch System.

(2) SECOND MOBILE LAUNCH PLATFORM.—

(A) IN GENERAL.—In implementing paragraph (1), the Administrator shall take all necessary steps to develop and complete a second mobile launch platform, to be in place by 2026, to support the first launch of the Block 1B variant of the Space Launch System.

(B) REQUIREMENT.—Such second mobile launch platform shall be sized and constructed to accommodate the Block 2 variant of the Space Launch System.

(d) REPORTS.—The Administrator shall submit to Congress—

(1) not later than 45 days after the date of the enactment of this Act, a report on the steps the Administrator and industry partners are taking—

(A) to address the cost, schedule, and performance challenges in the development of the Mobile Launch–2 platform; and

(B) to ensure that such platform is ready for operational use on a schedule that aligns with the current plans for an Artemis IV launch, which is currently anticipated in 2027; and

(2) not later than 90 days after such date of enactment, a report that contains a list of the key milestones required for completing each of the Space Launch System variants, and an estimated date on which such milestones will be completed.

(e) EXPLORATION UPPER STAGE.—

(1) IN GENERAL.—To meet the capability requirements under section 302(c)(2) of the National Aeronautics and Space Administration Authorization Act of 2010 (42 U.S.C. 18322(c)(2)), the Administrator shall continue development of the Exploration Upper Stage for the Space Launch System on a schedule consistent with the Artemis IV lunar mission.

(2) BRIEFING.—Not later than 90 days after the date of the enactment of this Act, the Administrator shall brief the appropriate committees of Con-

gress on the development and scheduled availability of the Exploration Upper Stage for the Artemis IV lunar mission.

(f) MAIN PROPULSION TEST ARTICLE.—To meet the requirements under section 302(c)(3) of the National Aeronautics and Space Administration Authorization Act of 2010 (42 U.S.C. 18322(c)(3)), the Administrator may initiate development of a main propulsion test article for the integrated Exploration Upper Stage element of the Space Launch System, consistent with cost and schedule constraints, particularly for long-lead propulsion hardware needed for flight.

SEC. 10813. ROCKET ENGINE TEST INFRASTRUCTURE.

(a) IN GENERAL.—The Administrator shall, to the extent practicable, continue to carry out a program to modernize rocket propulsion test infrastructure at NASA facilities—

(1) to increase capabilities;

(2) to enhance safety;

(3) to support propulsion development and testing; and

(4) to foster the improvement of Government and commercial space transportation and exploration.

(b) PROJECTS.—Projects funded under the program described in subsection (a) may include—

(1) infrastructure and other facilities and systems relating to rocket propulsion test stands and rocket propulsion testing;

(2) enhancements to test facility capacity and flexibility; and

(3) such other projects as the Administrator considers appropriate to meet the goals described in that subsection.

(c) REQUIREMENTS.—In carrying out the program under subsection (a), the Administrator shall—

(1) to the extent practicable and appropriate, prioritize investments in projects that enhance test and flight certification capabilities, including for large thrust-level atmospheric and altitude engines and engine systems, and multi-engine integrated test capabilities;

(2) continue to make underutilized test facilities available for commercial use on a reimbursable basis; and

(3) ensure that no project carried out under this program adversely impacts, delays, or defers testing or other activities associated with facilities used for Government programs, including—

(A) the Space Launch System and the Exploration Upper Stage of the Space Launch System;

(B) in-space propulsion to support exploration missions; or

(C) nuclear propulsion testing.

(d) RULE OF CONSTRUCTION.—Nothing in this section shall preclude a NASA program, including the Space Launch System and the Exploration Upper Stage of the Space Launch System, from using the modernized test infrastructure developed under this section.

(e) WORKING CAPITAL FUND STUDY.—

(1) IN GENERAL.—Not later than 1 year after the date of the enactment of this division, the Administrator shall submit to the appropriate committees of Congress a report on the use of the authority under section 30102 of title 51, United States Code, to promote increased use of NASA rocket propulsion test infrastructure for research, development, testing, and evaluation activities by other Federal agencies, firms, associations, corporations, and educational institutions.

(2) MATTERS TO BE INCLUDED.—The report required by paragraph (1) shall include the following:

(A) An assessment of prior use, if any, of the authority under section 30102 of title 51, United States Code, to improve testing infrastructure.

(B) An analysis of any barrier to implementation of such authority for the purpose of promoting increased use of NASA rocket propulsion test infrastructure.

SEC. 10814. PEARL RIVER MAINTENANCE.

(a) IN GENERAL.—The Administrator shall coordinate with the Chief of the Army Corps of Engineers on a comprehensive plan to ensure the continued navigability of the Pearl River and Little Lake channels sufficient to support NASA barge operations surrounding Stennis Space Center and the Michoud Assembly Facility.

(b) REPORT TO CONGRESS.—Not later than 180 days after the date of the enactment of this division, the Administrator shall submit to the appropriate committees of Congress a report on efforts under subsection (a).

(c) APPROPRIATE COMMITTEES OF CONGRESS DEFINED.—In this section, the term ''appropriate committees of Congress'' means—

(1) the Committee on Commerce, Science, and Transportation, the Committee on Environment and

Public Works, and the Committee on Appropriations of the Senate; and

(2) the Committee on Science, Space, and Technology, the Committee on Transportation and Infrastructure, and the Committee on Appropriations of the House of Representatives.

SEC. 10815. EXTENSION AND MODIFICATION RELATING TO INTERNATIONAL SPACE STATION.

(a) POLICY.—Section 501(a) of the National Aeronautics and Space Administration Authorization Act of 2010 (42 U.S.C. 18351(a)) is amended by striking ''2024'' and inserting ''September 30, 2030''.

(b) MAINTENANCE OF UNITED STATES SEGMENT AND ASSURANCE OF CONTINUED OPERATIONS.—Section 503(a) of the National Aeronautics and Space Administration Authorization Act of 2010 (42 U.S.C. 18353(a)) is amended by striking ''September 30, 2024'' and inserting ''September 30, 2030''.

(c) RESEARCH CAPACITY ALLOCATION AND INTEGRATION OF RESEARCH PAYLOADS.—Section 504(d) of the National Aeronautics and Space Administration Authorization Act of 2010 (42 U.S.C. 18354(d)) is amended—

(1) in paragraph (1), in the first sentence—

(A) by striking ''As soon as practicable'' and all that follows through ''2011,'' and inserting ''The''; and

(B) by striking ''September 30, 2024'' and inserting ''September 30, 2030''; and

(2) in paragraph (2), in the third sentence, by striking ''September 30, 2024'' and inserting ''September 30, 2030''.

(d) MAINTENANCE OF USE.—

(1) IN GENERAL.—Section 70907 of title 51, United States Code, is amended—

(A) in the section heading, by striking ''**2024**'' and inserting ''**2030**'';

(B) in subsection (a), by striking ''September 30, 2024'' and inserting ''September 30, 2030''; and

(C) in subsection (b)(3), by striking ''September 30, 2024'' and inserting ''September 30, 2030''.

(2) CONFORMING AMENDMENT.—The table of sections for chapter 709 of title 51, United States Code, is amended by striking the item relating to section 70907 and inserting the following:

''70907. Maintaining use through at least 2030.''.

(e) TRANSITION PLAN REPORTS.—Section 50111(c)(2) of title 51, United States Code is amended—

(1) in the matter preceding subparagraph (A), by striking ''2023'' and inserting ''2028''; and

(2) in subparagraph (J), by striking ''2028'' and inserting ''2030''.

(f) ASSESSMENTS AND REPORT.—The Administrator shall—

(1) conduct a comprehensive assessment of the viability of the ISS to operate safely and support full and productive use through 2030, including all necessary analyses to certify ISS operations through 2030;

(2) not later than 180 days after the date of the enactment of this Act, submit to the Aerospace Safety Advisory Panel an assessment of—

(A) the root cause of cracks and air leaks in the Russian Service Module Transfer Tunnel;

(B) the certification of all United States systems and modules to operate through 2030;

(C)(i) an inventory of spares or replacements for elements, systems, and equipment, including systems certified under subparagraph (B), that are currently produced, in inventory, or on order;

(ii) a description of the state of the readiness of such spares and replacements; and

(iii) a schedule for delivery of such spares and replacements to the ISS, including the planned transportation means for such delivery and the estimated cost and schedule for procurement of such spares and replacements and their delivery to the ISS; and

(D) any other relevant data, information, or analysis relevant to the safe and productive use of the ISS through 2030; and

(3) not later than 240 days after the date of the enactment of this Act, submit to the appropriate committees of Congress—

(A) a report on the results of the assessment conducted under paragraph (1); and

(B) a plan to address any recommendations of the Aerospace Safety Advisory Panel, consistent with section 31101(c)(2) of title 51, United States Code, with respect to such assessment.

SEC. 10816. PRIORITIES FOR INTERNATIONAL SPACE STATION.

(a) IN GENERAL.—The Administrator shall assess International Space Station research activities and shall ensure that crew time and resources allocated to the Ad-

ministration for use on the International Space Station prioritize—

(1) the research of the Human Research Program, including research on and development of countermeasures relevant to reducing human health and performance risks, behavioral and psychological risks, and other astronaut safety risks related to long-duration human spaceflight;

(2) risk reduction activities relevant to exploration technologies, including for the Environmental Control and Life Support System, extravehicular activity and space suits, environmental monitoring, safety, emergency response, and deep space communications;

(3) the advancement of United States leadership in basic and applied space life and physical science research, consistent with the priorities of the most recent space life and physical sciences decadal survey of the National Academies of Sciences, Engineering, and Medicine; and

(4) other research and development activities identified by the Administrator as essential to Moon to Mars activities.

(b) REPORTS.—

(1) ASSESSMENT AND PRIORITIZATION.—Not later than 180 days after the date of the enactment of this Act, the Administrator shall submit to the appropriate committees of Congress a report on—

(A) the assessment; and

(B) the steps taken to achieve the prioritization required by subsection (a).

(2) SPACE FLIGHT PARTICIPANTS.—Not later than 120 days after the date of the enactment of this Act, the Administrator shall submit to the appropriate committees of Congress a report on measures taken, with respect to space flight participants aboard the ISS, to ensure government astronaut safety, to avoid interference in ISS operations and research priorities, and to prevent undue demands on crew time and resources.

(3) ANNUAL PROGRESS REPORTS.—Concurrent with the annual budget submission of the President to Congress under section 1105(a) of title 31, United States Code, the Administrator shall provide to the appropriate committees of Congress an annual accounting of the use of Administration crew time and ISS resources, including the allocation of such resources toward the priorities described in subsection (a).

SEC. 10817. TECHNICAL AMENDMENTS RELATING TO ARTEMIS MISSIONS.

(a) Section 421 of the National Aeronautics and Space Administration Authorization Act of 2017 (Public Law 115–10; 51 U.S.C. 20301 note) is amended—

(1) in subsection (c)(3)—

(A) by striking ''EM–1'' and inserting ''Artemis I'';

(B) by striking ''EM–2'' and inserting ''Artemis II''; and

(C) by striking ''EM–3'' and inserting ''Artemis III''; and

(2) in subsection (f)(3), by striking ''EM–3'' and inserting ''Artemis III''.

(b) Section 432(b) of the National Aeronautics and Space Administration Authorization Act of 2017 (Public Law 115–10; 51 U.S.C. 20302 note) is amended—

(1) in paragraph (3)(D)—

(A) by striking ''EM–1'' and inserting ''Artemis I''; and

(B) by striking ''EM–2'' and inserting ''Artemis II''; and

(2) in paragraph (4)(C), by striking ''EM–3'' and inserting ''Artemis III''.

Subtitle B—Science

SEC. 10821. SCIENCE PRIORITIES.

(a) SENSE OF CONGRESS ON SCIENCE PORTFOLIO.—It is the sense of Congress that—

(1) a balanced and adequately funded set of activities, consisting of research and analysis grant programs, technology development, suborbital research activities, and small, medium, and large space missions, contributes to a robust and productive science program and serves as a catalyst for innovation and discovery; and

(2) the Research and Analysis programs funded by the Science Mission Directorate are critically important for—

(A) preparing the next generation of space and Earth scientists;

(B) pursuing peer-reviewed cutting-edge research;

(C) maximizing scientific return from the Administration's space and Earth science missions; and

(D) developing innovative techniques and future mission concepts.

(b) GOAL.—The Administrator shall pursue the goal of establishing annual funding for Research and Analysis

in the Science Mission Directorate that reaches a level of not less than 10 percent of the total annual funding of relevant divisions of the Science Mission Directorate by fiscal year 2025.

SEC. 10822. SEARCH FOR LIFE.

(a) SENSE OF CONGRESS.—It is the sense of Congress that—

(1) the report entitled ''An Astrobiology Strategy for the Search for Life in the Universe'' published by the National Academies of Sciences, Engineering, and Medicine outlines key scientific questions and methods on the search for the origin, evolution, distribution, and future of life in the universe; and

(2) the interaction of lifeforms with their environment, a central focus of astrobiology research, is a topic of broad significance to life sciences research in space and on Earth.

(b) PROGRAM CONTINUATION.—

(1) IN GENERAL.—The Administrator shall continue to implement a collaborative, multidisciplinary science and technology development program to search for evidence of the existence or historical existence of life beyond Earth in support of—

(A) the scientific priorities of the most recent decadal surveys on planetary science and astrobiology and astronomy and astrophysics of the National Academies of Sciences, Engineering, and Medicine; and

(B) the objective described in section 20102(d)(10) of title 51, United States Code.

(2) ELEMENT.—The program under paragraph (1) shall include activities relating to astronomy, biology, geology, and planetary science.

(3) COORDINATION WITH LIFE SCIENCES PROGRAM.—In carrying out the program under paragraph (1), the Administrator shall coordinate efforts with the life sciences program of the Administration.

(4) INSTRUMENTATION AND SENSOR TECHNOLOGY.—In carrying out the program under paragraph (1), the Administrator may invest in the development of new instrumentation and sensor technology.

(5) TECHNOSIGNATURES.—In carrying out the program under paragraph (1), the Administrator may support, as appropriate, merit-reviewed, competitively selected research on technosignatures.

SEC. 10823. NEXT GENERATION OF ASTROPHYSICS GREAT OBSERVATORIES.

(a) SENSE OF CONGRESS.—It is the sense of Congress that—

(1) NASA's Great Observatories, a suite of space-based telescopes launched over the course of 2 decades and comprised of the Hubble Space Telescope, Compton Gamma-Ray Observatory, Chandra X-Ray Observatory, and Spitzer Space Telescope, have enabled major scientific advances across a broad range of astrophysics disciplines, including with respect to the origins of planets, the formation and evolution of stars and galaxies, fundamental physics, and the structure of the universe;

(2) the decadal survey of the National Academies of Science, Engineering, and Medicine entitled ''Pathways to Discovery in Astronomy and Astrophysics for the 2020s'' recommends a vision to understand the relationships between stars and the bodies that orbit them by ''looking'' at the universe through a range of observations, including radio, optical, gamma rays, neutrinos, and gravitational waves, in order to understand the origin and evolution of galaxies;

(3) the United States and NASA are uniquely poised—

(A) to lead the world in the implementation of the next generation of Great Observatories, as recommended in such decadal survey, including implementation of an observatory to search for biosignatures of exoplanets in the habitable zone;

(B) to address the most compelling scientific questions of the next decade; and

(C) to transform not only our understanding of the universe and the processes and physical paradigms that govern the universe, but also the place of humanity in the universe;

(4) the Administrator should pursue an ambitious astrophysics program that meets the scientific vision of the astronomical community and the transformative capacity of technological innovation; and

(5) in implementing astrophysics research, in order to avoid the major growth in the cost of astrophysics flagship-class missions that has the potential to impact the overall portfolio balance of the Science Mission Directorate, the Administrator should seek to implement lessons learned from previous astrophysics missions, including by—

(A) establishing sufficient cost and schedule reserves;

(B) demonstrating in advance of preliminary design review, as practicable and appropriate, the maturity of necessary technologies through prototype demonstrations in a relevant environment;

(C) providing for regular updates to the cost, schedule, and risk of a project; and

(D) considering, as feasible, the impacts of cost and schedule changes across the Science Mission Directorate.

(b) NANCY GRACE ROMAN TELESCOPE.—

(1) IN GENERAL.—The Administrator shall continue development of the Nancy Grace Roman Space Telescope (commonly known as the ''Roman telescope'' and formerly known as the ''Wide Field Infrared Survey Telescope'') in the configuration established through critical design review, to meet the objectives prioritized in the 2010 decadal survey of astronomy and astrophysics of the National Academies of Sciences, Engineering, and Medicine.

(2) COST AND SCHEDULE.—Section 30104 of title 51, United States Code shall apply to the development of the Roman telescope under paragraph (1).

(3) QUARTERLY REPORTS.—Not less frequently than quarterly, the Administrator shall submit to the appropriate committees of Congress a report on the progress of the development of the Roman telescope and the budget profile and schedule relative to the baseline plan for such development.

SEC. 10824. EARTH SCIENCE MISSIONS AND PROGRAMS.

(a) SENSE OF CONGRESS.—It is the sense of Congress that—

(1) the Earth science and applications program of the Administration provides increasingly valuable data for natural resource management, agriculture, forestry, food security, air quality monitoring, and many other application areas; and

(2) a robust and balanced Earth science and applications program contributes significantly to—

(A) the scientific discovery and economic growth of the United States; and

(B) supporting the health and safety of the people of the United States and the citizens of the world.

(b) REAFFIRMATION.—Congress reaffirms the goal for the Administration's Earth science and applications program set forth in section 60501 of title 51, United States Code, which states: ''The goal for the Administra-

tion's Earth Science program shall be to pursue a program of Earth observations, research, and applications activities to better understand the Earth, how it supports life, and how human activities affect its ability to do so in the future. In pursuit of this goal, the Administration's Earth Science program shall ensure that securing practical benefits for society will be an important measure of its success in addition to securing new knowledge about the Earth system and climate change. In further pursuit of this goal, the Administration shall, together with the National Oceanic and Atmospheric Administration and other relevant agencies, provide United States leadership in developing and carrying out a cooperative international Earth observations-based research program.''.

(c) EARTH SCIENCE MISSIONS AND PROGRAMS.—With respect to the missions and programs of the Earth Science Division, the Administrator shall, to the maximum extent practicable, follow the recommendations and guidance provided by the scientific community through the decadal survey for Earth science and applications from space of the National Academies of Sciences, Engineering, and Medicine, including—

(1) the science priorities described in such survey;

(2) the execution of the series of existing or previously planned observations (commonly known as the ''program of record''); and

(3) the development of a range of missions of all classes, including opportunities for principal investigator-led, competitively selected missions.

(d) EARTH SYSTEM OBSERVATORY.—The Administrator shall pursue an Earth System Observatory, which shall consist of an array of new and complementary Earth-observing scientific satellites, instruments, and missions—

(1) to address the recommendations of the 2018 Earth science and applications decadal survey of the National Academies of Sciences, Engineering, and Medicine entitled ''Thriving on our Changing Planet'', including by conducting priority observations in—

(A) aerosols;

(B) cloud convection and precipitation;

(C) mass change;

(D) surface biology and geology;

(E) surface deformation and change; and

(F) other observation areas designated as high-priority by such decadal survey; and

(2) to achieve the goal of the Earth Science Program set forth in section 60501 of title 51, United States Code.

(e) SURVEY OF USE OF EARTH OBSERVATION DATA BY STATES, TRIBES, AND TERRITORIES.—

(1) SURVEY.—The Administrator shall arrange for the conduct of a survey of the use of NASA Earth observation data by States, Tribal organizations, and territories.

(2) SUBMISSION.—Not later than 18 months after the date of the enactment of this Act, the Administrator shall submit to the appropriate committees of Congress the results of the survey conducted under paragraph (1).

(f) CLIMATE ARCHITECTURE PLAN.—The Administrator shall—

(1) maintain a comprehensive, strategic Climate Architecture Plan for Earth Observations and Applications from Space that describes an integrated and balanced program of Earth science and applications observations to advance science, policy, and applications and societal benefits; and

(2) update such plan every 5 years so as to align with the release of the decadal surveys in Earth science and applications from space and the

mid-decade assessments of the National Academics of Sciences, Engineering, and Medicine.

SEC. 10825. PLANETARY DEFENSE COORDINATION OFFICE.

(a) FINDINGS.—Congress makes the following findings:

(1) Near-Earth objects remain a threat to the United States.

(2) Section 321(d)(1) of the National Aeronautics and Space Administration Authorization Act of 2005 (Public Law 109–155; 119 Stat. 2922; 51 U.S.C. 71101 note prec.), established a requirement that the Administrator plan, develop, and implement a Near-Earth Object Survey program to detect, track, catalogue, and characterize the physical characteristics of near-Earth objects equal to, or greater than, 140 meters in diameter in order to assess the threat of such near-Earth objects to the Earth, with the goal of 90 percent completion of the catalogue of such near-Earth objects by December 30, 2020.

(3) The goal described in paragraph (2) has not be met.

(4) The report of the National Academies of Sciences, Engineering, and Medicine entitled ''Finding Hazardous Asteroids Using Infrared and Visible

Wavelength Telescopes'', issued in 2019, states that—

(A) NASA should develop and launch a dedicated space-based infrared survey telescope to meet the requirements of section 321(d)(1) of the National Aeronautics and Space Administration Authorization Act of 2005 (Public Law 109–155; 119 Stat. 2922; 51 U.S.C. 71101 note prec.); and

(B) the early detection of potentially hazardous near-Earth objects enabled by a space-based infrared survey telescope is important to enable deflection of a dangerous asteroid.

(b) MAINTENANCE OF PLANETARY DEFENSE COORDINATION OFFICE.—The Administrator shall maintain an office within the Planetary Science Division of the Science Mission Directorate, to be known as the ''Planetary Defense Coordination Office''—

(1) to plan, develop, and implement a program to survey threats posed by near-Earth objects equal to or greater than 140 meters in diameter, as required by section 321(d)(1) of the National Aeronautics and Space Administration Authorization Act of 2005 (Public Law 109–155; 119 Stat. 2922; 51 U.S.C. 71101 note prec.);

(2) identify, track, and characterize potentially hazardous near-Earth objects, issue warnings of the effects of potential impacts of such objects, and investigate strategies and technologies for mitigating the potential impacts of such objects; and

(3) assist in coordinating government planning for response to a potential impact of a near-Earth object.

(c) DEDICATED SURVEY MISSION.—

(1) SENSE OF CONGRESS.—It is the sense of Congress that—

(A) the Near-Earth Object Surveyor mission, as designed, is anticipated to make significant progress toward carrying out congressional policy and direction, as set forth in section 321(d)(1) of the National Aeronautics and Space Administration Authorization Act of 2005 (Public Law 109–155; 119 Stat. 2922; 51 U.S.C. 71101 note prec.), to detect 90 percent of near-Earth objects equal to, or greater than, 140 meters in diameter; and

(B) the Administrator should prioritize the public safety role of the Near-Earth Object Surveyor mission and should not delay the de-

velopment and launch of the mission due to cost growth on other planetary science missions.

(2) CONTINUATION OF MISSION.—

(A) IN GENERAL.—The Administrator shall continue the development of a dedicated space-based infrared survey telescope mission, known as the ''Near-Earth Object Surveyor'', on a schedule to achieve a launch-readiness date not later than March 30, 2026, or the earliest practicable date, for the purpose of accomplishing the objectives set forth in section 321(d)(1) of the National Aeronautics and Space Administration Authorization Act of 2005 (Public Law 109–155; 119 Stat. 2922; 51 U.S.C. 71101 note prec.).

(B) CONSIDERATION OF RECOMMENDATIONS.—The design of the mission described in subparagraph (A) shall take into account the recommendations of the 2019 report of the National Academies of Sciences, Engineering, and Medicine entitled ''Finding Hazardous Asteroids Using Infrared and Visible Wavelength Telescopes'', the planetary science decadal survey, and the 2018 United States National

Near-Earth Object Preparedness Strategy and Action Plan.

(d) ANNUAL REPORT.—Section 321(f) of the National Aeronautics and Space Administration Authorization Act of 2005 (Public Law 109–155; 119 Stat. 2922; 51 U.S.C. 71101 note prec.) is amended to read as follows:

''(f) ANNUAL REPORT.—Not later than 180 days after the date of the enactment of the National Aeronautics and Space Administration Authorization Act of 2022 and annually thereafter through 90-percent completion of the catalogue required by subsection (d)(1), the Administrator shall submit to the Committee on Commerce, Science, and Transportation of the Senate and the Committee on Science, Space, and Technology of the House of Representatives a report that includes the following:

''(1) A summary of all activities carried out by the Planetary Defense Coordination Office established under section 10825 of the National Aeronautics and Space Administration Authorization Act of 2022 since the date of enactment of that Act.

''(2) A description of the progress with respect to the design, development, and launch of the space-based infrared survey telescope required by section

10825(c) of the National Aeronautics and Space Administration Authorization Act of 2022.

''(3) An assessment of the progress toward meeting the requirements under subsection (d)(1).

''(4) A description of the status of efforts to coordinate and cooperate with other countries to detect hazardous asteroids and comets, plan a mitigation strategy, and implement that strategy in the event of the discovery of an object on a likely collision course with Earth.

''(5) A summary of expenditures for all activities carried out by the Planetary Defense Coordination Office since the date of enactment of the National Aeronautics and Space Administration Authorization Act of 2022''.

(e) NEAR-EARTH OBJECT DEFINED.—In this section, the term ''near-Earth object'' has the meaning given the term in section 321(c) of the National Aeronautics and Space Administration Authorization Act of 2005 (Public Law 109–155; 119 Stat. 2922; 51 U.S.C. 71101 note prec.).

Subtitle C—Aeronautics

SEC. 10831. EXPERIMENTAL AIRCRAFT PROJECTS.

(a) SENSE OF CONGRESS.—It is the sense of Congress that—

(1) developing high-risk, precompetitive aerospace technologies for which there is not yet a profit rationale is a fundamental role of the Administration;

(2) large-scale flight test experimentation and validation are necessary for—

(A) transitioning new technologies and materials, including associated manufacturing processes, for aviation and aeronautics use; and

(B) capturing the full extent of benefits from investments made by the Aeronautics Research Mission Directorate; and

(3) a level of funding that adequately supports large-scale flight test experimentation and validation, including related infrastructure, should be ensured over a sustained period of time to restore the capacity of the Administration—

(A) to see legacy priority programs through to completion; and

(B) to achieve national economic and security objectives.

(b) STATEMENT OF POLICY.—It is the policy of the United States—

(1) to maintain world leadership in—

(A) civilian aeronautical science and technology; and

(B) aerospace industrialization; and

(2) to maintain as a fundamental objective of the aeronautics research of the Administration the steady progression and expansion of flight research and capabilities, including the science and technology of critical underlying disciplines and competencies, such as—

(A) computational-based analytical and predictive tools and methodologies;

(B) aerothermodynamics;

(C) propulsion;

(D) advanced materials and manufacturing processes;

(E) high-temperature structures and materials; and

(F) guidance, navigation, and flight controls.

(c) EXPERIMENTAL AIRCRAFT FLIGHT DEMONSTRATIONS.—

(1) IN GENERAL.—In meeting the objectives described in subsection (b), the Administrator shall carry out experimental aircraft demonstrations, including—

(A) a subsonic demonstrator to demonstrate the performance and feasibility of advanced, ultra-efficient, and low emissions subsonic flight demonstrator configurations;

(B) a low boom flight demonstrator to validate design tools and technologies that can be applied to low sonic boom commercial supersonic aircraft and support the development of a noise-based standard for supersonic overland flight; and

(C) a flight research demonstrator to test the performance and feasibility of advanced, ultra-efficient and net-zero emissions aircraft concepts and configurations.

(2) ELEMENTS.—For each demonstration under paragraph (1), the Administrator shall—

(A) include the development of experimental aircraft and all necessary supporting flight test assets;

(B) pursue a robust technology maturation and flight test validation effort;

(C) improve necessary facilities, flight testing capabilities, and computational tools to support the demonstration;

(D) award any primary contracts for design, procurement, and manufacturing to United States persons, consistent with international obligations and commitments; and

(E) coordinate research and flight test demonstration activities with other Federal agencies and the United States aviation community, as the Administrator considers appropriate.

(3) UNITED STATES PERSON DEFINED.—In this subsection, the term ''United States person'' means—

(A) a United States citizen or an alien lawfully admitted for permanent residence to the United States; or

(B) an entity organized under the laws of the United States or of any jurisdiction within the United States, including a foreign branch of such an entity.

(d) COLLABORATION WITH INDUSTRY AND ACADEMIA.—The Administration shall seek means to expand collaboration with industry and academia on basic research and technology development related to experimental aircraft, and on the experimental aircraft demonstrations required by subsection (c).

(e) ADVANCED MATERIALS AND MANUFACTURING TECHNOLOGY PROGRAM.—

(1) IN GENERAL.—The Administrator may establish an advanced materials and manufacturing technology program—

(A) to develop—

(i) new materials, including composite and high-temperature materials, from base material formulation through full-scale structural validation and manufacture;

(ii) advanced materials and manufacturing processes, including additive manufacturing, to reduce the cost of manufacturing scale-up and certification for use in aeronautics; and

(iii) noninvasive or nondestructive techniques for testing or evaluating aviation and aeronautics structures, including for materials and manufacturing processes;

(B) to reduce the time it takes to design, industrialize, and certify advanced materials and manufacturing processes;

(C) to provide education and training opportunities for the aerospace workforce; and

(D) to address global cost and human capital competitiveness for United States aeronautical industries and technological leadership in advanced materials and manufacturing technology.

(2) ELEMENTS.—In carrying out a program under paragraph (1), the Administrator may—

(A) build on work that was carried out by the Advanced Composites Project of the Administration;

(B) partner with the private and academic sectors, such as members of the Advanced Composites Consortium of the Administration, the Joint Advanced Materials and Structures Center of Excellence of the Federal Aviation Administration, the Manufacturing USA institutes of the Department of Commerce, and national laboratories, as the Administrator considers appropriate;

(C) provide a structure for managing intellectual property generated by the program based on or consistent with the structure established for the Advanced Composites Consortium of the Administration;

(D) ensure adequate Federal cost share for applicable research; and

(E) coordinate with advanced manufacturing and composites initiatives in other mission directorates of the Administration, as the Administrator considers appropriate.

(f) RESEARCH PARTNERSHIPS.—In carrying out the demonstrations under subsection (c) and a program under subsection (e), the Administrator may engage in cooperative research programs with—

(1) academia; and

(2) commercial aviation and aerospace manufacturers.

SEC. 10832. UNMANNED AIRCRAFT SYSTEMS.

(a) UNMANNED AIRCRAFT SYSTEMS OPERATION PROGRAM.—The Administrator shall—

(1) research and test capabilities and concepts, including unmanned aircraft systems communications, for integrating unmanned aircraft systems into the national airspace system;

(2) leverage the partnership NASA has with industry focused on the advancement of technologies for future air traffic management systems for unmanned aircraft systems; and

(3) continue to leverage the research and testing portfolio of NASA to inform the integration of unmanned aircraft systems into the national airspace system, consistent with public safety and national security objectives.

(b) SENSE OF CONGRESS ON COORDINATION WITH FEDERAL AVIATION ADMINISTRATION.—It is the sense of Congress that—

(1) NASA should continue—

(A) to coordinate with the Federal Aviation Administration on research on air traffic management systems for unmanned aircraft systems; and

(B) to assist the Federal Aviation Administration in the integration of air traffic management systems for unmanned aircraft systems into the national airspace system; and

(2) the test ranges (as defined in section 44801 of title 49, United States Code) should continue to be leveraged for research on—

(A) air traffic management systems for unmanned aircraft systems; and

(B) the integration of such systems into the national airspace system.

SEC. 10833. CLEANER, QUIETER AIRPLANES.

(a) INITIATIVE REQUIRED.—Section 40112 of title 51, United States Code, is amended—

(1) by redesignating subsections (b) through (f) as subsections (c) through (g), respectively; and

(2) by inserting after subsection (a) the following:

"(b) RESEARCH AND DEVELOPMENT INITIATIVE ON REDUCTION OF GREENHOUSE GAS AND NOISE EMISSIONS FROM AIRCRAFT.—

"(1) IN GENERAL.—The Administrator shall establish an initiative to research, develop, and demonstrate new technologies and concepts—

"(A) to reduce greenhouse gas emissions from aviation, including carbon dioxide, nitrogen oxides, other greenhouse gases, water vapor, black carbon and sulfate aerosols, and increased cloudiness due to contrail formation;

"(B) to reduce aviation noise emissions; and

"(C) to enable associated aircraft performance characteristics.

"(2) GOALS.—The goals of the initiative required by paragraph (1) shall be—

"(A) to ensure United States leadership in research and technology innovation leading to

substantial reductions in aviation noise and greenhouse gas emissions;

"(B) to enhance and expand basic research, and the translation of basic research into applications, that may lead to transformational advances in reducing aviation noise and greenhouse gas emissions;

"(C) to accelerate research and development that contributes to maturing new technologies for reducing aircraft noise and greenhouse gas emissions; and

"(D) to obtain and disseminate associated testing and performance data that facilitates the incorporation of new technologies into commercial aircraft development as soon as practicable.

"(3) OBJECTIVES.—The objectives of the initiative established under paragraph (1) and the goals described in paragraph (2) shall include—

"(A) as soon as practicable, a reduction of greenhouse gas emissions from new aircraft by at least 50 percent, as compared to the highest-performing aircraft technologies in service as of December 31, 2021;

"(B) noise levels from aircraft throughout all phases of flight that do not exceed ambient noise levels in the absence of flight operations in the vicinity of the flight route;

"(C) net-zero greenhouse gas emissions from aircraft by 2050; and

"(D) demonstration of new technologies developed pursuant to such initiative on—

"(i) regional aircraft intended to enter into service by 2030; and

"(ii) single-aisle aircraft designed to accommodate more than 125 passengers intended to enter into service by 2040.".

(b) TECHNOLOGY FOCUS AREAS.—In carrying out the research and development initiative established under section 40112(b) of title 51, United States Code, the Administrator shall advance research, development, and demonstration projects on promising technologies such as—

(1) advanced subsonic propulsion technology, design, and integration;

(2) electric and hybrid-electric propulsion, including battery electric and hydrogen fuel cell electric systems;

(3) airframe concepts and configurations;

(4) analysis of technology options, including cost-benefit analysis of greenhouse gas and noise emissions reduction technologies;

(5) analytical tools for system-level and system-of-systems-level modeling and integration;

(6) airspace operations improvements;

(7) noise emissions reduction; and

(8) any other effort, as determined by the Administration, that contributes to a sustainable future for aviation.

(c) IMPLEMENTATION.—In implementing the initiative established under section 40112(b) of title 51, United States Code, the Administrator shall, to the extent practicable—

(1) ensure that testing and performance data integrates the results of community acceptance surveys conducted by the Federal Aviation Administration and other relevant studies, including studies on the impacts of new noise effects from novel propulsion systems and from airspace operations changes;

(2) provide testing and performance data on the technologies described in subsection (b) of this section to the Administrator of the Federal Aviation Administration to facilitate the work of the Federal Aviation Administration in identifying new require-

ments for policy, infrastructure, and administrative capacity necessary to enable the safe integration of such technologies on aircraft;

(3) pursue partnerships with organizations, current commercial production aircraft providers, academic institutions, small businesses, and new entrants, including partnerships to advance research and development activities related to both regional aircraft and aircraft designed to accommodate more than 125 passengers;

(4) include universities, academic institutions, and other research organizations in the partnerships described in paragraph (3);

(5) expand basic research;

(6) ensure equity in research sponsorship of, and partnership opportunities with, underrepresented students, faculty, and minority-serving-institutions;

(7) continue to coordinate with the Secretary of Energy on battery technology research;

(8) make available the research and development carried out under the initiative established under subsection (b) of section 40112 of title 51, United States Code, to help enable an industry-wide shift toward aircraft concepts that reduce green-

house gas emissions and aircraft noise to achieve the goals and objectives under paragraphs (2) and (3) of that subsection; and

(9) continue to support research, development, and demonstration of aircraft concepts, including systems architecture, materials and components, integration of systems and airframe structures, human factors, airspace planning and operations, and the integration of related advanced technologies and concepts, with the goal of carrying out test flights with integrated subsystems by 2025.

(d) ANNUAL REPORT.—Not later than 1 year after the date of the enactment of this Act, and annually thereafter, the Administrator shall submit to the appropriate committees of Congress a report on the progress of the efforts carried out under the initiative established under subsection (b) of section 40112 of title 51, United States Code, including—

(1) the status of progress on such initiative;

(2) an updated, anticipated timeframe for readiness of technologies and aircraft to be adopted by industry with the emissions reduction levels directed under that subsection; and

(3) an identification of fundamental aeronautics research activities contributing to achieving the goals

and objectives of such initiative, as described in paragraphs (2) and (3) of that subsection, and a description of any obstacles to achieving such goals and objectives.

Subtitle D—Space Technology

SEC. 10841. SPACE NUCLEAR CAPABILITIES.

(a) NUCLEAR PROPULSION.—

(1) USE IN ROBOTIC AND HUMAN EXPLORATION ACTIVITIES.—The Administrator, in collaboration with other relevant Federal agencies and with industry, shall take all necessary steps to carry out research and development, ground-based testing and in-space testing, and other associated activities to enable the use of space nuclear propulsion in Administration robotic and human exploration activities, including in cargo missions to Mars in the late 2020's and crewed missions to Mars in the 2030's.

(2) SPACE NUCLEAR PROPULSION PROGRAM.—

(A) IN GENERAL.—The Administrator shall establish a space nuclear propulsion program to carry out the activities described in paragraph (1).

(B) ELEMENTS.—The program established under subparagraph (A) shall include the following:

(i) Research and development in both nuclear electric and nuclear thermal propulsion technology maturation efforts, to the extent practicable, and the development of consistent figures of merit across both nuclear electric and nuclear thermal systems, as recommended by the National Academies of Sciences, Engineering, and Medicine in the report entitled ''Space Nuclear Propulsion for Human Mars Exploration'', so as to inform a down-selection of a nuclear electric or nuclear thermal propulsion system by 2026, or as early as practicable.

(ii) Ground-based testing, to the extent practicable, including not less than 1 ground-based test of a full-scale, integrated nuclear propulsion system before any in-space test or demonstration of such system.

(iii) In-space demonstration of a nuclear propulsion system in the late 2020's, which may be carried out as a cargo mission to Mars.

(3) PLAN.—

(A) IN GENERAL.—Not later than 180 days after the date of the enactment of this Act, the Administrator shall submit to the appropriate committees of Congress a plan to achieve an in-space flight test of a nuclear propulsion system that could support the first crewed mission to Mars in the 2030's.

(B) ELEMENTS.—The plan required by subparagraph (A) shall include the following:

(i) A timeline to mature enabling technologies and an outline of major milestones for integration of such technologies into the larger nuclear propulsion system.

(ii) A cost estimate for maturing such technologies.

(iii) A description of facility requirements for the program under paragraph (2) associated with such technologies.

(iv) A description of the manner in which the Administrator will use the efforts described in paragraph (2)(B) to determine whether the in-space flight test should demonstrate a nuclear electric propulsion system or a nuclear thermal propulsion system.

(C) An identification of any policy or regulatory challenges or barriers to conducting such in-space test or any precursor ground-based testing, and a description of options for addressing such challenges or barriers.

(b) NUCLEAR SURFACE POWER PROGRAM.—

(1) ESTABLISHMENT.—The Administrator shall establish a program for research, testing, and development of a space nuclear surface power reactor design.

(2) PLAN.—

(A) IN GENERAL.—The Administrator shall—

(i) develop a plan and timeline for the program established under paragraph (1), taking into consideration mission needs; and

(ii) include in such plan opportunities for participation by United States commercial entities.

(B) SUBMISSION.—Not later than 1 year after the date of the enactment of this Act, the Administrator shall submit to the appropriate committees of Congress the plan developed under subparagraph (A).

(c) ASSESSMENT OF IN-SPACE PROPULSION TESTING FACILITIES.—

(1) IN GENERAL.—The Administrator shall carry out a needs assessment for facilities and technical capabilities required to support ground-based testing of a full-scale, full-power integrated nuclear propulsion system.

(2) ELEMENT.—The assessment required by paragraph (1) shall consider the potential development of facilities that will support long-term research and development of space nuclear propulsion systems.

(3) REPORT.—Not later than 270 days after the date of the enactment of this Act, the Administrator shall submit to the appropriate committees of Congress a report on the results of the assessment carried out under paragraph (1).

SEC. 10842. PRIORITIZATION OF LOW-ENRICHED URANIUM TECHNOLOGY.

(a) IN GENERAL.—The Administrator shall prioritize the use of low-enriched uranium, including high-assay low-enriched uranium, for space nuclear research and development, including ground and in-space testing and other related demonstration activities carried out under this title.

(b) INTERAGENCY COLLABORATION.—The Administrator shall, to the extent practicable, collaborate and coordinate with the Secretary of Defense, the Secretary of Energy, and the heads of other relevant Federal agencies on technology development, knowledge exchange, lessons learned regarding nuclear power and propulsion technologies, common fuels, flight demonstrations, and operational systems production for space applications.

(c) REPORT ON NUCLEAR TECHNOLOGY PRIORITIZATION.—Not later than 120 days after the date of the enactment of this Act, the Administrator shall submit to the appropriate committees of Congress a report that details the actions taken and planned, including a timeline for such actions, to implement subsection (a).

Subtitle E—STEM Engagement

SEC. 10851. OFFICE OF STEM ENGAGEMENT.

(a) SENSE OF CONGRESS.—It is the sense of Congress that NASA's inspiring mission, specialized facilities, skilled engineering and scientific workforce, and research activities present unique opportunities for inspiring public engagement in STEM and increasing the number of students pursuing STEM degrees and careers.

(b) ESTABLISHMENT.—The Administrator shall establish an Office of STEM Engagement (referred to in this section as the ''Office'') for the purpose of advancing

progress toward the STEM education goals of the United States by enhancing STEM literacy, increasing diversity, equity, and inclusion in STEM, and preparing the STEM workforce for the future.

(c) RESPONSIBILITIES.—The Office established shall be responsible for coordinating efforts and activities among organizations across the Administration, including NASA headquarters, mission directorates, and NASA centers, designed—

(1) to create unique opportunities for students and the public to learn from and contribute to the work of NASA in exploration and discovery;

(2) to contribute to the growth of a diverse STEM workforce; and

(3) to strengthen public understanding of science by enabling connections to the mission and work of NASA.

(d) PORTFOLIO.—The Office shall coordinate and administer—

(1) the National Space Grant College and Fellowship Program under chapter 403 of title 51 United States Code;

(2) the Established Program to Stimulate Competitive Research under section 40903 of title 51 United States Code;

(3) the Minority University Research and Education Project;

(4) the NextGen STEM Project; and

(5) any other program or activity the Administrator considers appropriate.

(e) TECHNICAL AMENDMENTS.—Section 40903 of title 51, United States Code, is amended—

(1) in the section heading, by striking "**Experimental**" and inserting "**Established**"; and

(2) in subsection (a), by striking ''Experimental'' and inserting ''Established''.

Subtitle F—Miscellaneous

SEC. 10861. PROGRAM, WORKFORCE, AND INDUSTRIAL BASE REVIEWS.

(a) REPORT ON INDUSTRIAL BASE FOR CIVIL SPACE MISSIONS AND OPERATIONS.—

(1) IN GENERAL.—Not later than 1 year after the date of the enactment of this Act, and from time to time thereafter, the Administrator shall submit to the appropriate committees of Congress a report on the United States industrial base for NASA civil space missions and operations.

(2) ELEMENTS.—The report required by paragraph (1) shall include the following:

(A) A comprehensive description of the current status of the United States industrial base for NASA civil space missions and operations.

(B) A description and assessment of the weaknesses in the supply chain, skills, manufacturing capacity, raw materials, key components, and other areas of the United States industrial base for NASA civil space missions and operations that could adversely impact such missions and operations if unavailable.

(C) A description and assessment of various mechanisms to address and mitigate the weaknesses described pursuant to subparagraph (B).

(D) A comprehensive list of the collaborative efforts, including future and proposed collaborative efforts, between NASA and the Manufacturing USA institutes of the Department of Commerce.

(E) An assessment of—

(i) the defense and aerospace manufacturing supply chains relevant to NASA in each region of the United States; and

(ii) the feasibility and benefits of establishing a supply chain center of excellence in a State in which NASA does not, as of the date of the enactment of this Act, have a research center or test facility.

(F) Such other matters relating to the United States industrial base for NASA civil space missions and operations as the Administrator considers appropriate.

(b) WORKFORCE AND MODELING AND TEST FACILITIES.—

(1) REVIEW.—

(A) IN GENERAL.—The Administrator shall enter into an arrangement with the National Academies of Sciences, Engineering, and Medicine to carry out a comprehensive review of the workforce, skills-base, and modeling and test facilities of the Administration.

(B) ELEMENTS.—The review conducted under subparagraph (A) shall include the following:

(i) A consideration of the use of emerging technologies in relevant engineering and science disciplines and the skills needed to apply such capabilities to Ad-

ministration missions across all mission directorates.

(ii) Prioritized recommendations on actions needed to align the Administration's workforce with research objectives and strategic goals and on the improvements and additions to modeling capabilities and test facilities needed to meet the Administration's strategic goals and objectives.

(C) REPORT.—Not later than 18 months after the date of the enactment of this Act, the Administrator shall submit to the appropriate committees of Congress report on the results of the review conducted under subparagraph (A).

(2) IMPLEMENTATION PLAN.—Not later than 120 days after the date on which the review under paragraph (1) is completed, the Administrator shall submit to the appropriate committees of Congress a plan for implementing the recommendations contained the review.

(3) REPORT ON NASA INFRASTRUCTURE, WORKFORCE SKILLS AND CAPABILITIES.—

(A) POLICY AND PROCEDURE.—

(i) IN GENERAL.—The Administrator shall develop an Administration policy and procedure for assessment, not less frequently than every 5 years, of the strategic capabilities of the Administration, including infrastructure and facilities, and workforce skills and capabilities.

(ii) ELEMENTS.—The policy and procedure developed under clause (i) shall include acquiring data and support for Administration decisions and recommendations on strategic capabilities, including on infrastructure and facilities, and workforce skills and capabilities needed to support the goals and objectives of the Administration through 2040.

(B) REPORT.—Not later than 1 year after the date of the enactment of this Act, the Administrator shall submit the policy and procedure developed under subparagraph (A) to the appropriate committees of Congress.

(4) INDEPENDENT PROGRAM ANALYSIS AND EVALUATION OFFICE.—

(A) ESTABLISHMENT.—The Administrator shall establish within NASA an Independent

Program Analysis and Evaluation Office (referred to in this paragraph as the ''Office'') for purposes of independently assessing program performance, making programmatic, technical risk mitigation and institutional recommendations, performing cost estimates and analyses, and conducting strategic planning activities, among other functions.

(B) INDEPENDENCE.—The Office shall remain independent of any program, and shall have no programmatic responsibilities, so as to maintain its independent assessment integrity.

(C) ACTIVITIES AUTHORIZED.—In conducting the functions of the Office, the Administrator may carry out—

(i) research on program assessment;

(ii) cost, schedule, and technical estimation; and

(iii) other relevant activities for the purposes of obtaining the highest level of expertise and the most effective decision-making tools with which to inform the Administrator.

(D) MOON TO MARS ACTIVITIES.—The Office shall maintain an ongoing, focused effort to

assess the goals, objectives, requirements, architectural approach, cost and schedule, and progress of the Administration's Moon to Mars activities.

(5) INTERNATIONAL SPACE STATION.—Not later than 1 year after the date of the enactment of this Act, the Administrator shall submit to the appropriate committees of Congress the results of an independent estimate by the Office of the cost of continuing International Space Station operations through September 30, 2030, including—

(A) crew and cargo transportation, research to be undertaken reflecting the priorities described in section 10816, and maintenance costs; and

(B) opportunities for operational efficiencies that could result in cost savings and increased research productivity and the amount of those potential savings and productivity increases.

SEC. 10862. MODIFICATION OF LEASE OF NON-EXCESS PROPERTY.

(a) IN GENERAL.—Section 20145 of title 51, United States Code, is amended in subsection (g), in the first sen-

tence, by striking ''December 31, 2022'' and inserting ''December 31, 2032''.

(b) REPORTING REQUIREMENTS.—Subsection (f) of such section is amended by adding at the end the following:

''(3) ANNUAL AND CUMULATIVE NUMBER OF LEASES.—The annual and cumulative number of leases entered into under this section, by National Aeronautics and Space Administration center and facility.

''(4) ESTIMATED COST SAVINGS.—For each active lease agreement under this section, the estimated cost savings to the Administration resulting from reduced maintenance, operating, and associated costs in the previous fiscal year.

''(5) OTHER QUANTIFIABLE BENEFITS.—Other quantifiable benefits, including additional cost savings not included under paragraph (4), to the Administration resulting from the use of leases under this section.''.

(c) REPORT ON REQUIREMENTS.—Such section is further amended—

(1) by redesignating subsection (g) as subsection (h); and

(2) by adding after subsection (f) the following:

"(g) REPORT ON ENHANCED-USE LEASING REQUIREMENTS.—Not later than 270 days after the date of the enactment of the National Aeronautics and Space Administration Authorization Act of 2022, the Administrator shall prepare and submit to the Committee on Commerce, Science, and Transportation of the Senate and the Committee on Science, Space, and Technology of the House of Representatives a report on existing requirements for applicants seeking a lease under this section, including—

"(1) any requirement related to the involvement of foreign entities, foreign entity ownership, and foreign entity investment; and

"(2) at the discretion of the Administrator, any other requirement related to the protection and security of Administration missions and facilities.".

DIVISION C—SUPPLEMENTAL APPROPRIATIONS TO ADDRESS THREATS TO THE SUPREME COURT OF THE UNITED STATES

The following sums are appropriated, out of any money in the Treasury not otherwise appropriated, for the fiscal year ending September 30, 2022, and for other purposes, namely:

TITLE I

DEPARTMENT OF JUSTICE

UNITED STATES MARSHALS SERVICE

SALARIES AND EXPENSES

For an additional amount for ''Salaries and Expenses'', $10,300,000, to remain available until September 30, 2023, for expenses necessary to address threats to the Supreme Court of the United States.

TITLE II

THE JUDICIARY

SUPREME COURT OF THE UNITED STATES

SALARIES AND EXPENSES

For an additional amount for ''Salaries and Expenses'', $9,100,000, to remain available until September 30, 2023, for expenses necessary to address threats to the Supreme Court of the United States.

TITLE III

GENERAL PROVISIONS—THIS ACT

SEC. 301. Each amount appropriated or made available by this Act is in addition to amounts otherwise appropriated for the fiscal year involved.

SEC. 302. No part of any appropriation contained in this Act shall remain available for obligation beyond the current fiscal year unless expressly so provided herein.

SEC. 303. Unless otherwise provided for by this Act, the additional amounts appropriated by this Act to appropriations accounts shall be available under the authorities and conditions applicable to such appropriations accounts for fiscal year 2022.

SEC. 304. Each amount provided by this Act is designated by Congress as being for an emergency requirement pursuant to section 4001(a)(1) and section 4001(b) of S. Con. Res. 14 (117th Congress), the concurrent resolution on the budget for fiscal year 2022.

This division may be cited as the ''Supreme Court Security Funding Act of 2022''.