

One Hundred Seventeenth Congress
of the
United States of America

AT THE SECOND SESSION

*Begun and held at the City of Washington on Monday,
the third day of January, two thousand and twenty-two*

An Act

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

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

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Except as expressly provided otherwise, an reference to "this Act" contained in an addition of this Act shall be read as referring only to the provision of this Act.

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 SEMI-CONDUCTORS (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 Incentive to Produce Semiconductors (CHIPS) for America Fund” (referred to in this section as the “Fund”) for the Secretary of Commerce to carry out section 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 section 9904 and 9906 of Public Law 116 283 shall be transferred to and merged with amounts in the Department of Commerce to be used for the purpose, 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 the purpose, there is appropriated to the Fund established in section (a)(1), 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 section (c) of section 9906 of Public Law 116 283, \$2,500,000,000 shall be for section (d) of section 9906 of Public Law 116 283, and \$500,000,000 shall be for section (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 section (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 section (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 section (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 section (c), (d), (e), and (f) of section 9906 of Public Law 116 283.

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

(i) up to \$6,000,000,000 of the amount made available for fiscal year 2022 for section 9902 of Public Law 116 283 for the cost of direct loan and loan guarantee, authorized by section 9902 of Public Law 116 283, provided—

(I) each cost, including the cost of modifying each loan and loan guarantee shall be as defined in section 502 of the Congressional Budget Act of 1974; and

(II) the funds are available to bind the obligation for the principal amount of direct loan and total loan principal, and part of, which may be guaranteed, not to exceed \$75,000,000,000;

(ii) up to 2 percent of the amount made available in each fiscal year for salaries and expense, administration, and other proper cost of section 9902 and 9906 of Public Law 116 283, of which \$5,000,000 in each of fiscal year 2022 through 2026 shall be transferred to the Office of Inspector General of the Department of Commerce to cover the expenditure from the Fund; and

(iii) up to \$2,300,000 of the amount 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 provided Federal financial assistance to conduct incentive programs in equipment and equipment in the United States for the fabrication, assembly, testing, or packaging of microelectronics mature technology node under subsection (e) of that section, authorized 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 allocation of the full amount made available under subsection (a)(2)

(i) for fiscal year 2022 and 2023, no later than 60 days after the date of enactment of this Act; and

(ii) for each subsequent fiscal year through 2026, a 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 Committee on Appropriation of the House of Representatives and the Senate may provide for alternate allocation of amount made available under subsection (a)(2), including budget account, program, and project.

(ii) ALLOCATION BY PRESIDENT.

(I) NO ALTERNATE ALLOCATIONS. If Congress has not enacted legislation establishing alternate allocation, including budget account, program, and

project, by the date on which the Act making fiscal year appropriations for the Department of Commerce and Justice, Science, and Related Agencies for the applicable fiscal year is enacted into law, only when the amount made available under subsection (a)(2) be allocated by the President or apportioned or allocated by account, program, and project pursuant to title 31, United States Code.

(II) INSUFFICIENT ALTERNATE ALLOCATION. If Congress enacts legislation establishing alternate allocation, including by account, program, and project, for amounts made available under subsection (a)(2) that are less than the full amount appropriated under subsection (a)(2), the difference between the amount appropriated and the alternate allocation shall be allocated by the President and apportioned and allocated 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 be used for construction of facilities.

(2) APPROPRIATION. In addition to amounts otherwise available for such purposes, there is appropriated to the Fund the amounts established in subsection (b)(1), 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 allocation of the full amount made available under subsection (b)(2)

(i) for fiscal year 2023, no later than 60 days after the date of enactment of this Act; and

(ii) for each subsequent fiscal year through 2027, a 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 Committee on Appropriation 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 allocation, including by account, program element, and project, by the date on which the Accounting Full-Year Appropriation for the Department of Defense for the applicable fiscal year is enacted in law, only the amount made available under subsection (b)(2) be allocated by the President or apportioned or allocated by account, program element, and project pursuant to title 31, United States Code.

(II) INSUFFICIENT ALTERNATE ALLOCATION. If Congress enacts legislation establishing alternate allocation, including by account, program element, and project, for amounts made available under subsection (b)(2) that are less than the full amount appropriated under subsection (b)(2), the difference between the amount appropriated and the alternate allocation shall be allocated by the President and apportioned and allocated 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 communication technology security and semiconductor supply chain resilience, including to support the development and adoption of secure and trusted electronic technologies, secure semiconductor, secure semiconductor supply chain, and other emerging technologies and to carry out section 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)), a appropriate amount in the Fund shall be transferred by the Secretary of State to account, within the Department of State, the United States Agency for International Development, the Export-Import Bank, and the United States International Development Finance Corporation, a appropriate, to be used for such purpose and under the terms and conditions of the account, which transferred.

(2) APPROPRIATION.

(A) In addition to amounts otherwise available for such purpose, here is appropriated to the Fund established in subsection (c)(1), of amount 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 his obligation, the Secretary of State may expend up to \$5,000,000 of the amount made available in each fiscal year for the Fund foralaria and expense, administration, and other 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 expenditure under the Fund.

(3) ALLOCATION AUTHORITY.

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

(i) for fiscal year 2023, no later than 90 days after the date of enactment of this Act; and

(ii) for each subsequent fiscal year through 2027, a 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 Committee on Appropriation of the House of Representatives and the Senate may provide for alternate allocation of amount made available under subsection (c)(2), including account, program, project, and activity.

(ii) ALLOCATION BY PRESIDENT.

(I) NO ALTERNATE ALLOCATIONS. If Congress has not enacted legislation establishing alternate allocation, including account, program, project, and activity, by the date on which the Act making fiscal year appropriation for the Department of State, Foreign Operations, and Related Program for the applicable fiscal year is enacted into law, only the amount made available under subsection (c)(2) be allocated by the President or appropriated or allocated by account, program, project, and activity pursuant to title 31, United States Code.

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

project, and activities 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 Incentive to Produce Semiconductors (CHIPS) for America Workforce and Education Fund" (referred to in this section as the "Fund") for the National Science Foundation for microelectronic 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 section (d)(1), of amounts in the Treasury no other than 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 allocation of the full amount made available under paragraph (2)

(i) for fiscal year 2023, no later than 60 days after the date of enactment of this Act; and

(ii) for each subsequent fiscal year through 2027, a 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 Committee on Appropriation 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 allocation, including by account, program, and project, by the date on which the Act making fiscal year appropriation for the Department of Commerce and Justice, Science, and Related Agencies for the applicable fiscal year is enacted in whole, only then shall amounts made available under section (d)(2) be allocated by the President or apportioned or allocated by account, program, and project pursuant to title 31, United States Code.

(II) INSUFFICIENT ALTERNATE ALLOCATION. If Congress enacts legislation establishing alternate allocation, including budget, program, and project, for amounts made available under subsection (d)(2) hereafter, the difference between the amount appropriated and the alternate allocation shall be allocated by the President and appropriated and allocated by budget, program, and project pursuant to rule 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 “Containing Fund, Section 5649 of the Federal Administration (89-5649-02-271).” 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 International 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 effect 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 effect of this section shall not be entered on any PAYGO scorecard maintained for reporting of section 4106 of H. Con. Res. 71 (115th Congress).

(3) CLASSIFICATION OF BUDGETARY EFFECTS. Notwithstanding Rule 3 of the Budget Scorekeeping Guidelines for 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 effect of this section shall not be estimated

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

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

(C) for reporting 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 through the criteria for eligible use of amounts under section 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 applicable under section 9903(b) of such Act

(15 U.S.C. 4653(b)), and the definition under 9906(c)(2) of such Act (15 U.S.C. 4656(c)(2))

(A) to purchase an equity interest held on a national exchange of such person or an parent company of such person; or

(B) to participate in or make other capital distribution which represents the common stock (or equivalent interest) of the person.

(2) COVERED FUND. In this section, 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 public 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 semiconductor." and inserting "of semiconductor, material used in manufacturing semiconductor, 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 area of related industry or related industry group

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

"(ii) for which the applicable industry group or group in the North American Industry Classification System code is listed

"(I) manufacturing primary production and parts, the sum of which accounts for no less than 5 percent of the manufacturing value added by industry group domestic production of the United States; and

"(II) employment directly for primary production and parts manufacturing activities, combined, accounts for no less than 5 percent of manufacturing employment in the United States; and

"(B) manufacturing other manufacturing industry designated by the Secretary based on the relevance of

the manufacturing industry of the national and economic security of the United States, including the impact of job loss.”; and

(4) by inserting after paragraph (6), a sentence, to read, as follows:

“(7) The term ‘foreign concern of concern’ means

“(A) a concern having a covered nation (as defined in section 4872(d) of title 10 United States Code); and

“(B) an concern having the Secretary, in consultation with the Secretary of Defense, the Secretary of State, and the Director of National Intelligence, determine to be engaged in conduct having detrimental to the national security or foreign policy of the United States.”; and

(5) by inserting after paragraph (9), a sentence, to read, as follows:

“(10) The term ‘manufacturing 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 fabrication”;

(B) by inserting “product ion,” before “or research and development”; and

(C) by striking the period at the end and inserting “of semiconductor, material used to manufacture semiconductor, 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 clause (III), by striking “and” at the end;

(ii) in clause (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, material, or research and development the covered entity will produce at the facility described in clause (i); and

“(bb) the category, or category of category, of component, or which the covered entity plans to sell the semiconductor technology, equipment, material, or research and development described in item (aa); and

“(VI) determined, on the basis of a practicable, workforce need and developed a strategy to meet such workforce need consistent with the commitments described in clause (II) and (III);”;

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

“(iii) the project described in clause (i), the coordinated entity has an effective plan to identify and mitigate relevant economic or supply chain security risks, including availability, confidentiality, integrity, and a lack of geographic diversification in the coordinated entity’s supply chain; and

“(i) the project for the production, assembly, or packaging of economic or , the coordinated entity has implemented policies and procedures to combat cloning, counterfeiting, and relabeling of economic or , as applicable.”;

(D) in paragraph (C)

(i) in clause (i)

(I) in clause (II), by striking “in the interest of the United States” and inserting “in the economic and national security interest of the United States”; and

(II) in clause (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 (); and

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

“(iii) the Secretary shall consider the type of economic or technology produced by the coordinated entity and whether the economic or technology advances the economic and national security interest of the United States ;

“(i) the Secretary may not approve an application, unless the coordinated entity provides a plan that does not use Federal financial assistance to support efforts to physically relocate or shifting facilities infrastructure to another jurisdiction within the United States , unless the project is in the interest of the United States ; and”;

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

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

“(D) PRIORITY. In awarding Federal financial assistance to coordinated entities under this section, the Secretary shall

“(i) give priority to entities that have coordinated entities receiving financial assistance, will

“(I) manufacture economic or 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 economic or necessary for the national 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 awarded to coordinated entities is for both advanced and mature technology nodes to meet the priorities described in clause (i).”;

(3) in section (a)(4)(A), by striking “set” for “economic or” and inserting “set” for “purpose”;

(4) in + b ec ion (a)(5)

- (A) in + b paragraph (A), b riking "major";
- (B) in + b paragraph (D), b riking "major"; and
- (C) in + b paragraph (E)(i), b riking "major";

(5) b in er ing af er + b ec ion (a)(5) he follq ing:

"(6) EXPANSION CLAWBACK.

"(A) DEFINITION OF LEGACY SEMICONDUCTOR.

"(i) IN GENERAL. In hi paragraph, he erm 'legac emicond c or'

"(I) incl de

"(aa) a emicond c or echnolog ha i of he 28 nanome er genera ion or older for logic;

"(bb) i h re pec o memor echnolog , analog echnolog , packaging echnolog , and an o her rele an echnolog , an legac genera ion of emicond c or echnolog rel- a i e o he genera ion de cribed in i em (aa), a de rmined b he Secre ar , in con+ l a- ion , i h he Secre ar of Defen e and he Direc or of Na ional In elligence; and

"(cc) an addi ional emicond c or ech- nolog iden ified b he Secre ar in a p blic no ice i + ed+ nder clæ e (ii); and

"(II) doe no incl de a emicond c or ha i cri cal o na ional eæ ri , a de rmined b he Secre ar , in con+ l a ion , i h he Secre ar of Defen e and he Direc or of Na ional In el- ligence.

"(ii) UPDATES. No la er han 2 ear af er he da e of enac men of he CHIPS Ac of 2022, and no le freq en l han once e er 2 ear hereaf er for he 8- ear period af er he la a ard+ nder hi ec ion i made, he Secre ar , af er p blic no ice and an oppor+ ni for commen and if applicable and nec- e ar , hall i + e a p blic no ice iden if ing an addi- ional emicond c or echnolog incl ded in he meaning of he erm 'legac emicond c or' + nder clæ e (i).

"(iii) FUNCTIONS OF THE SECRETARY. The f nc- ion of he Secre ar + nder hi paragraph hall no be + bjec o ec ion 551, 553 hræ gh 559, and 701 hræ gh 706 of i le 5, Uni ed S a e Code.

"(i) CONSULTATION. In carr ing æ clæ e (ii), he Secre ar hall con+ l , i h he Direc or of Na ional In elligence and he Secre ar of Defen e.

"() CONSIDERATIONS. In carr ing æ clæ e (ii), he Secre ar hall con ider

"(I) a e-of- he-ar emicond c or echnologie in he Uni ed S a e and in erna ionall , incl ding in foreign cæ n rie of concern; and

"(II) con i enc , i h eæ por con rol rela ing o emicond c or .

"(B) DEFINITION OF SEMICONDUCTOR MANUFAC- TURING. In hi paragraph, he erm 'emicond c or man fac+ ring'

“(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) include from -end emiconduct or fabrication.

“(C) REQUIRED AGREEMENT.

“(i) IN GENERAL. On or before the date on which the Secretary and Federal financial assistance of 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 emiconduct or 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 emiconduct or ; or

“(II) significant transaction involving the material expansion of emiconduct or manufacturing capacity that

“(aa) produce legacy emiconduct or ; and

“(bb) predominate over 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, with respect 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 transaction of the covered entity involving the material expansion of emiconduct or 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. No 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 should 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) has a planned significant

ran action of a covered entity in violation of the agreement of the covered entity required under paragraph (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 of notice and provide to the Secretary the tangible proof described in paragraph (I).

“(iii) FAILURE BY THE COVERED ENTITY TO CEASE OR REMEDY THE ACTIVITY. Subject to clause (i), if a covered entity fails to remedy a violation after 90 days under clause (ii), the Secretary shall recover the full amount of the Federal financial assistance provided to the covered entity under this section.

“(i) 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 would violate the agreement required under paragraph (C)(i) could take measures in connection with the transaction to mitigate an risk to national security, the Secretary

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

“(II) may take the recovery requirements 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 paragraph (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), an 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 an administrative or judicial action or proceeding.

“(II) Information that a covered entity has consented to be disclosed to the public.

“(III) Information necessary to fulfill the requirements of the congressional notification under paragraph (H).

“(H) CONGRESSIONAL NOTIFICATION. No later than 60 days after the date on which the Secretary finds a violation

be a condition of an agreement required under paragraph (C)(i), and after providing the condition with an opportunity to provide information in response to his finding, the Secretary shall provide to the appropriate Committee of Congress

“(i) a notification of the violation;

“(ii) a brief description of how the Secretary determined the condition to be in violation; and

“(iii) a summary of an action or planned action by the Secretary in response to the violation.

“(I) REGULATIONS. The Secretary make any regulations implementing this paragraph.”; and

(6) by adding at the end the following:

“(d) SENSE OF CONGRESS. In the event of Congress has, in carrying out subsection (a), the Secretary should allocate funds in a manner that

“(1) strengthen the energy and resilience of the semiconductor supply chain, including by mitigating gaps and vulnerabilities;

“(2) provide a supply of energy semiconductor relevant for national energy;

“(3) strengthen the leadership of the United States in semiconductor technology;

“(4) grow the economy of the United States and support job creation in the United States;

“(5) bolster the semiconductor and skilled technical workforce in the United States;

“(6) promote the inclusion of economically disadvantaged individuals and small businesses; and

“(7) improve the resilience of the semiconductor supply chain 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 provide Federal financial assistance to conditionally encourage investment in facilities and equipment in the United States for the fabrication, assembly, testing, or packaging of semiconductor or mature technology nodes.

“(2) ELIGIBILITY AND REQUIREMENTS. In order for an entity to qualify to receive Federal financial assistance under this subsection, the condition 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 material for the fabrication, assembly, testing, or packaging of semiconductor or mature technology nodes in the United States; or

“(ii) fabricate, assemble, test, or package semiconductor or mature technology nodes in the United States;

“(D) committing an Federal financial assistance received under this section to increase the production of semiconductor or mature technology nodes; and

“(E) be subject to the conditions described in subsection (a)(2)(C).

"(3) PROCEDURES. In granting Federal financial assistance to be expended in the United States under this section, the Secretary may take the procedure established under this section (a).

"(4) CONSIDERATIONS. In addition to the consideration described in this section (a)(2)(C), in granting Federal financial assistance under this section, the Secretary may consider whether a covered entity produces or applies equipment or material used in the fabrication, assembly, testing, or packaging of microelectronics manufacturing technology hardware necessary to support a critical manufacturing industry.

"(5) PRIORITY. In awarding Federal financial assistance to be expended in the United States under this section, the Secretary shall give priority to covered entities that support the resiliency of microelectronics supply chain for critical manufacturing industries in the United States.

"(6) AUTHORIZATION OF APPROPRIATIONS. There are authorized to be appropriated to the Secretary to carry out this section \$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 this section (a) and this section, the Secretary may make or guarantee a loan to be expended in the United States financial assistance under this section.

"(2) CONDITIONS. The Secretary may elect eligible projects to receive loan or loan guarantee under this section 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 other criteria that may be established and published by the Secretary; and

"(B) the amount of the loan (when combined with any amount available to the loan recipient 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 reasonable available);

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

"(C) cash flow and other revenue enhancements;

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

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

“(ii) heretofore the loan term after the project is completed;

“(E) the financial strength of the investor and strategic partner of the corporation, 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 section

“(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 of the Department of the Treasury for obligation of comparable maturity; and

“(B) shall have a term of no more than 25 years.

“(5) ADDITIONAL TERMS. A loan or grant provided under this section may include any other term and condition that the Secretary determines to be appropriate.

“(6) RESPONSIBLE LENDER. No loan may be granted under this section, 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. No loan may be obligated and no loan grant may be committed under this section, unless appropriate provision of budget authority is made 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 grant provided under this section shall provide that no provision of the loan agreement may be amended, waived, or otherwise modified by the Secretary.

“(h) OVERSIGHT. No later than 4 years after the termination of the first financial award under this section (a), the Inspector General of the Department of Commerce shall audit the program under this section once.

“(1) the eligible recipients for corporations that are receiving financial assistance under the program are met;

“(2) the eligible entities that receive financial assistance under the program in accordance with the requirements of this section;

“(3) the eligible corporations that are receiving financial assistance under the program have carried out the commitments made in their contracts and commitments under this section (a)(2)(B)(ii)(II) by the appropriate date for completion established by the Secretary under this section (a)(5)(A);

“(4) the eligible recipients of the loan agreements entered into by corporations and the Secretary under this section (a)(6)(C)(i), including the notification process, have been carried out to provide corporations with efficient guidance about a violation of the required agreement;

“(5) the Secretary has provided a written notification to the Secretary 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 is in violation under subsection (a)(6)(E); and
 “(6) the Secretary has efficiently received and covered entity engaging in a limited 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 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 clause (II), by inserting “, including for technologies based on organic and inorganic material” after “component”; and

(B) in clause (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 “promoting of advanced semiconductor technology”; and

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

(B) in paragraph (2)

(i) in paragraph (B), by inserting “and capabilities” before “and investment”; and

(ii) by striking paragraph (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, in support of higher education, and workforce training entities to increase and expand geographically diverse participation in graduate, undergraduate, and community college program relevant to microelectronics, including through

“(i) the development and dissemination of expertise and research training experience; and

“(ii) the development of workforce training program and apprenticeship in advanced microelectronics design, research, fabrication, and packaging capabilities.”;

(3) in subsection (d)

(A) by striking “the Manufacturing USA initiative” and inserting “a Manufacturing USA initiative”; and

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

(4) in subsection (f)

(A) in the manner preceding paragraph (1)

(i) by striking "a Manufacturing USA Initiative" and inserting "no more than 3 Manufacturing USA Initiatives";

(ii) by striking "initiated on economic or manufacturing" and inserting "are focused on economic or manufacturing. The Secretary of Commerce may award financial assistance to a Manufacturing USA Initiative for work relating to economic or manufacturing"; and

(iii) by striking "Such initiative may emphasize" and inserting "Such initiative may emphasize"; and

(5) by adding at the end the following:

"(h) CONSTRUCTION PROJECTS. Section 602 of the Public Work 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 that may be necessary and appropriate to the Secretary considered appropriate;

"(2) make advance payments under agreements and other transactions authorized under paragraph (1), in accordance with 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 property and in emergency cases of property and contracts in accordance with section 3109 of title 5, United States Code;

"(5) notwithstanding section 3104 of title 5, United States Code, or the provision of another law relating to the appointment, number, classification, or compensation of employees, make appointments of civilian, engineering, and professional personnel, and fix the basic pay of such personnel at a rate to be determined by the Secretary at a rate not in excess of the highest annual compensation payable at the rate determined under section 104 of title 3, United States Code, except that the Secretary shall appoint no 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, in or with reimbursement, an service, equipment, personnel, or facilities of that Federal agency; and

"(7) establish a checklist, regulation, and procedure as the Secretary considered appropriate.

"(b) REQUIREMENT. Any funds received from a payment made by a person or entity pursuant to a transaction (a)(3) shall be credited

o and merged, in the account from which + ppor o the person or entity made”.

(e) CONFORMING AMENDMENT. The table of contents for division H of title XCIX of the William M. (Mac) Thornberr 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 authorization.”.

SEC. 104. OPPORTUNITY AND INCLUSION.

(a) ESTABLISHMENT. No later than 180 days after the date of enactment of this Act, the Secretary of Commerce shall establish in the Department of Commerce, within the program established under section 9902 of the William M. (Mac) Thornberr National Defense Authorization Act for Fiscal Year 2021 (15 U.S.C. 4652), to carry out his section + ing fund appropriated under this Act.

(b) IN GENERAL. The Secretary of Commerce shall assign personnel to lead and support the activities carried out under his section, including coordination, in 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 his section shall

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

(2) enter each covered entity, as defined in section 9901 of the William M. (Mac) Thornberr National Defense Authorization Act for Fiscal Year 2021 (15 U.S.C. 4651), has awarded financial assistance under section 9902 of this 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 his section by the date for completion established by the Secretary of Commerce under subsection (a)(5)(A) of his section; and

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

(d) STAFF. The activities under his section shall be funded as the appropriate level to carry out the function and responsibility under his section + n the 95 percent of the amount of funds made available for the program established under section 9902 of the William M. (Mac) Thornberr National Defense Authorization Act for Fiscal Year 2021 (15 U.S.C. 4652) have been expended.

(e) REPORT. Beginning on the date hereinafter the date on which the Secretary of Commerce establishes the activities described in subsection (c), the Secretary of Commerce shall submit to the appropriate committee of Congress, as defined in section 9901(1) of the William M. (Mac) Thornberry National Defense Authorization 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 activities 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 subsection (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 action to address shortages in the semiconductor or supply chain, including

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

“(II) additional incentives, a national and global scale, to accelerate utilization of leading-edge semiconductor nodes to address shortages in mature semiconductor nodes; and”;

(B) in subsection (C)

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

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

“() headquarters are supporting the semiconductor or need of critical infrastructure industries in the United States, including those industries designated by the Cybersecurity and Infrastructure Security Agency as essential infrastructure industries; and”;

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

“(D) drawing on data made available by the Department of Labor or otherwise, on the extent practicable, an analysis of

“(i) semiconductor industry data regarding bottlenecks that are

“(I) majorly required and controlled by minority

industries;

“(II) majorly required and controlled by women;

or

“(III) majorly required and controlled by both women and minority industries;

“(ii) the number and amount of contracts and subcontracts awarded by each covered entity during fiscal year made available under subsection (a) disaggregated by recipient of each such contract or subcontract that are majorly required and controlled by minority industries and majorly required and controlled by women; and

“(iii) aggregated workforce data, including data by race or ethnicity, sex, and job category.”.

(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 individual and majority owned and controlled by women)” after “or, hom”.

SEC. 106. APPROPRIATIONS FOR WIRELESS SUPPLY CHAIN INNOVATION.

(a) DIRECT APPROPRIATIONS. In addition to amount otherwise available for such purpose, 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)), of amount in the Treasury no 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 amount made available under subsection (a)

(1) no more than 5 percent of the amount allocated pursuant to subsection (c) in any given fiscal year made available by the Assistant Secretary of Commerce for Communication and Information to administer the program funded from the Public Wireless Supply Chain Innovation Fund; and

(2) no 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 activities conducted in connection.

(c) ALLOCATION AUTHORITY.

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

(A) for fiscal year 2022 and 2023, no later than 60 days after the date of enactment of this Act; and

(B) for each subsequent fiscal year through 2032, a 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 Committee on Appropriation of the House of Representatives and the Senate may provide for alternate allocation of amount recommended for allocation in any given fiscal year from amount 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 allocation, including by account, program, and project, by the date on which the Act making fiscal year appropriation for the Department of Commerce and Justice, Science, and Related Agencies for the applicable fiscal

ear i enac ed in o la , onl hen hall amon recommended for allocation for ha fi cal ear from amon made a ailable+ nder + b ec ion (a) be alloca ed b he Pre iden or appor ioned or allo ed b accon , program, and projec pr+ an o ile 31, Uni ed S a e Code.

(ii) INSUFFICIENT ALTERNATE ALLOCATION. If Congre enac legi la ion e abli hing al erna e allocation , incl ding b accon , program, and projec , for amon recommended for allocation in a gi en fi cal ear from amon made a ailable+ nder + b ec ion (a) ha are le han he fl amon recommended for allocation for ha fi cal ear, he difference be een he amon recommended for allocation and he al erna e allocation hall be alloca ed b he Pre iden and appor ioned and allo ed b accon , program, and projec pr+ an o ile 31, Uni ed S a e Code.

(d) SEQUESTRATION. Sec ion 255(g)(1)(A) of he Balanced B dge and Emergenc Defici Con rol Ac of 1985 (2 U.S.C. 905(g)(1)(A)) i amended b in er ing af er "Po al Ser vice R nd (18 4020 0 3 372)." he follq ing:

"R blic Wirele S ppl Chain Inno a ion R nd."

(e) BUDGETARY EFFECTS.

(1) STATUTORY PAYGO SCORECARDS. The b dge ar effec of hi ec ion hall no be en ered on ei her PAYGO corecard main ained pr+ an o ec ion 4(d) of he S a+ or Pa -A -Y -Go Ac of 2010.

(2) SENATE PAYGO SCORECARDS. The b dge ar effec of hi ec ion hall no be en ered on an PAYGO corecard main ained for prpo e of ec ion 4106 of H. Con. Re . 71 (115 h Congre).

(3) CLASSIFICATION OF BUDGETARY EFFECTS. No i h- anding R le 3 of he B dge Scorekeeping G ideline e for h in he join ex plana or a emen of he commi ee of conference accompa ing Conference Repor 105 217 and ec ion 250(c)(8) of he Balanced B dge and Emergenc Defici Con rol Ac of 1985, he b dge ar effec of hi ec ion hall no be e ima ed

(A) for prpo e of ec ion 251 of + ch Ac ;

(B) for prpo e of an allocation o he Commi ee on Appropria ion pr+ an o ec ion 302(a) of he Congre ional B dge Ac of 1974; and

(C) for prpo e of paragraph (4)(C) of ec ion 3 of he S a+ or Pa -A -Y -Go Ac of 2010 a being incl ded in an appropria ion Ac .

SEC. 107. ADVANCED MANUFACTURING INVESTMENT CREDIT.

(a) IN GENERAL. S bpar E of par IV of + bchap er A of chap er 1 of he In ernal Re en e Code of 1986 i amended b in er ing af er ec ion 48C he follq ing ne ec ion:

"SEC. 48D. ADVANCED MANUFACTURING INVESTMENT CREDIT.

"(a) ESTABLISHMENT OF CREDIT. For prpo e of ec ion 46, he ad anced man+ fac+ ring in e men credi for an a+ able ear i an amon eq al o 25 percen of he q alified in e men for + ch a+ able ear , i h re pec o an ad anced man+ fac+ ring facili of an eligible a+ pa er.

"(b) QUALIFIED INVESTMENT.

“(1) IN GENERAL. For purposes of subsection (a), the qualified in e men , i h re pec o an ad anced manufac+ring facili for an ap+able ear i he ba i of an q+alified proper placed in er ice b he ap+pa er d+ring + ch ap+able ear, hich i par of an ad anced manufac+ring facili .

“(2) QUALIFIED PROPERTY.

“(A) IN GENERAL. For purposes of hi+ subsection, the term ‘qualified proper’ mean proper

“(i), hich i angible proper ,

“(ii) i h re pec o , hich deprecia ion (or amor i a ion in li+ of deprecia ion) i allq+able,

“(iii), hich i

“(I) con+ r+ c ed, recon+ r+ c ed, or erec ed b he ap+pa er, or

“(II) acq+ired b he ap+pa er if he original + e of + ch proper commence , i h he ap+pa er, and

“(i) , hich i in egral o he opera ion of he ad anced manufac+ring facili .

“(B) BUILDINGS AND STRUCTURAL COMPONENTS.

“(i) IN GENERAL. The term ‘qualified proper’ incl+de an b+ilding or i+ r+ c+ral componen , hich o her i e a i f he req+iremen+ +nder + bparagraph (A).

“(ii) EXCEPTION. Cla+e (i) hall no appl , i h re pec o a b+ilding or por ion of a b+ilding + ed for office , admini+ra i e er ice , or o her f+nc ion + nrela ed o manufac+ring.

“(3) ADVANCED MANUFACTURING FACILITY. For purposes of hi+ subsection, the term ‘ad anced manufac+ring facili’ mean a facili for hich he primar purposes i he manufac+ring of emicond+ c or or emicond+ c or manufac+ring eq+ipmen .

“(4) COORDINATION WITH REHABILITATION CREDIT. The qualified in e men , i h re pec o an ad anced manufac+ring facili for an ap+able ear hall no incl+de ha por ion of he ba i of an proper , hich i a rib+able o q+alified rehabili a ion expendi+re (a+ defined in ec ion 47(c)(2)).

“(5) CERTAIN PROGRESS EXPENDITURE RULES MADE APPLICABLE. Re+le imilar o he r+le of + b ec ion (c)(4) and (d) of ec ion 46 (a in effec on he da before he da e of he enac men of he Re+en+e Reconcilia ion Ac of 1990) hall appl for purposes of + b ec ion (a).

“(c) ELIGIBLE TAXPAYER. For purposes of hi+ subsection, the term ‘eligible ap+pa er’ mean an ap+pa er, hich

“(1) i no a foreign eni+ of concern (a+ defined in ec ion 9901(6) of he William M. (Mac) Thornberr Na+ional Defen e A+ hori a ion Ac for Fi cal Year 2021), and

“(2) ha no made an applicable ran ac ion (a+ defined in ec ion 50(a)) d+ring he ap+able ear.

“(d) ELECTIVE PAYMENT.

“(1) IN GENERAL. Excep a+ o her i e pro ided in paragraph (2)(A), in he ca+e of a ap+pa er making an elec ion (a+ + ch ime and in + ch manner a+ he Secre ar ma pro ide) +nder hi+ + b ec ion , i h re pec o he credi+ de+rmind +nder + b ec ion (a) , i h re pec o + ch ap+pa er, + ch ap+pa er hall be rea ed a making a pa men+ again he ap+

imposed by title A (for the taxable year, in the case of which such credit is determined) equal to the amount of such credit.

“(2) SPECIAL RULES. For purposes of this section

“(A) APPLICATION TO PARTNERSHIPS AND S CORPORATIONS.

“(i) IN GENERAL. In the case of the credit determined under this section (a) in the case of an individual who is a partner in a partnership or S corporation, an election under paragraph (1) shall be made by such partnership or S corporation. If such partnership or S corporation makes an election under this paragraph (in such manner as the Secretary may provide) in the case of 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, in the case of such credit, before determining a partner's distributive share, or shareholder's pro rata share, of such credit,

“(III) an amount in the case of which the election in paragraph (1) is made shall be treated as a dividend for purposes of sections 705 and 1366, and

“(IV) a partner's distributive share of such dividend income shall be based on such partner's distributive share of the other applicable credits for each taxable year.

“(ii) COORDINATION WITH APPLICATION AT PARTNER OR SHAREHOLDER LEVEL. In the case of an individual who is a partner in a partnership or S corporation, no election by a partner or shareholder shall be allowed under paragraph (1) in the case of a credit determined under this section (a) in the case of such partner.

“(B) ELECTIONS. An election under paragraph (1) shall be made no later than the date (including extension of time) for the return of a 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 Act. An election, once made, shall be irrevocable. Except as otherwise provided in this paragraph, an election under paragraph (1) shall apply in the case of an individual for the taxable year for which the election is made.

“(C) TIMING. The payments described in paragraph (1) shall be treated as made on the later of the date (determined in the case of an extension) of the return of a 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 this paragraph (A)(i)(I) shall be treated in the same manner as a dividend from a credit provision referred to in this section (b)(2) of this section.

“(E) ADDITIONAL INFORMATION. A condition of, and prior to, an amount being read as a payment, which is made by the taxpayer under paragraph (1) or an amount being made pursuant to paragraph (A), the Secretary may require such information or registration if the Secretary deems necessary or appropriate for the purpose of preventing duplication, fraud, improper payments, or excessive payments under this section.

“(F) EXCESSIVE PAYMENT.

“(i) IN GENERAL. In the case of an amount read as a payment, which is made by the taxpayer under paragraph (1), or an amount made pursuant to paragraph (A), which the Secretary determines constitutes an excessive payment, the taxpayer is 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,

“(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 the purpose of this paragraph, the term ‘excessive payment’ means, with respect to proper for which an election is made under this subsection for an taxable year, an amount equal to the excess of

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

“(II) the amount of the credit, which, in the application of this subsection, shall be otherwise allowable (determined in the regard to section 38(c)) under subsection (a), with respect to such proper 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 or, if necessary, shall, for another purpose under this title, be deemed to have been allowed to the taxpayer for such taxable year.

“(4) MIRROR CODE POSSESSIONS. In the case of an possession of the United States, which is a mirror code asset (as defined in section 24(k)), this subsection shall not be read as a part of the income tax law of the United States for the purpose of determining the income tax law of such possession and such possession election shall be otherwise read.

“(5) BASIS REDUCTION AND RECAPTURE. Rule similar to the rule of subsection (a) and (c) of section 50 shall apply, with respect to

“(A) an amount read as a payment, which is made by the taxpayer under paragraph (1), and

“(B) any payments 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 purpose of this section, including

“(A) regulations or other guidance providing rules for determining a partner’s distributive share of the partner’s income described in paragraph (2)(A)(i)(III), and

“(B) guidance concerning the amount of the payments or deemed payments made under this section in connection with the amount of the credit allowable (determined in accordance with 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 paragraph (3) through (5) as paragraphs (4) through (6), respectively, and beginning after paragraph (2) the following new paragraph:

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

“(A) IN GENERAL. If there is an applicable transaction by an applicable taxpayer before the close of the 10-year period beginning on the date such taxpayer placed in service in the United States property which is eligible for the advanced manufacturing incentive credit under section 48D(a), then the taxpayer shall be increased by 100 percent of the aggregate decrease in the credit allowed under section 38 for all prior applicable years which would have resulted from reducing to zero the credit determined under section 46 which is attributable to the advanced manufacturing incentive credit under section 48D(a), in the respective year.

“(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 purpose 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 subparagraph:

“(D) APPLICABLE TRANSACTION. For purposes of this section

“(i) IN GENERAL. The term ‘applicable transaction’ means, in the case of an applicable taxpayer, an significant transaction (as determined by the Secretary), in coordination with the Secretary of Commerce and

the Secretary of Defense) in obtaining 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 semiconductor (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 an taxpayer who has been allowed a credit under section 48D(a) for an 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 an applicable transaction of which paragraph (3)(A) applies” after “paragraph (1) and (2)”, and

(ii) by inserting “or applicable transaction” after “transaction”.

(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 of individual made pursuant to provision of the Internal Revenue Code of 1986 enabling refundable credits shall be exempt from reduction under an order issued under this part.”.

“(2) CERTAIN ELECTIVE PAYMENTS. Payments made of taxpayer pursuant to election under subsection (d) of section 48D of the Internal Revenue Code of 1986, or amount read a payments which are made by taxpayer under paragraph (1) of such subsection, shall be exempt from reduction under an 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 (i),

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

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

“(i) the basis of an qualified proper (as defined in subsection (b)(2) of section 48D), which is part of

an advanced manufacturing facility (as defined in subsection (b)(3) of this section).”.

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

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

“Sec. 48D. Advanced manufacturing incentive 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. Conf. Rep. 71 (115th Cong.).

(3) CLASSIFICATION OF BUDGETARY EFFECTS. Notwithstanding Rule 3 of the Budget Scorekeeping Guidelines for 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 this Act;

(B) for purposes of an allocation of the Committee on Appropriation 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 proper placed in effect after December 31, 2022, and, for an appropriate transition, which begin prior to January 1, 2023, only to the extent of the basis hereof attributable to the transition, retransition, or reversion after the date of enactment of this Act.

(2) EXEMPTION OF ELECTIVE PAYMENTS FROM SEQUESTRATION. The amendments made by subsection (c) shall apply to an equitable 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.

The table of contents for this division is as follows:

DIVISION B RESEARCH AND INNOVATION

- Sec. 10000. Table of contents.
- Sec. 10001. Short title.
- Sec. 10002. Definition.
- Sec. 10003. Budgetary effects.

TITLE I DEPARTMENT OF ENERGY SCIENCE FOR THE FUTURE

- Sec. 10101. Mission of the Office of Science.
- Sec. 10102. Basic energy science program.
- Sec. 10103. Biological and environmental research.
- Sec. 10104. Advanced scientific computing research program.
- Sec. 10105. Fusion energy research.
- Sec. 10106. High energy physics program.
- Sec. 10107. Nuclear physics program.
- Sec. 10108. Science laboratory infrastructure program.
- Sec. 10109. Accelerator research and development.
- Sec. 10110. Frontier research, development, and production.
- Sec. 10111. Increased collaboration, interchange and information.
- Sec. 10112. High intensity laser research initiative; helium confinement program; Office of Science emerging biological preparedness research initiative; mid career management and research equipment program; authority of appropriation.
- Sec. 10113. Established program of international cooperative research.
- Sec. 10114. Research effort.

TITLE II NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY FOR THE FUTURE

- Sec. 10201. Definition.
- Subsection A Authority of Appropriation
- Sec. 10211. Authority of appropriation.
- Subsection B Measurement Research
- Sec. 10221. Engineering biological and biotechnology.
- Sec. 10222. Greenhouse gas measurement research.
- Sec. 10223. NIST authority for certification and accreditation.
- Sec. 10224. Software and hardware.
- Sec. 10225. Digital identification management research.
- Sec. 10226. Biometric research and engineering.
- Sec. 10227. Federal biometric performance standard.
- Sec. 10228. Protecting research from certification theft.
- Sec. 10229. Demonstration of research for research initiative.
- Sec. 10230. Advanced communication research.
- Sec. 10231. Non-carbon.
- Sec. 10232. Artificial intelligence.
- Sec. 10233. Sustainable chemical research and education.
- Sec. 10234. Premise planning research.
- Sec. 10235. Dr. David Satcher Certification Education Grant Program.
- Subsection C General Activities
- Sec. 10241. Educational outreach and support for underrepresented communities.
- Sec. 10242. Other research authority.
- Sec. 10243. Report of Congressional collaboration, interagency.
- Sec. 10244. Hiring critical technical expert.
- Sec. 10245. International standard development.
- Sec. 10246. Standard technical update.
- Sec. 10247. GAO audit of NIST research authority policies and procedure.
- Sec. 10248. Standard development organization grant.
- Subsection D Holling Manufacturing Extension Partnership
- Sec. 10251. Establishment of expansion award pilot program as part of the Holling Manufacturing Extension Partnership.
- Sec. 10252. Update of Holling Manufacturing Extension Partnership.
- Sec. 10253. National Supply Chain Database.
- Sec. 10254. Holling Manufacturing Extension Partnership activities.
- Sec. 10255. Amendment of the Holling Manufacturing Extension Partnership relationship in initiative of higher education.
- Subsection 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

- Subsection A Preliminary Matter
- Sec. 10301. Sense of Congress.

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- Sec. 10302. Definition .
Sec. 10303. Authority a ion of appropriation .

Sub B STEM Education

- Sec. 10311. PreK-12 STEM education.
Sec. 10312. Undergraduate STEM education.
Sec. 10313. Graduate STEM education.
Sec. 10314. STEM workforce data.
Sec. 10315. Career workforce development research and development .
Sec. 10316. Federal career scholarship-for-merit program.
Sec. 10317. Career-oriented workforce data initiative .
Sec. 10318. Microelectronic workforce development initiative .
Sec. 10319. Incorporation of research and development-oriented STEM education.
Sec. 10320. Mandatory co-funding.
Sec. 10321. Program to address the STEM workforce.

Sub C Broadening Participation

- Sec. 10321. Presidential award for excellence in mathematics and science.
Sec. 10322. Robert Noyce Teacher Scholarship program expansion.
Sec. 10323. NSF Eddie Bernice Johnson INCLUDES Initiative .
Sec. 10324. Broadening participation on major facilities award .
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SEC. 10001. SHORT TITLE.

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SEC. 10002. DEFINITIONS.

In this division:

(1) **ARTIFICIAL INTELLIGENCE.** The term “artificial intelligence” or “AI” has the meaning given 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, which Federal agency awarded and has accountable to the Federal Government for the use of the funds provided.

(3) **AWARD PERSONNEL.** The term “award personnel” means principal investigator and co-principal investigator, faculty, postdoctoral researcher, and other employee appointed by a grant, cooperative agreement, or contract under Federal law.

(4) **BIOMANUFACTURING.** The term “biomanufacturing” means the utilization of biological technology and advanced engineering product, tool, and process in a 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 expenditure.

(6) **ENGINEERING BIOLOGY.** The term “engineering biology” means the application of engineering design principle and practice to biological system, including molecular and cellular system, to advance fundamental understanding of complex natural system and to enable novel or optimized function and capability.

(7) **EPSCoR.** The term “EPSCoR” has the meaning given 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 in section 4 of the Senior-Worker Technology Innovation Act of 1980 (15 U.S.C. 3703).

(10) FEDERAL RESEARCH AGENCY. The term “Federal research agency” means an Federal agency which has an annual extramural research expenditure of over \$100,000,000 in fiscal year 2022 contained in the budget.

(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 “public 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 the term shall also include

(A) an organization composed of labor organization, which is a labor union, federal or a State or municipal labor body; and

(B) an organization, which should be included in the definition for that term under that section 2(5) but for the fact that the organization represents

(i) individuals employed by the United States, an unincorporated Government corporation, a Federal Reserve Bank, or an State or political subdivision hereof;

(ii) individuals employed by persons in the railroad industry; or

(iii) individuals employed as agricultural laborer.

(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 the criteria of poverty established by the Bureau of Economic Analysis.

(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. 278 (d)).

(19) MINORITY-SERVING INSTITUTION. The term “minority-serving institution” means a Hispanic-serving institution 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 defined in section 317(b) of that Act (20 U.S.C. 1059d(b)); or a Predominantly Black institution, Asian American and Native American Pacific

International organization, or Native American- or non-tribal organization 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 Science, 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 Information Science Act (15 U.S.C. 8801).

(24) RECIPIENT. The term “recipient” means an entity, including a non-Federal entity, that receives a Federal award directly from a Federal research agency. The term “recipient” does not include an entity that receives a Federal award or indirect award as the beneficiary of the award.

(25) RESEARCH AND DEVELOPMENT AWARD. The term “research and development award” means a proprietary product of an individual or entity by a Federal research agency or carried out research and development activities, which may include a proprietary form of a grant, contract, cooperative agreement, or other transaction. The term does not include a grant, contract, agreement or other transaction for the procurement of goods or services to meet the administrative need 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 effect 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 effect 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 for this Act,

join explanation a amen of the commi ee of conference accompan ing Conference Repor 105 217 and ec ion 250(c)(8) of the Balanced B dge and Emergenc Defici Con rol Ac of 1985, the b dge ar effec of hi di i ion shall no be e ima ed

(1) for p rpo e of ec ion 251 of + ch Ac ;

(2) for p rpo e of an alloca ion o the Commi ee on Appropria ion p r+ an o ec ion 302(a) of the Congre ional B dge Ac of 1974; and

(3) for p rpo e of paragraph (4)(C) of ec ion 3 of the S a+ or Pa -A -Yø -Go Ac of 2010 a being incl ded in an appropria ion Ac .

TITLE I—DEPARTMENT OF ENERGY SCIENCE FOR THE FUTURE

SEC. 10101. MISSION OF THE OFFICE OF SCIENCE.

Sec ion 209 of the Depar men of Energ Organi a ion Ac (42 U.S.C. 7139) i amended b adding a he end he follq ing:

“(d) USER FACILITIES. The Direc or shall carr o the con r c ion, opera ion, and main enance of+ er facili ie o + ppor the mi ion de cribed in + b ec ion (c). A prac icable, he e facili ie shall er e the need of the Depar men , ind r , the academic comm ni , and o her rele an en i ie for the p rpo e of ad anc ing the mi ion of the Depar men , impro ing the compe i i ene of the Uni ed S a e , pro ec ing p blic heal h and afe , and addre ing o her na ional priori ie incl ding emergencie .

“(e) COORDINATION.

“(1) IN GENERAL. The Secre ar

“(A) shall en+ re the coordina ion of the Office of Science , i h the o her ac i i ie of the Depar men , incl ding the ran fer of knq ledge, capabili ie , and rele an echnologie from ba ic re earch program of the Depar men o applied re earch and de elopmen program of the Depar men for the p rpo e of enabling de elopmen of mi ion-rele an echnologie ;

“(B) shall + ppor join ac i i ie among the program of the Depar men ;

“(C) shall coordina e , i h o her rele an Federal agencie opera ing + nder e i ing a hori a ion rela ing o + bjec rela ing o he mi ion de cribed in + b ec ion (c) in + ppor ing ad ancemen in rela ed re earch area a appropria e; and

“(D) ma form par ner hip o enhance he+ ili a ion of and en+ re acce o+ er facili ie b o her Federal agencie .

“(2) OFFICE OF SCIENCE. The Direc or

“(A) shall en+ re the coordina ion of program and ac i i ie carried o b the Office of Science; and

“(B) shall direc all program , hich ha e no recen l comple ed a f + re planning roadmap con i en , i h the f nding of + ch program a hori ed+ nder the Re earch and De elopmen , Compe i ion, and Inno a ion Ac o comple e + ch 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 subsection (a) through (e) as subsections (c) through (g), respectively;

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

“(a) PROGRAM. A 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 science, including material science and engineering, chemical science, physical bio science, geo science, and other discipline, authorized and, model, and control matter and energy at the electronic, atomic, and molecular level in order to provide the foundation for new energy technologies, address scientific grand challenges, and support the energy, environment, and national emergency mission 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 alternative and methodologies of radiological chemical production 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) a nonomeric chemistry and material science and characterization facilities have erage advance in artificial intelligence; 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 kiloelectronvolts.”

“(B) UPGRADE. The Secretary shall provide for the upgrade of the Advanced Photon Source described in the public law approved by the Basic Energy Science Advisory Committee on June 9, 2016, entitled ‘Report on Facility Upgrade’, 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 beamline optimized for this source.

“(C) START OF OPERATIONS. The Secretary shall, by the date of availability of appropriation, ensure the start of full operation of the upgrade under this paragraph occur before March 31, 2026.

“(D) FUNDING. Out of funds authorized to be appropriated under subsection (j), hereinafter 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 of 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 public law entitled ‘Facilities for the Future of Science: A Ten-Year Outlook’, published by the Office of Science of the Department in December, 2003;

“(ii) the public law entitled ‘For Year Later: An Interim Report on Facilities for the Future of Science: A Ten-Year Outlook’, published by the Office of Science of the Department in August, 2007; and

“(iii) the public law approved by the Basic Energy Science Advisory Commission June 9, 2016, entitled ‘Report on Facility Upgrade’.

“(C) START OF OPERATIONS. The Secretary shall, subject to the availability of appropriation, ensure the start of full operation of the upgrade under this paragraph on or 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 public law entitled, ‘Facilities for the Future of Science: A Ten-Year Outlook’, published by the Office of Science of the Department in December, 2003;

“(ii) the public law entitled, ‘For Year Later: An Interim Report on Facilities for the Future of Science: A Ten-Year Outlook’, published by the Office of Science of the Department in August, 2007; and

“(iii) the public law approved by the Basic Energy Science Advisory Commission June 9, 2016, entitled ‘Report on Facility Upgrade’.

“(C) START OF OPERATIONS. The Secretary shall, subject to the availability of appropriation, ensure the start of full operation of the second target station under this paragraph on or 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 electronvolts.

“(B) UPGRADE. The Secretary shall provide for the upgrade of the Advanced Light Source described in the publication approved by the Basic Energy Science Advisory Committee on June 9, 2016, entitled ‘Report on Facility Upgrade’, 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, in conjunction with the availability of appropriation, ensure the start of full operation 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 kiloelectronvolt range.

“(ii) HIGH REPETITION RATE. The term ‘high repetition rate’ means the delivery of x-ray pulses at a rate of 1,000,000 pulses per second.

“(iii) ULTRA-SHORT PULSE. The term ‘ultra-short pulse’, with respect to an x-ray, means a hard x-ray that is capable of duration of less than 100 femtoseconds.

“(B) UPGRADE. The Secretary shall

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

“(ii) ensure that the upgrade enables the production and use of high energy, ultra-short pulse x-rays delivered at a high repetition rate.

“(C) START OF OPERATIONS. The Secretary shall, subject to the availability of appropriation, ensure the start of full operation of the upgrade under this paragraph on or before December 31, 2026.

“(D) FUNDING. Of the funds authorized to be appropriated under subsection (j), here are authorized to be appropriated to the Secretary 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 its upgrade.

“(B) CONSULTATION REQUIRED. The Secretary shall consult with the private sector, in addition to higher education, National Laboratories, and relevant Federal agencies to ensure the facility described in subsection (A) has the capability to maintain, repair, and enhance performance of radio frequency accelerator components.

“(C) FUNDING. Of the funds authorized to be appropriated under subsection (j), here 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 Center, 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 and advance in the critical field of science including nanoscience, material, chemical, biological, and quantum information science.

“(B) FUNDING. Of the funds authorized to be appropriated under subsection (j), here 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 appropriation, the Secretary

“(i) shall begin carrying out paragraph (A) no later than September 30, 2036; and

“(ii) shall begin carrying out paragraph (A)

“(I) in calendar year 2033; or

“(II) after the completion of individual beamline installation;” 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 fundamental 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 high advanced characterization of materials, materials synthesis, processing, and innovation of experimental and theoretical data;

“(C) codeign of chemical systems and chemistry modeling of areas with advanced computing systems and hardware technologies; and

“(D) modeling of chemical processes, assemblies, and reactions at the molecular level and quantum chemistry, including high level computing methods.

“(2) COMPUTATIONAL MATERIALS AND CHEMICAL SCIENCES CENTERS.

“(A) IN GENERAL. In carrying out the activities authorized under paragraph (1), the Director shall elect and establish up to 6 computational materials and chemical science centers

“(i) develop open-source, robust, and validated computational codes and user-friendly software, including innovation of experimental and theoretical data, to enable the design, discovery, and development of new materials and chemical systems; and

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

“(B) SELECTION. The Director shall elect centers under paragraph (A) on a competitive, merit-reviewed basis. The Director shall consider application from the National Laboratories, in addition to higher education, multi-institutional collaboration, and other appropriate entities.

“(C) DURATION.

“(i) NEW CENTERS. A center elected under paragraph (A) shall receive support for a period of no more than 5 years beginning on the date of establishment of the center, subject to the availability of appropriate funding.

“(ii) EXISTING CENTERS. A center already in existence on the date of enactment of the Research and Development, Competition, and Innovation Act shall continue to receive support for a period of no more than 5 years beginning on the date of establishment of the center.

“(D) RENEWAL. Upon the expiration of an period of + ppor of a cen er + nder hi + b ec ion, he Direc or ma rene + ppor for he cen er, on a meri-re iq ed ba i , for a period of no more han 5 ear .

“(i) MATERIALS RESEARCH DATABASE.

“(1) IN GENERAL. The Direc or hall + ppor he de elopmen of a eb-ba ed pla form o de elop and pro ide acce o a da aba e of comp ed informa ion on kno n and predic ed ma erial proper ie and comp a ional ool o accelera e break hrø gh in ma erial di co er and de ign.

“(2) PROGRAM. In carr ing ø hi + b ec ion, he Direc or hall

“(A) cond c coopera ie re earch among Na ional Lab- ora orie , ind r , academia, and o her re earch in i+ ion o ad ance+ nder anding, predic ion, and manip la- ion of ma erial and facili a e he de ign of no el ma erial ;

“(B) de elop and main ain da a infra + c+ re a + er facili ie ha genera e da a o collec , anal e, label, and o her ie prepare he da a for incl ion in he da aba e;

“(C) le erage e i ing high performance comp ing em o cond c high hrø gh+ calø la ion , and de elop comp a ional and da a mining algori hm for he predic ion of ma erial proper ie ;

“(D) reng hen he fø nda ion for ne echnologie and ad anced man+ fac+ ring; and

“(E) dri e he de elopmen of ad anced ma erial for applica ion ha pan he Depar men ’ mi ion in energ , en ironmen , and na ional eø ri .

“(3) COORDINATION. In carr ing ø hi + b ec ion, he Direc or hall le erage program and ac i i ie acro he Depar men , incl ding comp a ional ma erial and chemical cience cen er e abli hed+ nder + b ec ion (h).

“(4) FUNDING. Of f nd ø hori ed o be appropria ed + nder + b ec ion (j), here i ø hori ed o be appropria ed o he Secre ar o carr ø ac i i ie + nder hi + b ec ion \$10,000,000 for each of fi cal ear 2023 hrø gh 2027.

“(j) AUTHORIZATION OF APPROPRIATIONS. Of f nd ø hori ed o be appropria ed o he Office of Science in a fi cal ear, here are ø hori ed o be appropria ed o he Secre ar o carr ø he ac i i ie de cribed in hi ec ion

“(1) \$2,685,414,000 for fi cal ear 2023;

“(2) \$2,866,890,840 for fi cal ear 2024;

“(3) \$2,987,727,170 for fi cal ear 2025;

“(4) \$3,062,732,781 for fi cal ear 2026; and

“(5) \$3,080,067,167 for fi cal ear 2027.”.

(b) ARTIFICIAL PHOTOSYNTHESIS. Sec ion 973 of he Energ Polic Ac of 2005 (42 U.S.C. 16313) i amended

(1) in + b ec ion (b), b riking paragraph (4) and in er ing he follø ing:

“(4) FUNDS. Of he f nd ø hori ed o be appropria ed for ba ic energ cience in a fi cal ear, here i ø hori ed o be appropria ed o he Secre ar o carr ø ac i i ie + nder hi + b ec ion \$50,000,000 for each of fi cal ear 2023 hrø gh 2027.”; and

(2) in + b ec ion (c), b riking paragraph (4) and in er ing he follø ing:

“(4) FUNDS. Of the funds authorized to be appropriated for basic energy science in a fiscal year, hereinafter authorized to be appropriated to the Secretary of Energy 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 enhance the competitiveness of the United States in energy storage by fostering an ecosystem linking fundamental research and development to deployment of storage technology while minimizing the environmental impact of energy storage technology.”; 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) to establish an 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 science in a fiscal year, hereinafter authorized to be appropriated to the Secretary of Energy 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 science in a fiscal year, hereinafter authorized to be appropriated to the Secretary of Energy 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 science in a fiscal year, hereinafter authorized to be appropriated to the Secretary of Energy 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, and expand theoretical and fundamental knowledge relevant to, and understanding of nuclear material and matter for the benefit of commerce, medicine, and national security.

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

(A) the Director of the Office of Science shall support basic research on priority disciplines 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 disciplines, 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 neutron 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 clause (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 fundamental research, development, and validation of physical concepts developed under the program.

(3) FUNDING. Of the funds authorized to be appropriated for basic energy science in a fiscal year, hereinafter 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 gas, and carbon ore chemistry and to further advance the conversion of carbon to material products.

(B) COORDINATION. In carrying out a program and activities under the Initiative, the Director shall cooperate and receive information 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 of support, and develop fundamental knowledge relating to, carbon material and carbon ore processing research.

(B) ACTIVITIES. A part of the program described in paragraph (A), the Director shall, in coordination with the Assistant Secretary of Energy for Fossil Energy and Carbon Management, appropriately support research on pertinent disciplines of scientific inquiry, including

(i) methods of extraction, processing, recycling, and utilization of the material and extractable mineral contained in raw coal and coal gas;

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

(iii) concentration pathways and material for conversion of carbon dioxide molecule, mineral, and material.

(C) REVIEW. The Director shall periodically review activities carried out under the program described in paragraph (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 paragraph (A), the Director shall

(i) enter into coordination and knowledge sharing with

(I) the United States Geological Survey; and

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

(ii) a coordinated application of effort 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 Material 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 extractable material or mineral from raw coal, coal gas, or other solid carbon material, for the development of new carbon-based material;

(II) methods of improving the physical, chemical, and chemical properties of carbon-based material or other extractable material from raw coal, coal gas, or other solid carbon material and their recyclability;

(III) overcoming the challenge and maximizing the benefit of commercial extraction, production, or improving coal-derived carbon and related production; and

(IV) identifying novel pathways and materials for carbon storage and conversion in oil production.

(B) SELECTION. The Director shall

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

(ii) consider application from the National Laboratories, in addition of higher education, multi-institutional collaboration, and other appropriate entities.

(C) DURATION. A Center shall receive support for a period of no more than 5 years beginning on the date of establishment of the Center, subject to the availability of appropriations.

(D) RENEWAL. On the expiration of an period of support of a Center, the Director may renew support for the Center, on a merit-reviewed basis, for a period of no 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 resources 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 section 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 section 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 formation.

(B) LEVERAGING. In carrying out program 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, in addition of higher education, and the private sector.

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

(D) ADDITIONAL ACTIVITIES. The Secretary may organize additional activities under his direction through other organizational structures.

(2) RESEARCH PROGRAM.

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

(B) ACTIVITIES. A part of the program described in paragraph (A), the Director of the Office of Science shall appropriate fundamental research projects and include the following:

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

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

(iii) evaluating carbon equilibrium;

(i) monitoring carbon migration in geologic formation;

(i) advancement in data analysis, including the analysis of seismic data, and computational science to improve the advanced computing, visualization, and imaging of geologic formation for the equilibrium of carbon; and

(i) prediction and understanding of coupled processes in complex subsurface geologic systems for carbon storage.

(C) REVIEW. The Secretary shall periodically review activities carried out under the program described in paragraph (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 elect and establish no more than 2 carbon storage research and geologic computational science centers (referred to in this paragraph as a "Center") to develop and advance improvements in data collection, analysis, and modeling of subsurface geology for the purpose of advancing carbon equilibrium in geologic formation.

(B) SELECTION.

(i) IN GENERAL. The Secretary shall

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

(II) to the maximum extent practicable, locate each Center in a geographically diverse region, which is established and ongoing geologic carbon equilibrium research and demonstration.

(ii) APPLICATIONS. In electing Centers under paragraph (A), the Secretary shall consider application from institutions of higher education, multi-institutional collaboration, 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 no more than 5 years beginning on the date of establishment of the Center, subject to the availability of appropriation.

(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 no more than 5 years beginning on the 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 no more than 5 years.

(4) COORDINATION WITH EXISTING PROGRAMS AND CENTERS. In carrying out his function, the Secretary shall

(A) enter into coordination with

(i) the United States Geological Survey; and

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

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

(g) FUNDING FOR CARBON INITIATIVES. Of the funds authorized to be appropriated for basic energy science in a fiscal year, hereinafter authorized to be appropriated to the Secretary to carry out activities under subsection (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 paragraph (6) through (8) as paragraph (5) through (7), respectively;

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

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

“(a) PROGRAM. A 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 section 303 and 304, the Director shall carry out a program of research and development in the area of biological science and climate and environmental science, including basic science, relevant to the development of new energy technologies and to support the energy, environmental, and national security mission of the Department.

“(b) BIOLOGICAL SYSTEMS. The Director shall carry out research and development activities in genomic science including fundamental research on plant and microbial genome evolution and understanding of the complex biological systems, which may include activities

“(1) to provide fundamental understanding of the biology of plants, fungi, and microbes as a basis for developing innovative processes for bioenergy and bioproduction and accelerate breakthrough and new knowledge that would enable the cost-effective, sustainable production of

- “(A) advanced biofuel ;
 - “(B) bioenergy ; and
 - “(C) biobased material ;
- “(2) to conduct foundational functional environmental biological research
- “(A) to support expanded environmental design research;
 - and
 - “(B) to—
 - “(i) fundamental genome research; and
 - “(ii) phenomena, including functional genomic of gene products a genome scale;
- “(3) to develop environmental design and synthetic biology approaches for new nonfood plant-derived and microbially derived bioproducts as a basis for new bioeconomic and biotechnological application in bioproduct production, resource recovery, recycling, and upcycling energy ;
- “(4) to better understand the behavior of microbiome in the environment and interdependence 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 energy generation, storage, and utilization ;
- “(6) to understand the microbiome mechanism and microbial attachment to plant form, immobilization, or removal of carbon from the atmosphere in the environment and has affected the cycling and deposition of carbon, nitrogen, and compounds in the environment ;
- “(7) to develop complementary approaches and integrated platform for open access collaborative science ;
- “(8) to leverage tools and approaches across the Office of Science to expand research on novel processes, methods, and science to develop bio-based chemical, polymer, inorganic material, including research
- “(A) to advance fundamental, microbial, and plant environmental design research to advance the understanding of high 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 role 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 environmental design methods and tools to increase the efficiency of photosynthesis in plants ; and
 - “(D) to increase the scale and pace of characterizing the function and physical characteristics of microbes and microbial communities to improve environmental design ;
- “(9) to conduct research focused on developing analytical techniques and instrumentation capabilities, including artificial intelligence and machine learning, on high-performance computing platform to accelerate collaborative and reproducible environmental biological research ;

“(10) to develop and improve new technologies for bioimaging, measurement, and characterization properties of the structural, physical, and temporal relationships of metabolic processes governing phenotypic expression in plants and microbes;

“(11) to conduct research focused on genotypic-phenotypic relationships to develop predictive understanding of cellular function under a variety of relevant environmental and bioenergy-related conditions;

“(12) to conduct metagenomic and metadatabase research encoding 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 and their expression, structure, and function of genome information encoded within cells and for real-time measurement in ecosystems and field sites of relevance to the mission of the Department.”; and

(4) by adding at the end the following:

“(1) 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 biofuel.

“(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 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 breakthrough in long-range and long-range radiation research and development as described in subsection (e) and to inform the advancement of new tools, technologies, and advanced material needed to facilitate long-range 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. A 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 agency to carry out activities relating to Earth and environmental science research, which may include activities

“(A) to understand, observe, measure, and model the response of Earth's atmosphere and biosphere to changing concentration of greenhouse gas emission and associated change 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 equilibrium and transformation of these, carbon dioxide, and other relevant molecules in the biosphere;

“(C) to understand, observe, and model the cycling of water, carbon, and nitrogen in terrestrial and atmospheric systems;

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

“(E) to understand and predict interaction among natural and human systems to inform potential mitigation and adaptation options for increased concentration of greenhouse gas emission and associated change 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 production and application of environmental monitoring and extreme weather in climate and Earth system prediction model in high-performance computing; and

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

“(3) ENVIRONMENTAL SYSTEMS SCIENCE RESEARCH.

“(A) IN GENERAL. A part of the activities described in paragraph (1), the Director shall carry out research to advance and improve, robotics, and catalysis are predictive understanding of environmental systems, including the role of hydrobiogeochemistry, from the surface to the top of the atmosphere canopy has considered effects of seasonal environmental variability and change.

“(B) CLEAN WATER AND WATERSHED RESEARCH. A part of the activities described in paragraph (A), the Director shall

“(i) support interdisciplinary research to significant advances in understanding of, availability, quality, and the impact of human activities and a changing climate on urban and rural watersheds; including freshwater resources;

“(ii) conduct with the Interagency Research Development, and Demonstration Coordination Committee on the Next of Energy and Water for Sustainability established under section 1010 of the Energy Act of 2020 (Public Law 116-260) on energy-related 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 technology, technological innovation, or practice relating to the energy-related, applicable; and

“(i) 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. A 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, 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 systems, and other relevant models to inform decision on reducing greenhouse gas emissions and the resulting impacts of a changing global climate. Such modeling shall include

“(A) in regard to capabilities for modeling multilateral interaction, including the impact of climate policies on human health and interdependence and risk to the energy sector; and

“(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. An office shall be established in the Department of the Interior to carry out the following research grants:

“(i) by competitive solicited mid-scale, multi-institutional research centers;

“(ii) by large-scale experimental or other facilities; or

“(iii) through existing facilities and programs of the Department of the Interior, National Oceanic and Atmospheric Administration.

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

“(6) ATMOSPHERIC SYSTEMS AND SCIENCES RESEARCH PROGRAM.

“(A) IN GENERAL. A 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 evaluate and 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 topic described in this paragraph, shall conduct research relating to:

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

“(ii) understanding of the effects of climate change on the environment, including the impact of the interdependence of clouds, atmospheric aerosols, radiation processes, and precipitation;

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

“(iv) demonstrating the improved predictability of regional and global atmospheric model development of improved processes and understanding;

“(v) atmospheric regimes with large uncertainties in earth system prediction, aerosol processes, stratospheric and lower-tropospheric processes, convection processes, and high-latitude processes;

“(vi) reduced uncertainties and improved information capabilities of earth system model of the atmospheric environment in a holistic, comprehensive fashion; and

“(vii) understanding and modeling representation of priority research areas, including aerosols, stratosphere,

bø ndar la er, con ec i e, and high-la i+ de proc-
e e .

“(B) ACTIVITIES. In carr ing ø he A mo pheric S -
em and Science Re earch Program, he Direc or hall,
in coordina ion, and a appropria e, in collabora ion, i h
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“(i) collec da a and cond c re earch o ad ance
a mo pheric and Ear h em modeling capabili e ;

“(ii) de elop or par icipa e in ø i ing or f + re
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“(I) incorpora e proce -le el+ nder anding of
he life c cle of aero ol , clø d , and precipi a ion;
and

“(II) can be incorpora ed in o o her model ;

“(iii) impro e da a, anal i , and predic ion -
em in marine, li oral, erre rial, and arc ic en iron-
men , incl ding ho e en ironmen en i i e o
change in he clima e, rela ing o he energ and
cience mi ion of he Depar men ; and

“(i) + ppor he de elopmen of echnologie
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a mo pheric en or ;

“(II) ob er ing en or ne, ork ; and

“(III) comp a ional predic i e modeling.

“(C) USE OF ATMOSPHERIC RADIATION MEASUREMENT
PROGRAM FACILITIES AND INFRASTRUCTURE. To + ppor he
A mo pheric S em and Science Re earch Program and,
in coordina ion, and a appropria e, in collabora ion, i h
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o her rele an Federal agencie , o impro e f ndamen al
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face or + b+ rface phenomena, he Direc or hall+ e he
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or of he Na ional Oceanic and A mo pheric Admini ra-
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U er Facili e

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i+ , remo e- en ing, and aircraf ob er a ion of

“(I) he microph ical proper ie of clø d and
a mo pheric aero ol ;

“(II) he coinciden and highl de ailed d nam-
ical and hermod namic proper ie of he
a mo pheric en ironmen ha con ain ho e
clø d and aero ol ;

“(III) he proper ie of precipi a ion;

“(IV) he proper ie of radia ion and he back-
grø nd en ironmen ; and

“(V) he proper ie of + rface or + b+ rface
phenomena;

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ba ed and airborne field campaign o arge pecific
a mo pheric and + rface or + b+ rface proce e

relating to the energy and science mission of the Department in different locations and across a range of environments, including developing technologies

“(iii) to build data sets that can be incorporated into a global model; and

“(i) to enhance observation-based modeling and information that the accuracy of climate model parameters.

“(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 application from the National Laboratories, institutions of higher education, multi-institutional collaboration, 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-resolution molecular phenotyping, for understanding and predicting the functional processes of biological and environmental systems;

“(C) integrated high-resolution sequencing, advanced bioanalytical techniques, DNA design and synthesis, metabolomic, and computational analysis; and

“(D) each other facilities that 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 a leading user facilities to advance the collection, validation, and analysis of a global data, including high-resolution data.

“(A) to advance knowledge of the Earth and environmental systems and improve model representation; and

“(B) to measure the impact of a global gauge, aerosol, and cloud 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 Science Laboratory, or other facilities, to advance high-throughput microbial plant and molecular phenotyping capabilities to accelerate discovery of new protein function and metabolic pathways in microbial systems.

“(B) CAPABILITIES. In carrying out paragraph (A), the Secretary shall ensure the following capabilities:

“(i) Core high-throughput automated experimental and multimedial analytical capabilities.

“(ii) Direction of automated genomic analysis, biomolecular and cellular imaging, and functional biological assays with high-throughput microbial cultivation and data analysis capabilities available to biological processes under natural and perturbed environmental conditions.

“(C) DATA COORDINATION. In carrying out paragraph (A), the Secretary shall ensure integration and coordination, including data platform and other facilities of the Department.

“(D) START OF OPERATIONS. Subject to the availability of appropriation, the Secretary shall begin carrying out paragraph (A) no 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 other 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, robotic, computational biology, bioinformatic, bioengineering, cellular platform 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 coordinate with

“(A) the National Oceanic and 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) rele an akeholder , incl ding in i+ ion of higher ed ca ion, nonprofi re earch in i+ ion , ind r , S a e, erri orial, local, and Tribal go ernmen , and o her appropria e en i ie o en+ re acce o he be a ailable rele an a mo pheric and hi orical, ea her da a.

“(i) TERRESTRIAL-AQUATIC INTERFACE RESEARCH INITIATIVE.

“(1) IN GENERAL. The Direc or hall carr o a re earch program o enhance he + nder anding of erre rial-aq a ic in erface. In carr ing o he program, he Direc or hall priori i e effor o enhance he collec ion of ob er a ional da a, and hall de elop model o anal e he na+ ral and h man proce e ha in erac in li oral one .

“(2) LITTORAL DATA COLLECTION SYSTEM. The Direc or hall e abli h an in egra ed em of geographical di er e field re earch i e in order o impro e he cien ific + nder anding and predic abili of he major land a er in erface of he Uni ed S a e hr o gh impro ed da a o an i and o ali , incl ding in

“(A) he Grea Lake region;

“(B) he Pacific coa ;

“(C) he A lan ic coa ;

“(D) he Arc ic;

“(E) he G lf coa ; and

“(F) he coa of Uni ed S a e erri orie and freel a ocia ed S a e .

“(3) EXISTING INFRASTRUCTURE. In carr ing o he program and e abli hing he field re earch i e + nder paragraph (1) and (2), he Secre ar hall le erage e i ing re earch and de elopmen infra r c+ re + ppor ed b he Depar men , incl ding he Depar men ’ e i ing marine and coa al re earch lab.

“(4) COORDINATION. For he p rpo e of carr ing o he program and e abli hing he field re earch i e + nder paragraph (1) and (2), he Secre ar ma en er in o agreemen i h Federal depar men and agencie i h complemen ar capabili e , incl ding he Na ional Oceanic and A mo pheric Admini ra ion and an o her rele an Federal agenc a appropria e.

“(5) REPORT. No earlier han 2 ear af er he da e of enac men of he Re earch and De elopmen , Compe i ion, and Inno a ion Ac , he Direc or hall pro ide o he Commi ee on Science, Space, and Technolog , he Commi ee on Na+ ral Re o rce , and he Commi ee on Appropria ion of he Ho e of Repre en a i e , and he Commi ee on Energ and Na+ ral Re o rce and he Commi ee on Appropria ion of he Sena e, a repor e x amining he her he em de cribed in paragraph (2) h o ld be e abli hed a a Na ional U er Facili i hin he Depar men or a a re earch facili i hin ano her Federal agenc .

“(6) INTEROPERABILITY.

“(A) IN GENERAL. The Direc or hall en+ re ha ac i i ie carried o + nder paragraph (1) and (2), incl ding ob er a ion, da a collec ion, moni oring, and model de elopmen and enhancemen , are in eroperable and ma be in egra ed i h e i ing rela ed em a he Na ional Oceanic and A mo pheric Admini ra ion and o her rele an Federal agencie , a prac icable.

“(B) RESOURCES. In carrying out paragraph (A), in support of interoperability, a 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 program carried out under paragraph (1) and (2) into relevant data elements and models, a practicable.

“(j) ENGINEERED ECOSYSTEMS INITIATIVE.

“(1) IN GENERAL. The Secretary shall establish the Biological and Environmental Research program and initiatives focused on the development of engineered ecosystems through the application of artificial intelligence, novel engineering 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 ensure that activities carried out under the initiatives established under paragraph (1) are complementary to activities being undertaken by other agencies.

“(3) REPORT. No 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 activities authorized under this section.

“(k) AUTHORIZATION OF APPROPRIATIONS. Of the 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) \$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 biofuel, bioenergy or bio-based material, chemical, and product chains produced from a variety of regionally diverse feedstock, and to facilitate the transition of research results to industry. The activities of the centers authorized under this section 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 enhance the production of advanced biofuel and bioproduct from lignocellulosic biomass; and

“(C) using the latest tools in genomic, molecular biology, cellular science, chemical engineering, systems biology, and computational and robotic technologies to enhance the production and refinement of biomass into advanced biofuel and bioproduct.

“(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 no more than 5 years, subject to the availability of appropriation, beginning on the date of establishment of the center.

“(B) APPLICATIONS. The Director shall consider applications from National Laboratories, multi-institutional collaboration, 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 no more than 5 years beginning on the date of establishment of the center.

“(D) NEW CENTERS. The Director shall select a new center pursuant to paragraph (1) on a competitive, merit-reviewed basis, with special consideration for applications from institutions 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 no 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 no more than 5 years, and may additionally provide an additional renewal on a merit-reviewed basis for a period of no more than 5 years.

“(4) ACTIVITIES. Centers shall undertake research activities to accelerate the production of advanced biofuel and bioproduct from biomass resources by identifying the most viable species of plants for energy crops; and improving methods of breeding, propagation, planting, production, harvesting, storage and processing. Activities may include the following:

“(A) Research activities to increase sustainability, including

“(i) advancing knowledge of high bioenergy crop production, high biomass and bioconversion factors, insect crop growth, yield, and quality;

“(ii) identifying the most impactful research areas that address the economic of advanced biofuel and bioproduct production; and

“(iii) developing multiscalar modeling to advance prediction of advanced biofuel cropping ecosystem.

“(B) Research activities to further feedstock development, including lignocellulosic, algal, grass, and other including carbon dioxide and methane, and direct air capture of single carbon gas via plant and microbes, including

“(i) developing genetic and genomic tools, high-throughput analytical tools, and bioengineering approaches to enhance bioenergy feedstock and their associated microbiome;

“(ii) conducting field testing of new potential bioenergy feedstock crop under non-irrigated benign and geographically diverse conditions to assess viability and robustness; and

“(iii) developing quantitative model informed by experimentation to predict high bioenergy feedstock performance under diverse conditions.

“(C) Research activities to improve lignocellulosic deconstruction and separation methods, including

“(i) developing feedstock-agnostic deconstruction processes capable of efficient fractionating biomass into targeted streams;

“(ii) gaining advanced understanding of plant cell wall biochemistry, composition, structure, and properties during deconstruction; and

“(iii) improving enzyme and approaches for biomass breakdown and cellulosic, hemicellulosic, and lignin processing.

“(D) Research activities to improve the feedstock conversion process for advanced biofuel and bioproduct, including

“(i) developing high-throughput methods to screen or select high-performance microbial strains and communities to improve product formation rate, yield, and efficiency;

“(ii) establishing a broad base of platform microorganisms and microbial communities suitable for metabolic engineering to produce advanced biofuel and bioproduct and high-throughput methods for experimental validation of genetic function;

“(iii) developing techniques to enhance microbial robustness for scaling up in improved advanced biofuel and bioproduct yield and to gain a better understanding of the cellular and molecular basis of tolerance for major chemical classes of inhibitor found in the process;

“(i) advancing technologies for heat recovery, condensation, and consolidated bioprocessing;

“(ii) identifying, creating, and optimizing microbial and chemical pathways to produce promising, economically intermediate and final bioproduct from biomass with consideration given to non-irrigated benign processes;

“(iii) developing high-throughput, real-time, in situ analytical techniques to monitor and characterize

the pre- and post-bioproduct separation remain in detail;

“(ii) creating methodologies for efficient identification of large molecules, identifying high-value bioproducts in existing biomass streams, and utilizing green bioproduct streams;

“(iii) identifying and improving plant feedstocks with enhanced extractable levels of desired bioproducts or bioproduct precursors, including lignin streams; and

“(iv) developing integrated biological and chemical catalytic approaches to valorize and produce additional portfolio of advanced biofuel and bioproducts.

“(5) INDUSTRY PARTNERSHIPS. Centers shall establish industry partnerships to advance research related to commercial application.

“(6) COORDINATION. In coordination with the Bioenergy Technology Office of the Department, the Secretary shall support interdisciplinary research activities to improve the capacity, efficiency, resilience, energy, reliability, and affordability of the production and use of advanced biofuel and bioproducts, as well as activities to enable positive impact and avoid the potential negative impact of the production and use of advanced biofuel and bioproducts on the environment, 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 subsection (b) of section 306 of the Department of Energy Research and Innovation Act (42 U.S.C. 18644) for a fiscal year 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 biofuel.

“(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 ‘bio-based 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 subsection (a) through (c) as subsections (b) through (d), respectively;

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

“(a) IN GENERAL. A 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) of quantum and applied mathematics, computational science, and computer science research relevant to the mission of the Department and the competitive edge of the United States;

“(2) of development modeling, simulation, and other computational tools relevant to other scientific disciplines and other development of new energy technologies and other technologies;

“(3) of advanced computing and networking capabilities for data-driven discovery; and

“(4) of development of advanced scientific computing hardware and software tools for science and engineering.”;

(3) in subsection (c), as 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 his or her jurisdiction, to determine and meet the computational and networking research and facilities needs of the Office of Science and all other relevant energy technology and energy efficiency programs within the Department and within other Federal agencies as appropriate.”;

(4) by amending subsection (d), as 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 of development, education, and support

“(A) mathematics, physics, and algorithms for modeling complex systems relevant to the mission 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 programs established under section 976 of the Energy Policy Act of 2005 (42 U.S.C. 16316) that support robust investments in

“(i) applied mathematical, computational, and computer science research needs relevant to the mission of the Department, including foundational areas that are critical to the advancement of energy science and technology and new and emerging computing technologies; and

“(ii) advanced 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 effectively fulfilled its mission to create a broad ecosystem that provides

of, are package, no el e at a ion em, and applica ion rele an o he cience and engineering req iremen of he Depar men, and ha + ch prod- + c m+ be main ained and impro ed in order ha he fl po en ial of he deplo ed em can be con in+ l reali ed.

“(ii) SUSTAINMENT. The Secre ar hall eek o + ain and e ol e he eco em de cribed in clæ e (i) o en+ re ha he e+ a cale of, are ack and o her re earch of, are, ill con in+ e o be main ained, hard- ened, and o her, i e op imi ed for long- erm + e on e+ a cale em and be ond and reliable a ailabili o he+ er comm+ ni .”; and

(5) b adding a he end he follq ing:

“(e) ADVANCED COMPUTING PROGRAM.

“(1) IN GENERAL. The Secre ar hall e abli h a program o de elop and implemen a ra eg for achie ing comp+ ing em, i h capabili e be ond e+ a cale comp+ ing em. In e abli hing hi program, he Secre ar hall

“(A) main ain fæ nda ional re earch program in ma hema cal, comp+ a ional, and comp+ er cience foæ ed on ne and emerging comp+ ing need, i hin he mi ion of he Depar men, incl ding po -Moore, la comp+ ing archi ec+ re, no el approache o modeling and im+ la ion, ar ificial in elligence and cien ific machine learning, q an+ m comp+ ing, edge comp+ ing, e+ reme he erogenei, incl ding po en ial q an+ m accelera or, and di rib+ ed high-performance comp+ ing;

“(B) re ain be prac ice and main ain + ppor for e en ial hard ware, applica ion, and of, are elemen of he E+ a cale Comp+ ing Program ha are nece ar for + aining he i ali of a long- erm capable of, are eco em for e+ a cale and be ond; and

“(C) de elop a Depar men, ide ra eg for balancing on-premi e and clæ d- ba ed comp+ ing and cien ific da a managemen .

“(2) REPORT. No la er han 1 ear af er he da e of enac - men of he Re earch and De elopmen, Compe i ion, and Inno a ion Ac, he Secre ar hall + bmi o he Commi ee on Science, Space, and Technolog of he Hæ e of Repre en a- i e and he Commi ee on Energ and Na+ ral Re æ rce of he Sena e a repor on he de elopmen and implemen a ion of he ra eg de cribed in paragraph (1).

“(f) GUIDANCE ON MITIGATION OF BIAS IN HIGH-PERFORMANCE COMPUTING CAPABILITIES. In le eraging high-performance comp+ ing em for re earch p rpo e, incl ding hræ gh he+ e of machine learning algori hm for da a anal i and ar ificial in elligence, he Secre ar hall i + e, and en+ re adherence o, g idance for he Depar men, he Na ional Labora orie, and+ er a o hq ho e capabili e hæ ld be emplo ed in a manner ha mi iga e and, o he ma+ im+ m e+ en prac icable, a oid harmf l algori hmic bia .

“(g) ARCHITECTURAL RESEARCH IN HETEROGENEOUS COMPUTING SYSTEMS.

“(1) IN GENERAL. The Secre ar hall carr æ a program of re earch and de elopmen in he erogeneæ and reconfig rable comp+ ing em o e+ pand+ nder anding of

the potential for heterogeneous and reconfigurable computing to deliver high performance, high efficiency computing for Departmental mission challenges. The program shall include research and development that explore the convergence of big data analytics, simulation, and artificial intelligence to drive the design of heterogeneous computing 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 material research supported by the Basic Energy Science 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-performance computing, artificial intelligence, and efficient 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 development of energy efficient hardware, software, and applications across all applicable program offices of the Department, and provide access to energy efficient computing resources to each partner;

“(ii) develop hardware and software technologies that decrease the energy need of advanced computing practices, including through data center optimization;

“(iii) consider multiple heterogeneous computing architectures in collaboration with the program established under subsection (g), including nonomorphic computing, persistent computing, and distributed networking; and

“(i) 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 subsection (A)(i), the Secretary shall select participants through a competitive, merit-reviewed 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 subsection (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 upgrade of the Energy Science Network facilities in order to meet the research needs of the Department for highly reliable data and superior 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 high performance computing across the continental United States and the Atlantic Ocean.

“(B) To ensure network reliability.

“(C) To protect the network infrastructure from cyber attack.

“(D) To manage resources of exponential increasing levels of data from the Department, National Laboratories, and other 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 section

“(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. Of the 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) \$1,126,950,000 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 Information Science 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 an facility, experiment,

or capabilities that are necessary to enable the development and deployment of scalable and diverse quantum networking technologies.”

(2) DEPARTMENT OF ENERGY QUANTUM NETWORK INFRASTRUCTURE RESEARCH AND DEVELOPMENT PROGRAM.

(A) IN GENERAL. Title IV of the National Quantum Initiatives 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 networking infrastructure in order to

“(1) facilitate the advancement of diversified quantum computing technologies; and

“(2) improve the precision of measurements of scientific phenomena and physical imaging technologies;

“(3) develop core national quantum communication technologies and strategies;

“(4) demonstrate quantum networking utilizing the Department of Energy’s Energy Science Network User Facilities; and

“(5) advance the relevant domestic supply chain, manufacturing capabilities, and associated implementation 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, including, National Laboratories, in the area of higher education, and other research in the area of facilitating quantum networking methods and technologies, including

“(A) quantum-limited detectors, ultrahigh optical channel, space-ground connection, and classical networking and cyber security protocols;

“(B) entanglement and hyper-entangled state generation and transmission, control, and measurement of quantum states;

“(C) quantum interconnection of all-range local connection between quantum processors;

“(D) standards for quantum state and signal between optical, a long-haul regime, including electrocommunication regime and quantum computer-relevant domain, including microscale;

“(E) development of quantum memory buffer and small-scale quantum computer hardware compatible with photonic quantum bits in the optical or electrocommunication, a long-haul;

“(F) long-range engineering development, including all engineering-based projects, a heavy industrial and large-scale atomic processes, a heavy industrial and space-based development of atomic reactors and optical or laser communication;

“(G) atomic reactors, multiplexers, reactors, and related technologies necessary to create energy long-distance atomic communication; and

“(H) investigation of electromagnetic atomic technology back in optical computing networks, including development of remote controlled, high-performance, and reliable implementation of key atomic networks, components leveraging the expertise, infrastructure and supplemental investments of the National Labor Office in the Energy Science Network User Facility;

“(3) engage with the Atomic Economic Development Corporation and other organizations, as applicable, organizations components technologies to help facilitate appropriate development of an atomic supply chain for atomic networks technology;

“(4) advance basic research in advanced scientific computing, particle and nuclear physics, and materials science to enhance the understanding, prediction, and manipulation of material, process, and physical phenomena relevant to atomic networks infrastructure;

“(5) develop experimental tools and methods in collaboration with the Energy Science Network User Facility necessary to support cross-fundamental research and development activities with direct stakeholder from industry, National Labor Office, and in addition of higher education; and

“(6) consider atomic networks infrastructure application haspan the Department of Energy's mission 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 Labor Office;

“(6) industry stakeholder;

“(7) in addition of higher education; and

“(8) the National Atomic Information Science Research

Center.

“(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 Commission on Science, Space, and Technology of the House of Representatives and the Commission on Energy and Natural Resources of the Senate a 4-year research plan identifying and prioritizing basic research need relating to atomic networks 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, hereinafter 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 cloud for research purposes.

“(1) to enhance the United States quantum research enterprise;

“(2) to educate the workforce;

“(3) to accelerate the advancement of United States quantum computing capabilities; and

“(4) to advance the relevant domestic supply chain, manufacturing processes, and associated infrastructure or modeling capabilities.

“(b) PROGRAM. In carrying out this section, the Secretary shall

“(1) coordinate, in

“(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 research based within the United States, in-house access, and use of United States quantum computing resources through a competitive, merit-reviewed process;

“(3) consider application from the National Labor Organization, multi-institutional collaboration, institution of higher education, industry stakeholder, and any other entity that the Secretary determines are appropriate to provide national leadership on quantum computing related issues;

“(4) coordinate, in his primary role as stakeholder, leadership, and in engagement partnership program development and best management practice; and

“(5) to the extent practicable, balance and encourage commercial opportunities available for use across a broad class of application and Federal research programs that enable benchmarking and identification 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 Labor Organization;

“(6) industry stakeholder;

“(7) institution of higher education; and

“(8) the National Quantum Information Science Research Center.

“(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, here 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, research and development program.

“Sec. 404. Department of Energy quantum 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 subparagraph (A) and (B) as clause (i) and (ii), respectively, and redesignating subparagraph (A) as (B);

(B) by redesignating paragraph (1) and (2) as subparagraph (A) and (B), respectively, and redesignating subparagraph (A) as (B);

(C) in the matter preceding subparagraph (A) (as so redesignated), by striking “A part of” and inserting the following:

“(1) IN GENERAL. A part of”; and

(D) by adding at the end the following:

“(2) AUTHORIZATION OF APPROPRIATIONS. Of the funds authorized to be appropriated under subsection (q), here is authorized to be appropriated to the Secretary to carry out activities described 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 “+ b e c i o n (i)” and inserting “hi + b e c i o n”;
- (B) in + b p a r a g r a p h (D), by striking “and” at the end;
- (C) in + b p a r a g r a p h (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 + b e c i o n (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 later than 2 national teams described in paragraph (2) that shall

“(A) develop conceptual pilot plan design and technology roadmap; 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 industry; and

“(B) include public-private partnerships.

“(3) AUTHORIZATION OF APPROPRIATIONS. Of the funds authorized to be appropriated for Fusion Energy Science in a fiscal year, there are authorized to be appropriated to the Secretary to carry out the following:

“(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 + b e c i o n (o) as + b e c i o n (r);

(7) by inserting after + b e c i o n (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 plasma and materials for high temperature and density;

“(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 take advantage of the expertise from the private sector, in addition to higher education, and the National Laboratories to leverage existing, and developing, computational software and capabilities that protect and enhance the

accelerate research and development of fusion energy.

“(B) To develop computational tools to simulate and predict fusion energy science phenomena has many beneficial high physical experimental.

“(C) To increase the utilization of the research infrastructure of the Department by coordinating, in the Advanced Scientific Computing Research program, within the Office of Science.

“(D) To leverage experience from existing modeling and simulation in 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 industrial engineering and industrial capabilities to accelerate the realization of fusion energy technology and energy.

“(3) DUPLICATION. The Secretary shall ensure the coordination of, and avoid unnecessary duplication of, the activities of the program under paragraph (1), in the activities of

“(A) other research entities of the Department, including the National Laboratories, the Advanced Research Project 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, in 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 analytic technology 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

“(i) another 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 elect the Center on a competitive, merit-based 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, in addition of higher education, and the National Laboratories to enhance existing computational and development computational software and capabilities to accelerate the commercial application of fusion energy.

“(ii) MAINTENANCE OF RESOURCE AVAILABILITY.

The Secretary may enter into contracts with commercial cloud computing providers to ensure the availability within the Department of recorded or digital information related to the activities of the Center.

“(F) DURATION. Subject to paragraph (G), the Center shall receive support for a period of no more than 5 years, subject to the availability of appropriation.

“(G) RENEWAL. On the expiration of the period of support of the Center under paragraph (F), the Secretary may renew support for the Center, on a merit-based basis, for a period of no more than 5 years.

“(p) MATERIAL PLASMA EXPOSURE EXPERIMENT.

“(1) IN GENERAL. The Secretary shall conduct a Material Plasma Exposure Experiment facility as described in the 2020 public law approved by the Fusion Energy Science Advisory Committee entitled ‘Pursuing the Future: Fusion and Plasma’. The Secretary shall conduct, in the private sector, in addition 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-heating, 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 edge of 1 Tesla.

“(B) An energy flux at the edge of 10 MW/m².

“(C) The ability to expose pre-irradiated plasma-facing material samples to plasma.

“(3) START OF OPERATIONS. The Secretary shall, subject to the availability of appropriation, ensure that the start of full operation of the facility described in paragraph (1) occurs before December 31, 2027.

“(4) FUNDING. Of the funds authorized to be appropriated for Fusion Energy Science, here are authorized to be appropriated to the Secretary for the Office of Fusion Energy Science 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 of the Matter in Extreme Condition end station at the Linac Coherent Light Source as described in the 2020

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“(2) START OF OPERATIONS. The Secre ar hall, + bjec
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before December 31, 2028.”; and

(8) in + b ec ion (r) (a o rede igna ed)

(A) b riking “There” and in er ing “O of f nd
a hori ed o be appropria ed for he Office of Science
in a fi cal ear, here”; and

(B) b riking paragraph (3) hrø gh (5) and in er ing
he follo ing:

“(3) \$1,025,500,400 for fi cal ear 2023;

“(4) \$1,043,489,724 for fi cal ear 2024;

“(5) \$1,053,266,107 for fi cal ear 2025;

“(6) \$1,047,962,074 for fi cal ear 2026; and

“(7) \$1,114,187,798 for fi cal ear 2027.”.

(b) ITER CONSTRUCTION. Sec ion 972(c)(3) of he Energ Polic
Ac of 2005 (42 U.S.C. 16312(c)(3)) i amended

(1) in + b paragraph (A), b riking “and” a he end;
and

(2) b riking + b paragraph (B) and in er ing he fol-
lq ing:

“(B) \$379,700,000 for fi cal ear 2023;

“(C) \$419,250,000 for fi cal ear 2024;

“(D) \$415,000,000 for fi cal ear 2025;

“(E) \$370,500,000 for fi cal ear 2026; and

“(F) \$411,078,000 for fi cal ear 2027.”.

SEC. 10106. HIGH ENERGY PHYSICS PROGRAM.

(a) PROGRAM. Sec ion 305 of he Depar men of Energ
Re earch and Inno a ion Ac (42 U.S.C. 18643) i amended

(1) b rede igna ing + b ec ion (b) hrø gh (d) a + b-
ec ion (d) hrø gh (f), re pec i el ; and

(2) b in er ing af er + b ec ion (a) he follo ing:

“(b) PROGRAM. A par of he ac i i ie a hori ed + nder ec-
ion 209 of he Depar men of Energ Organi a ion Ac (42 U.S.C.
7139), he Direc or hall carr ø a re earch program in elemen ar
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“(c) HIGH ENERGY FRONTIER RESEARCH. A par of he pro-
gram de cribed in + b ec ion (b), he Direc or hall carr ø
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icle and in e iga e f ndamen al force .”.

(b) INTERNATIONAL COLLABORATION. Sec ion 305 of he
Depar men of Energ Re earch and Inno a ion Ac (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) a practicable and in coordination, in his or her appropriate Federal agency 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 the ongoing United States participation in the Large Hadron Collider, and prioritize expanding international partnership and involvement 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 international facilities having global priority to the most advanced accelerators and facilities in the world of 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 constituents of the universe, including the nature of dark energy and dark matter. The activities shall, to the maximum extent practicable, be conducted in his or her research priority identified by the High Energy Physics Advisory Panel of the National Academy of Science, and may include

“(1) collaboration, in his or her National Aeronautics and Space Administration, the National Science Foundation, or in international partnership on relevant projects; and

“(2) the development of space-based, land-based, sea-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 practice, the Director shall, to the maximum extent practicable, be incorporating the findings and recommendations of the 2014 Particle Physics Project Prioritization Panel (P5) report entitled ‘Building for Discovery’, in support of 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 Experiment;

“(D) the Legacy Survey of Space and Time camera;

“(E) upgrade of detector 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 examine the fundamental properties of neutrinos, explore physics beyond the Standard Model, and better clarify the existence and nature of an imaginary.

“(B) FACILITY CAPABILITIES. The Secretary shall ensure that the facility described in subparagraph (A) will provide, as a minimum, the following capabilities:

“(i) A neutrino beam with a bandwidth capability of 1.2 megawatts of beam power and upgradeable to 2.4 megawatts of beam power.

“(ii) 3 caverns excavated for a 70 kiloton fiducial detector mass and supporting surface building and utilities.

“(iii) Cryogenic system to support neutrino detector.

“(C) START OF OPERATIONS. The Secretary shall, by the date of availability of appropriation, ensure that the start of full operation of the facility described in subparagraph (A) occurs before December 31, 2031.

“(D) FUNDING. Out of funds authorized to be appropriated under this section (k), there are authorized to be appropriated to the Secretary 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 of the Fermilab accelerator complex identified in the 2014 Particle Physics Project Prioritization Panel (P5) report entitled ‘Building for Discovery’, to provide the ‘world’ momentum in the 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 further significant contributions to the capabilities of this project.

“(B) FACILITY CAPABILITIES. The Secretary shall ensure that the facility described in subparagraph (A) will provide, as 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 user experiments and a customized beam tailored to specific scientific needs.

“(iv) Sustained high reliability operation of the Fermilab accelerator complex.

“(C) START OF OPERATIONS. The Secretary shall, in connection with the availability of appropriation, ensure that the start of full operation of the facility described in subparagraph (A) occurs before December 31, 2028.

“(D) FUNDING. Of the funds authorized to be appropriated under subsection (k), here 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 realize the cosmic microwave background observation theory of cosmic inflation as described in the 2014 Particle Physics Prioritization Panel (P5) report entitled ‘Building for Discovery: Strategic Plan for U.S. Particle Physics in the Global Context’.

“(B) CONSULTATION. The Secretary shall consult with the appropriate sector, in addition to 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 accelerating the ultra-high energy physics of inflation and improving our understanding.

“(C) EXPERIMENTAL CAPABILITIES. The Secretary shall ensure that the maximum experimental capabilities of the facility described in subparagraph (A) will provide, at a minimum, 500,000 superconducting detector deployed on an array of millimeter-scale elements within the required range in frequency, intensity, and speed that will provide sufficient capabilities to enable an order of magnitude advance in observation of the Cosmic Microwave Background, delivering transformative discoveries in fundamental physics, cosmology, and astrophysics.

“(D) START OF OPERATIONS. The Secretary shall, in connection with the availability of appropriation, ensure that the start of full operation of the facility described in subparagraph (A) occurs before December 31, 2030.

“(E) FUNDING. Of the funds authorized to be appropriated under subsection (k), here 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, maintain high reliability, and improve precision measurements to advance the highest priority particle physics research program. In carrying out facility

to upgrade, 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. A 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 need 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 mission of the Department and the scientific need of the High Energy Physics program, including host laboratories in the most recent report of the Particle Physics Project Prioritization Panel of the High Energy Physics Advisory Panel, leverage the capabilities of relevant underground science and engineering facilities;

"(2) carry out a competitive grant program of advanced scientific and engineering education, higher education, non-profit education, 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 in-depth underground mine in the United States that may be suitable for future development of underground science and engineering facilities and an anticipated challenge associated with reporting, repair, facilities, or construction.

"(k) AUTHORIZATION OF APPROPRIATIONS. 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. A 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 and address 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 neutron and answer fundamental questions about the nature of matter.

"(2) FACILITY CAPABILITY. The Secretary shall ensure that the facilities described in paragraph (1) meet the requirements in the 2015 Long Range Plan described in this paragraph, including

"(A) at least 70 percent polarized beam of electron and light ion;

"(B) ion beam from deuterium or other suitable nuclei;

"(C) variable center of mass energy from 20 to 140 GeV;

"(D) high collision luminosity of $10^{33-34} \text{cm}^{-2} \text{s}^{-1}$; and

"(E) the possibility of more than 1 interaction region.

"(3) START OF OPERATIONS. The Secretary shall, subject to the availability of appropriation, ensure that the start of full operation 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 appropriated 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 evaluate all available approaches and mechanisms, and the Secretary determine to be appropriate, including

"(1) capital investments;

"(2) minor construction projects;

"(3) energy saving performance contracts;

"(4) utility energy service contracts;

"(5) alternative financing; and

"(6) other spending.

"(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 Appropriation and the Committee on Energy and Natural Resources of the Senate and the Committee on Appropriation and the Committee on Science, Space, and Technology of the House

of Representative 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. Of the 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. A 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 partnership in development, demonstration, and enable the commercial application of accelerator technology;

“(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 creating accelerator technologies including conducting magnetic and accelerator, beam physics, data analytic-based accelerator control, implementation of rare, new particle science, advanced laser technology, and transformational 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 partnership to foster the development, demonstration, and commercial application of accelerator technology, including advanced conducting wire and cable, conducting RF cavities, and high efficiency radiofrequency power sources for accelerators.

“(d) RESEARCH COLLABORATIONS. In developing accelerator technology under the program authorized under subsection (a), the Director shall

“(1) consider the requirements necessary to support translational research and development for medical, industrial, energy, and defense application; and

“(2) leverage investments in accelerator technology 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 technology.

“(e) AUTHORIZATION OF APPROPRIATIONS. Of the 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 supply.

“(2) EXCLUSION. In this section, the term ‘critical radioactive and stable isotope’ does not include the medical isotope molybdenum-99, the production and supply of which is addressed in the American Medical Isotope Production Act of 2012 (Public Law 112-239; 126 Stat. 2211) (including the amendments made by this 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 of production, 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 by production, importation, and related activities;

“(C) to maintain and enhance the infrastructure required to produce and supply critical radioactive and stable isotope production and related activities;

“(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 maintaining workforce development;

“(E) to reduce domestic dependence 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, including the 2015 report of the Nuclear Science Advisory Committee entitled ‘Meeting Isotope Needs and Capacity Opportunities for the Future’; and

“(ii) a system of isotope supply chain, including the elements described in paragraph (3),

an report submitted pursuant to subsection (d), and other criteria and requirements;

"(2) entities having production activities carried out under this subsection are consistent with the amendments of policies and procedures for Transfer of Commercial Radioactive Production and Distribution of Priority ' (30 Fed. Reg. 3247 (March 9, 1965));

"(3) are the domestic requirements of criteria and application, including controlling, identifying area having requirements for expedited development of domestic production capacity for home use, including through public-private partnership, appropriate;

"(4) entities have action taken by the Department do not interfere, in any way, competition, or otherwise adversely affect efforts by the private sector to make available or otherwise facilitate the development of critical radioactive and stable isotope, including efforts undertaken through agreements between the Department or contractor of the Department and the private sector; and

"(5) in coordination with the Assistant Secretary for Nuclear Energy, appropriate for demonstrating the production of critical radioactive and stable isotope in research, development, or commercial nuclear reactor and accelerator, including reactor and accelerator operated activities.

"(c) ADVISORY COMMITTEE.

"(1) IN GENERAL. Not later than 90 days after the date of enactment of this section, the Secretary 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 referred to in paragraph (b) of the IAEA Subcommittee of the Nuclear Science Advisory Committee; and

"(B) to provide expert advice and assistance to the Director in carrying out this program.

"(2) REPORT.

"(A) IN GENERAL. Not later than 1 year after the committee is established, the committee shall

"(i) submit the 2015 Nuclear Science Advisory Committee IAEA Subcommittee Report entitled 'Meeting IAEA Needs and Capacity Opportunities for the Future'; and

"(ii) periodically submit reports hereafter as needed.

"(B) INCLUSIONS. Any submitted report under paragraph (A) shall include an assessment of

"(i) criteria demand in the United States for critical radioactive and stable isotope;

"(ii) the impact of continued reliance on foreign development of critical radioactive and stable isotope;

"(iii) proposed mitigation strategies, including increasing domestic production capacity for critical radioactive and stable isotope, that

"(I) are not commercially available; or

"(II) are commercially produced in quantities that are not sufficient

“(aa) to address domestic demand; and

“(bb) to minimize production constraints and to support the production of the United States health care and industrial infrastructure;

“(i) to assess facilities, including upgrades of those facilities, and new facilities needed to meet domestic critical infrastructure needs; and

“(j) workforce development needs.

“(3) NONDUPLICATION. The committee shall work in alignment with, and shall not duplicate the efforts of, preceding advisory committee hearings on the program established under subsection (b).

“(4) FACILITY. The committee shall be subject to the Federal Advisory Committee Act (5 U.S.C. App.).

“(d) REPORT.

“(1) IN GENERAL. No later than the end of the first fiscal year beginning after the date of enactment of this section, and biennially hereafter, the Secretary of Energy Advisory Board shall transmit to the Committee on Energy and Natural Resources and Environment and Public Work of the Senate and the Committee 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 shortage in the United States;

“(B) a description of

“(i) any production in the international supply of critical radioactive and stable isotope during the preceding 2 fiscal years; and

“(ii) the impact of those production on related activities; and

“(C)(i) a projection of any anticipated production in the international supply, or supply constraints, of critical radioactive and stable isotope during the next 2 fiscal years; and

“(ii) the anticipated impact of those production 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. No 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 program of the program established under paragraph (1) to support the development and commercial demonstration of critical radioisotope 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 paragraph (A).

“(C) DEFINITION OF CRITICAL RADIOACTIVE AND STABLE ISOTOPE. In this paragraph, the term ‘critical radioisotope 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 conduct a radioisotope processing facility to provide for the growing radiochemical processing capabilities needed to address, in the production of critical radioisotope isotope authorized under section 311 of the Department of Energy Research and Innovation Act.

(2) FUNDING. Of the 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 isotope;

(C) to promote economic resilience; and

(D) to conduct research and development on stable isotope production and advanced methods and technology.

(2) FUNDING. Of the 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 programmatic facilities collaboration between and among each elementary school and secondary school, Federal local educational agencies, Federal institutions of higher education, early-career researchers, Federal institutions of higher education, and the National Laboratories, including through the use of proven techniques to expand the number of individuals from underrepresented groups providing and gaining skills or undergraduate and graduate degree 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 “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) professional working in disciplines relevant to the mission of the Department; and

“(2) broaden the recruitment pool to increase participation from Historically Black College or Universities (as defined in section 3167B(f)), Hispanic-serving institutions (as defined in the Act), Tribal College or Universities (as defined in the Act), minority-serving institutions (as defined in the Act), institutions eligible for jurisdiction (as defined in the Act), emerging research institutions, community colleges, and scientific societies in the discipline.”

“(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 Committee 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 program supported by the Department, including

“(1) a plan for + ppor ing rele an Federal re earch a ard gran ee and le eraging he Na ional Science Fø nda ion INCLUDES Na ional Ne, ork and rele an par ner hip , incl ding par ner hip main ained b o her Federal re earch agencie ;

“(2) me ric for a e ing he par icipa ion of + nderrep- re en ed grø p in program + ppor ed b he Depar men ;

“(3) e, periened and po en ial barrier o broadening par icipa ion of + nderrep- re en ed grø p in program + ppor ed b he Depar men , incl ding recommended ol ion ; and

“(4) an o her ac i i ie he Secre ar de ermine appro- pria e.

“(c) AUTHORIZATION OF APPROPRIATIONS. Of he amø n a, hori ed o be appropria ed + nder ec ion 3169, no le han \$2,000,000 i a, hori ed o be appropria ed each fi cal ear for he ac i i ie de cribed in hi ec ion.

“SEC. 3167B. EXPANDING OPPORTUNITIES FOR HIGHLY SKILLED SCIENCE, TECHNOLOGY, ENGINEERING, AND MATHEMATICS (STEM) PROFESSIONALS.

“(a) IN GENERAL. The Secre ar hall

“(1) e, pand oppor+ ni ie and increa e he n, mber of highl killed cience, echnolog , engineering, and ma hema ic (STEM) profe ional , orking in di cipline rele an o he mi ion of he Depar men ; and

“(2) broaden he recr i men pool o increa e par icipa ion from and e, pand par ner hip , i h Hi oricall Black College or Uni er i ie , Hi panic er ing in i+ ion , Tribal College or Uni er i ie , minori - er ing in i+ ion , in i+ ion in eligible j ri dic ion , emerging re earch in i+ ion , comm- ni college , and cien ific ocie ie in ho e di cipline .

“(b) PLAN AND OUTREACH STRATEGY.

“(1) PLAN.

“(A) IN GENERAL. No la er han 180 da af er he da e of enac men of he Re earch and De elopmen , Compe i ion, and Inno a ion Ac , he Secre ar hall + bmi o he Commi ee on Science, Space, and Technolog of he Hø e of Repre en a i e and he Commi ee on Energ and Na+ ral Re ø rce of he Sena e a 10- ear ed ca ional plan o f nd and e, pand ne, or e, i ing program admini- ered b he Office of Science and i ed a he Na ional Labora orie and Depar men + er facili ie o e, pand ed- ca ional and , orkforce de elopmen oppor+ ni ie for + nderrep- re en ed indi id al , incl ding

“(i) high school, + ndergrad a e, and grad a e + - den ; and

“(ii) recen grad a e , eacher , and faø l in STEM field .

“(B) CONTENTS. The plan + nder + bparagraph (A) ma incl de paid in ern hip , fellø hip , emporar emplo men , raining program , i i ing + den and fac- + l program , abba ical , and re earch + ppor .

“(2) OUTREACH CAPACITY. The Secre ar hall incl de in he plan + nder paragraph (1) an ø reach ra eg o impro e he ad er i ing, recr i men , and promo ion of ed ca ional and , orkforce de elopmen program o comm- ni college , Hi oricall Black College or Uni er i ie , Hi panic- er ing

in institution, Tribal College or University, minority-serving institution, institution eligible for designation, and emerging research institution.

“(c) BUILDING RESEARCH CAPACITY.

“(1) IN GENERAL. The Secretary shall develop a program that strengthens the research capacity and role of the Office of Science discipline and emerging research institution, including minority-serving institution, Tribal College or University, Historically Black College or University, institution eligible for designation (as defined in section 2203(b)(3)(A) of the Energy Policy Act of 1992 (42 U.S.C. 13503(b)(3)(A))), institution in community, high-technology, or other previously employed in manufacturing, energy production, including coal power plant, and mineral and material mining, and other institution of higher education.

“(2) INCLUSIONS. The program developed under paragraph (1) may include

“(A) enabling master and joint managed partnerships between research institutions and emerging research institution; and

“(B) soliciting research proposals, fellowships, training programs, and research support directly from emerging research institution.

“(d) TRAINEESHIPS.

“(1) IN GENERAL. The Secretary shall establish a national Traineeship Program to address workforce development need in STEM field and role of the Department.

“(2) FOCUS. The focus of the Traineeship Program established under paragraph (1) shall be on

“(A) supporting workforce development and research experience for underrepresented undergraduate and graduate students; and

“(B) increasing participation from underrepresented populations.

“(3) INCLUSION. The traineeship 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 program of the Office of Science.

“(e) EVALUATION.

“(1) IN GENERAL. The Secretary shall establish the performance indicators to measure and monitor progress of education and workforce program and expand Department 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 Pension of the Senate a report summarizing progress and measuring the 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 location, a high school, a high school degree, or the predominant high school degree, in an academic degree; or

“(B) a 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 ‘public 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 an of paragraph (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 technology 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 Authorization Act for Fiscal Year 1991 (Public Law 101 510; 104 Stat. 1497) is amended by striking the item relating to section 3167 and 3168 and inserting the following:

“Sec. 3167. Partnership in historically Black college and university, Hispanic-serving institution, and tribal college.

“Sec. 3167A. Broadening participation for teacher and scientist.

“Sec. 3167B. Expanding opportunity for high skilled science, technology, engineering, and mathematics (STEM) professional.

“Sec. 3168. Definition.

“Sec. 3169. Authorization of appropriation.”.

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 in accordance with the recommendation of the National Academic Report on High Intensity Laser Research.”

Ul rafa La er : Reaching for the Bright Light' and the report from the Bright Light Initiative, workshop entitled 'The Future of Innovation in the U.S.'. The initiative would include research and development of pe a a -cale and of high a erage p q er la er echnologie nece ar for f + re facili need in di -co er cience and o ad ance energ echnologie , a ell a + ppor for a + er ne, ork of academic and Na ional Labora or high in en i la er facili ie .

“(b) LEVERAGE. The Director shall leverage ne la er echnologie for more compac , le comple , and lq -co accelera or em needed for cience applica ion .

“(c) COORDINATION.

“(1) DIRECTOR. The Director shall coordinate the initiative e abli hed + nder + b ec ion (a) among all rele an program , i hin the Office of Science.

“(2) UNDER SECRETARY. The Under Secretary for Science shall coordinate the initiative e abli hed + nder + b ec ion (a) , i ho her rele an program , i hin the Depar men and o her Federal agencie .

“(d) AUTHORIZATION OF APPROPRIATIONS. O of f nd a hori ed o be appropria ed for the Office of Science in a fi cal ear, here are a hori ed o be appropria ed o the Secretary o carr he ac i i ie de cribed in hi ec ion

“(1) \$50,000,000 for fi cal ear 2023;

“(2) \$100,000,000 for fi cal ear 2024;

“(3) \$150,000,000 for fi cal ear 2025;

“(4) \$200,000,000 for fi cal ear 2026; and

“(5) \$250,000,000 for fi cal ear 2027.

“SEC. 314. HELIUM CONSERVATION PROGRAM.

“(a) IN GENERAL. The Secretary shall e abli h a program o red ce the con + mp ion of heli m for Depar men gran recipien and facili ie and encorage heli m rec cling and re e. The program shall compe i i el a ard gran for

“(1) the p rcha e of eq ipmen o cap + re, re e, and rec cle heli m;

“(2) he in alla ion, main enance, and repair of ne and e i ing heli m cap + re, re e, and rec cling eq ipmen ; and

“(3) heli m alerna i e re earch and de elopmen ac i i ie .

“(b) REPORT. No la er han 2 ear af er the da e of enac -men of the Re earch and De elopmen , Compe i ion, and Inno a -ion Ac , and e er 3 ear hereaf er, the Director shall + bmi o the Commi ee on Science, Space, and Technolog of the Ho e of Repre en a i e and the Commi ee on Energ and Na + ral Re o rce of the Sena e a repor on the p rcha e of heli m a par of re earch projec and facili ie + ppor ed b the Depar men . The repor shall incl de

“(1) the o an i of heli m p rcha ed for projec and facili ie + ppor ed b Depar men gran ;

“(2) a co -anal i for + ch heli m;

“(3) o the ma i m e en prac icable, informa ion on the her + ch heli m , a impor ed from o ide the Uni ed S a e , and if a ailable, the co n r or region of the orld from, hich the heli m , a impor ed;

“(4) expected or experienced impact of helicopter age or price on the research project and facilities supported by the Department; and

“(5) recommendation for reducing Department grant recipient's helicopter price and helicopter age.

“(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 helicopter cooperation.

“(d) DURATION. The program established under this section shall receive support for a period of no more than 5 years, subject to the availability of appropriation.

“(e) RENEWAL. Upon expiration of an period of support for the program under this section, the Director may renew support for the program for a period of no 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 research and tools, other facilities, and advanced computational and networking capabilities of the Department in order to support efforts to prevent, prepare for, predict, and respond to biological threats to national security, including infectious disease.

“(b) COMPETITIVE, MERIT-REVIEWED PROCESS. The Secretary shall carry out the initiative established under subsection (a) through a competitive, merit-reviewed process, and consider application from National Laboratories, institutions of higher education, multi-institutional collaboration, industry partner 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 this subsection;

“(2) prioritize the objectives of

“(A) supporting fundamental research and development in advanced analytical, experimental and diagnostic, materials science, and high-performance computing technologies needed in order to more quickly and effectively characterize, model, imitate, and predict complex natural phenomena and biological material related to emerging biological threats;

“(B) supporting the development of tools for inform epidemiological modeling, and applying artificial intelligence, machine learning, and other computing tools to accelerate such processes;

“(C) supporting research and capabilities enhancement under standing 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 the experimental and computational tools are accessible to relevant research communities,

including private sector and other Federal research institutions; and

“(F) supporting activities and projects that combine computational modeling and simulation, high performance research facilities and—

“(3) leverage the research infrastructure of the Department, including scientific computing, supercomputing, high performance computing, nanotechnology research centers, and engineering 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 other facilities of the Department by providing necessary access and other data transfer capabilities; and

“(5) ensure that experimental and computational tools are accessible to relevant research communities, including private sector and other emerging biological areas.

“(d) COORDINATION. In carrying out the initiatives 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 Center for Disease Control and Prevention;

“(6) the Director of the National Institute of Health;

“(7) the Assistant Secretary for Preparedness and Response;

“(8) the head 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 initiatives established under subsection (a) by providing, to the extent practicable, a centralized entity for multidisciplinary, collaborative, emerging infectious diseases and biosecurity research and development through high performance computing and advanced data analytic technologies and processes, in conjunction with the experimental research facilities and—

“(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 computing time, capabilities, or other resources.

“(3) ACTIVITIES. The Consortium shall—

“(A) match applications with available Federal and private sector computing resources;

“(B) consider supplemental awards for computing partnership with Consortium members to qualifying entities on a competitive basis;

“(C) encourage collaboration and communication among member representatives of the Congress and aardee ;

“(D) provide access to the high-performance computing capabilities, expertise, and other facilities of the Department and the National Laboratories ; and

“(E) transmit an annual report to the Secretary summarizing the activities of the Congress, including

“(i) describing each project undertaken by the Congress ;

“(ii) detailing organizational expenditures ; and

“(iii) evaluating contributions to the achievement of technical milestones determined in subsection (a).

“(4) COORDINATION. The Secretary shall ensure the coordination of, and avoid unnecessary duplication of, the activities of the Congress, 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, Competition, 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 Pension 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 achievement of the initiative, including the achievement of the technical milestones determined under the 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 mid-scale instrument and research equipment program to develop, acquire, and commercially research instrument and equipment needed to meet the mission 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) provide significant acceleration in scientific breakthroughs and other facilities ; and

“(2) encourage partnership among

“(A) National Laboratories ;

“(B) further facilities; and

“(C)(i) in addition in a State receiving funding under the Established Program of Stimulated 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 college or university;

“(iii) minority-serving institution of higher education;

or

“(i) institution of higher education in a rural area.

“(c) COORDINATION WITH OTHER PROGRAMS. The Director shall coordinate the program established under subsection (a), in 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 Transition, and relevant academic and private organizations to identify, demonstrate, and commercialize research in men, equipment, and related technologies developed to aid basic science research disciplines having 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 fiscal 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 in order after the item relating to section 309 the following:

“Sec. 310. Accelerate research and development.

“Sec. 311. Improve research, development, and production.

“Sec. 312. Increased collaboration, industry, and science.

“Sec. 313. High intensity laser research initiative.

“Sec. 314. Helium conservation program.

“Sec. 315. Office of Science Biological Threat Preparedness Research Initiative.

“Sec. 316. Mid career transition 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 clause (I), by inserting “nuclear energy,” before “and”; and

(B) by striking clause (V) and inserting the following:

“(V) scientific research, including
“(aa) advanced scientific computing
research;
“(bb) basic energy science;
“(cc) biological and environmental
research;
“(dd) fusion energy science;
“(ee) high energy physics;
“(ff) nuclear physics;
“(gg) cooperative 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 Sec-
retary.”; and

(3) in clause (ii)

(A) in clause (II), by striking “graduate” and
inserting “undergraduate scholar ship, graduate fel-
lowship, and”;

(B) in clause (III), by striking “; and” and insert-
ing “and staff”;

(C) in clause (IV)

(i) by striking “biennial” and insert-
ing “and

(ii) by striking the period at the end and insert-
ing a semicolon; and

(D) by adding at the end the following:

“(V) of development research center for particular
areas of expertise; and

“(VI) of directorial staff and 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 paragraph (F) and inserting the following:

“(F) RESEARCH CAPABILITY ENHANCEMENT.

“(i) SCHOLARSHIPS AND FELLOWSHIPS.

“(I) IN GENERAL. Paragraph (E)(ii), the Secretary shall award grants in in-
stitution of higher education in eligible jurisdiction
for the institution of higher education to provide
scholarship and fellowship.

“(II) GRANT. A scholarship or fellowship
awarded by an institution of higher education in
an eligible jurisdiction through a grant provided
under clause (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 fel-
lowship, shall be for a period of no more than
5 years.

“(ii) EARLY CAREER CAPACITY DEVELOPMENT.

“(I) IN GENERAL. Paragraph (E)(ii), the Secretary shall award grants to early

career faculty and staff affiliation of higher education in eligible jurisdiction

“(aa) to support international research, including academic research equipment and instrumentation;

“(bb) to provide academic, identification and responding of funding opportunities;

“(cc) to provide technical assistance for the purchase of funding opportunities; and

“(dd) to develop and enhance collaboration among National Laboratories, Department of Energy program, the private sector, and other relevant entities.

“(II) GRANTS. A grant awarded under subsection (I) shall be

“(aa) for a period of no more than 5 year; and

“(bb) competitive renewable for an additional 5-year period.

“(iii) RESEARCH CAPACITY DEVELOPMENT.

“(I) IN GENERAL. Pursuant to paragraph (E)(ii), the Secretary shall award competitive grants in jurisdiction of higher education in eligible jurisdiction for research capacity development and implementation, including

“(aa) developing expertise in key technology area, including academic equipment and instrumentation;

“(bb) developing and acquiring novel, state-of-the-art instrumentation and equipment having a 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 program; and

“(dd) supporting formal partnership program with jurisdiction of higher education and National Laboratories.

“(II) GRANTS. A grant awarded under subsection (I) shall be

“(aa) for a period of no more than 5 year; and

“(bb) renewable for an additional 5-year period.

“(III) EQUIPMENT AND INSTRUMENTATION. To the maximum extent practicable, the Secretary shall encourage research equipment and instrumentation developed or acquired pursuant to a grant awarded under subsection (I) to maintain continuous operation and be maintained, in light of the need for additional or better equipment 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 Research 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 committee described in clause (i).”.

(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:

“(i) 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 expenditure 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 in a jurisdiction of higher education located in an eligible jurisdiction; and

“(bb) the amount and type of each award;

“(III) the number of awards that are not EPSCoR awards made by the Secretary in a jurisdiction of higher education located in an eligible jurisdiction;

“(IV)(aa) the number of representatives of a jurisdiction of higher education in an eligible jurisdiction serving on each Office of Science and Technology committee; and

“(bb) for each such advisory committee, the percentage of committee membership that is held by individuals from that jurisdiction; and

“(V) the number of individuals from a jurisdiction of higher education in an eligible jurisdiction 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 a jurisdiction of higher education that is not located in an eligible jurisdiction, the Secretary may not

“(I) the full amount of funds expended to provide the grant or award meeting the funding requirements in clause (iii) if the lead entity of the contractor is an institution of higher education located in an eligible jurisdiction; and

“(II) only the funds provided to an institution of higher education located in an eligible jurisdiction for the grant or award meeting the funding requirements in clause (iii) if the lead entity of the contractor 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 process 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 an institution of higher education, no less than 10 percent is awarded to an institution of higher education in an eligible jurisdiction pursuant to the evaluation and selection criteria in section 605.10 of title 10, Code of Federal Regulation (or successor regulation).

“(i) ADDITIONAL FUNDS FOR EQUIPMENT AND INSTRUMENTATION. In addition to funds authorized to be appropriated under clause (i), hereinafter authorized to be appropriated to the Secretary to award grants under paragraph (F)(iii)(I) for the purpose described in item (bb) of paragraph \$25,000,000 for each of fiscal years 2023 through 2027, to remain available until expended.

“(j) ACCOUNTING. To the maximum extent practicable, the Secretary shall ensure that each program within the Department of Energy has endorsed an EPSCoR grant award shall contribute funding to the award to acknowledge the research benefits of 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 Under Secretary for Science shall seek to ensure, to the maximum extent practicable, the robust participation of an institution of higher education (as defined in section 101 of the Higher Education Act of 1965 (20 U.S.C. 1001)) 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))) 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 paragraph (B), to present a risk of theft of United States intellectual property or a threat to the national security of the United States if national of the country, or an individual owned or controlled by the country or national of the country, participates in an 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 paragraph (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 an 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 an entity, including a national, having

(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 enforced in Supplement No. 4 to part 744 of title 15, Code of Federal Regulation;

(D) included in the list required by section 9(b)(3) of the United States 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 having jurisdiction, authority, or responsibility, a supporting or manageable threat

(i) to the national security of the United States;

or

(ii) of the foreign or local 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 a pool and procedure to manage and mitigate research efforts in the field of science and technology, informed by the Director of the Office of Intelligence and Counterintelligence, to facilitate determination of the risk of loss of United States intellectual property or creation of the national efforts of the United States posed by activities carried out under an covered program.

(2) CONTENT AND IMPLEMENTATION. In developing and operating the pool and procedure developed under paragraph (1), the Secretary shall

(A) develop risk-based approaches to evaluating, assessing, and managing certain research, development, demonstration, and deployment activities, including designation of high-risk activities; and

(B) advise the Secretary on the most 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 an covered program of unmanageable creation of United States national efforts or of the loss of United States intellectual property posed by an entity of concern;

(D) consider requiring recipients of covered programs to implement additional research efforts mitigation for higher-risk activities if appropriate; and

(E) support the development of research efforts training for recipients of covered programs on the risk posed by entities of concern.

(3) ANNUAL UPDATES. The pool and procedure developed under paragraph (1) shall be evaluated annually and updated as needed, with the Secretary informed by the Office of Intelligence and Counterintelligence, to reflect change 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 having a national or controlled interest, or under common ownership or control, in an entity of concern, may receive, or perform work under, an covered program.

(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 later than 2 weeks prior to issuing a waiver under paragraph (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 initiation of the waiver, including a justification for the waiver.

(3) PENALTY.

(A) TERMINATION OF SUPPORT. On finding that an entity of concern or individual described in paragraph (1) has received covered program and has not received a waiver

under paragraph (2), the Secretary shall terminate all covered property of concern or individual, as applicable.

(B) PENALTIES. An entity of concern or individual identified under paragraph (A) shall be

(i) prohibited from receiving or participating in covered property for a period of no less than 1 year but no more than 10 years, as determined by the Secretary; or

(ii) in each of the penalties described in clause (i), subject to any other penalty authorized under applicable law or regulation, the Secretary determine to be in the national interest.

(C) NOTIFICATION TO CONGRESS. Prior to imposing a penalty under paragraph (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 and justification for the penalty.

(4) COORDINATION. The Secretary shall

(A) share information about unmanageable breaches 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 obligation of the United States under international agreements.

(e) REPORT REQUIRED. No later than 240 days after the date of enactment of this Act, the Secretary shall submit to Congress a report that

(1) describe

(A) the pool and process developed under subsection (b)(1) and any update to the pool and process; and

(B) if applicable, the science and technology risk matrix developed under subsection (a) and how it has been applied;

(2) include a mitigation plan for managing risk posed by concern of risk, in the report of the ongoing research and development activities of the Department of Energy; and

(3) define 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 need-based" 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 standard organization” has the meaning given to that term in section 451 of the Trade Agreement 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 exercise 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 Repair; and

(C) \$372,350,000 is authorized for industrial technology exercise activities, of which \$275,300,000 is authorized to be appropriated for the Manufacturing Extension Partnership program under section 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. 278).

(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 exercise 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 Repair, including \$20,000,000 for IT infrastructure; and

(C) \$404,000,000 is authorized for industrial technology research 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, purchase, and support Federal coordination of supply chain databases maintained by the Center (as that term is defined in 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. 278).

(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 research 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 Repair, including \$20,000,000 for IT infrastructure; and

(C) \$719,000,000 is authorized for industrial technology research 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, purchase, and support Federal coordination of supply chain databases maintained by the Center (as that term is defined in 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. 278).

(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 research 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 Repair, including \$20,000,000 for IT infrastructure; and

(C) \$759,000,000 is authorized for industrial technology research 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 appropriated to maintain, purchase, and support Federal coordination of State and local chain data base maintained by the Center (as defined in section 25 of this Act)) and \$209,000,000 is appropriated for the Manufacturing USA Program under section 34 of the National Institute of Standards and Technology Act (15 U.S.C. 278).

(e) FISCAL YEAR 2027.

(1) IN GENERAL. There are appropriated 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 appropriated by paragraph (1)

(A) \$1,283,360,000 is appropriated for scientific and technical research and service laboratory activities;

(B) \$200,000,000 is appropriated for the construction and maintenance of facilities, of which \$80,000,000 is appropriated to be appropriated for Safety, Capacity, Maintenance, and Major Repair, including \$20,000,000 for IT infrastructure; and

(C) \$800,000,000 is appropriated for industrial technology service activities, of which \$550,000,000 is appropriated to be appropriated for the Manufacturing Extension Partnership program under section 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 appropriated to maintain, purchase, and support Federal coordination of State and local chain data base maintained by the Center (as defined in section 25 of this Act)) and \$250,000,000 is appropriated to be appropriated for the Manufacturing USA Program under section 34 of the National Institute of Standards and Technology Act (15 U.S.C. 278).

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 mechanism of construction of DNA information in cellular function;

(B) technologies for measurement of such biomolecular components and relationships;

(C) next generation, efficient, and precise 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) to provide access to information and expand the development of measurement infrastructure needed to develop technical standards to establish interoperability and facilitate commercial development of biomolecular measurement technology and engineering biological applications;

(3) convene industry, in addition of higher education, nonprofit organizations, Federal laboratories, and other Federal agencies engaged in engineering biological research and development to develop coordinated technical roadmap for a horizon of measurement of the molecular components of the cell;

(4) provide access to facilities, high advanced equipment, services, materials, and other resources to industry, in addition 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 biological research and development, in addition of higher education, Federal laboratories, and industry to advance engineering biological applications; and

(6) to provide graduate and postgraduate research and training in biotechnology, biomaterials, and engineering biological.

(b) **RULE OF CONSTRUCTION.** Nothing in this section may be construed to alter the policies, procedures, or practices of individual Federal agencies in effect on the date 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 regulatory control 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 head of other Federal agencies, as appropriate, shall carry out a measurement research program to inform the development or improvement of best practices, benchmark, 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 to better direct measurement at the component or process level through a multiphase operation;

(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

characterization for the measurement of greenhouse gas emission, taking into account existing United States and international technical standards and guidance;

(4) conduct outreach and coordination of greenhouse gas emission measurement and standard development organizations;

(A) assist in the development and adoption of best practices and technical standards for greenhouse gas emission measurement; and

(B) promote consistency and comparability 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 technical standard reference material at the Director's direction in connection with the development of technical standards, taking into account existing United States or international standards;

(6) coordinate with the National Oceanic and Atmospheric Administration, the Environmental Protection Agency, and the Secretary of Energy, and promote full and open exchange of Federal and State level, and, if appropriate, international information; and

(7) coordinate with international partners, including international standard organizations, to maintain global greenhouse gas measurement technical standards.

(c) TESTBEDS. In coordination with the appropriate Federal, State, and local governments, the National Oceanic and Atmospheric Administration, the Environmental Protection Agency, the Department of Energy, and other Federal agencies, as appropriate, the Director may conduct development and management of advanced research and standard development for greenhouse gas emission measurement from in situ and pace-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 head of other Federal agencies, as appropriate, shall establish a Center for Greenhouse Gas Measurement, Standards, and Information (in this section 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 analysis, and modeling of a range of climate change related measurement and estimation of the components of greenhouse gas emissions and a comprehensive observation and analysis of the atmospheric concentration of all major greenhouse gases;

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**SEC. 10223. NIST AUTHORITY FOR CYBERSECURITY AND PRIVACY
ACTIVITIES.**

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SEC. 10224. SOFTWARE SECURITY AND AUTHENTICATION.

(a) **VULNERABILITIES IN OPEN SOURCE SOFTWARE.** The Director shall assign a research-oriented identifier to vulnerabilities in open source software and products of national significance of which the entity has maintained open source software repositories or disseminated and mitigated vulnerabilities.

(b) **ARTIFICIAL INTELLIGENCE-ENABLED DEFENSES.** The Director shall carry out research and engineering to improve the effectiveness of artificial intelligence-enabled cyber operations, including by generating optimized data to train artificial intelligence defenses and evaluating the performance of artificial network architectures and engineering networks.

(c) **AUTHENTICATION OF INSTITUTE SOFTWARE.** The Director shall ensure all software released by the Intelligence Digital Agency and maintained by enable stakeholder verification 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 of the performance of the information operations program and practice 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 cyber operations and practices, including cyber control, control enhancement, supplemental guidance, or other supporting information to enable software developers and operators to identify, assess, and manage cyber 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 standard development organizations, as appropriate, to encourage the national adoption of the software lifecycle cyber practices by Federal agencies and industry stakeholders.

SEC. 10225. DIGITAL IDENTITY MANAGEMENT RESEARCH.

Section 504 of the Cyber Operations 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 national, consensus-based technical standards, best practices, benchmark methodologies, metrics, evidence, and conformance criteria for identity management, taking into account appropriate other concerns:

“(1) improve interoperability and portability among identity management technologies;

“(2) strengthen identity proofing and verification methodologies used in identity management systems, including 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, reliability, and inclusivity of identity management systems.

“(b) DIGITAL IDENTITY TECHNICAL ROADMAP. The Director, in consultation with other relevant Federal agencies and stakeholder from the private sector, shall develop and maintain a technical roadmap for digital identity management research and development focused on enabling the innovation and adoption of modern digital identity solutions that align with the 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 innovation guidance for digital identity management systems, including identity and attribute administration services provided by Federal, State, and local governments.

“(2) GUIDANCE. The Guidance shall

“(A) align with the criteria in subsection (a), as practicable;

“(B) provide a timeline of implementation of guidance;

“(C) incorporate innovation technical standards and indicators; and

“(D) not preclude 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 having a direct or indirect relationship to digital identity verification; and

“(D) other relevant experience in the field to 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 of support, measurement, research, information, development of best practices, benchmark, methodologies, procedures, and innovation, consistent with 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, and support efforts to improve the performance of biometric identification systems, including in areas related to conformity assessment, image quality and interoperability, consistent with biometric capture technologies, and human-in-the-loop biometric identification systems and processes;

(2) convene and engage, in relevant stakeholder organizations, to establish common definitions and characteristics 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,

ein, behavioral biometric, genetic, multimodal biometric, and emerging application of biometric identification technology;

(4) to identify and promote the use of privacy-enhancing technologies and other technical protective controls to facilitate access, appropriate, and public data use for biometric research;

(5) to conduct outreach and coordination of hardware technical expertise, industry and nonindustry stakeholders, and standard development organizations to assist in the development of best practices and national technical standards; and

(6) to develop technical standard reference architecture the Director determine necessary for the development of national technical standards.

(b) BIOMETRICS TEST PROGRAM.

(1) IN GENERAL. The Secretary, acting through the Director, shall carry out a program of provide biometric endorsement opportunities to biometric identification technology 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 accuracy, efficacy, and bias of biometric identification technologies, which may include research and testing on demographic variation, capture device, presentation acknowledgment, partial occlusion or computer-generated image, privacy and erasure design and control, template protection, de-identification, and comparison of algorithms, human, and combined algorithm-human recognition capabilities;

(B) develop an approach for testing of, and validation of biometric application, including remote use, in industry applications;

(C) establish reference test cases for biometric identification technologies and performance criteria for applications each test case, including accuracy, efficacy, and bias metrics;

(D) produce public-facing reports of the findings from testing for a general audience;

(E) develop policies and procedures concerning for the legal and social implications of activities under this paragraph when working with a foreign entity of concern (as that term is defined in section 10612);

(F) establish procedures of priority testing of biometric identification technologies developed by entities headquartered in the United States; and

(G) conduct other activities as determined necessary by the Director.

(c) GAO REPORT TO CONGRESS. No 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.

Section (b) of section 20 of the National Information Security 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 standard and guideline for high risk biometric identification system, including facial recognition system, accounting for privacy and security, type of biometric identification system, and relevant operational conditions."

SEC. 10228. PROTECTING RESEARCH FROM CYBERSECURITY THEFT.

Subparagraph (A) of section 2(e)(1) of the National Information Security Standards and Technology Act (15 U.S.C. 272(e)(1)) is amended

- (1) in clause (iii), by striking "and" after the semicolon;
- (2) by redesignating clause (j) as clause (i); and
- (3) by inserting after clause (iii) the following:
 - "(i) concerning inclusion of higher education (as that 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. No later than one year after the date of the enactment of this Act, the Director shall, through the authority of the Director under subsection (c)(15) and (e)(1)(A)(j) of section 2 of the National Information Security 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 cyber security risk related conducting research.

(2) REQUIREMENTS. The Director shall ensure that the resources disseminated pursuant to paragraph (1)

- (A) are generally applicable and applicable to a wide range of qualifying institutions;
- (B) are, in the nature and type of the qualifying institutions, and the nature and extent of the data collected or stored on the information system or device of the qualifying institutions;
- (C) include elements that promote awareness of implementation, workplace cybersecurity, and third-party stakeholder relationship, to assist qualifying institutions in mitigating common cybersecurity risks;
- (D) include case studies, examples, and scenarios of practical application;
- (E) are cost-effective and can be implemented using a variety of technologies that are commercial and off-the-shelf; and
- (F) of 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

effort 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 resource under paragraph (1) as the Director determines appropriate.

(5) **VOLUNTARY RESOURCES.** The use of the resource designated under paragraph (1) shall be considered optional.

(b) **OTHER FEDERAL CYBERSECURITY REQUIREMENTS.** Nothing in this section may be construed to preempt, alter, or otherwise affect any cybersecurity requirements applicable to Federal agencies.

(c) **DEFINITIONS.** In this section:

(1) **QUALIFYING INSTITUTIONS.** The term “qualifying institution” means an institution of higher education that are awarded in excess of \$50,000,000 per year in total Federal research funding.

(2) **RESOURCES.** The term “resource” means guideline, tool, best practice, technical standard, methodology, and other type of providing information.

SEC. 10230. ADVANCED COMMUNICATIONS RESEARCH.

The National Institute of Standards and Technology Act (15 U.S.C. 271e 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 measuring research for advanced communications technologies.

“(2) RESEARCH AREAS. Research areas may include

“(A) radio frequency emission and interference, including technology and technique of mitigation of emission and interference;

“(B) advanced antenna array and artificial intelligence capable of operating advanced antenna array;

“(C) artificial intelligence enabled in operation of networking, immersion technology, and other advanced communications technologies;

“(D) network engineering and monitoring technology;

“(E) technology enabled spectrum flexibility and agility;

“(F) optical and quantum communications technology;

“(G) security of advanced communications systems;

“(H) public safety communications;

“(I) resilient in operation of networking application 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 communication technologies, a voiding duplication of existing equipment between 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 stakeholder, on an ongoing basis, to help inform research and development priorities, including through work shop and other multi stakeholder activities.

“(5) TECHNICAL ROADMAPS. In carrying out the activities under this subsection, the Director shall convene industry, industry of higher education, nonprofit organization, Federal laboratories, and other Federal agencies engaged in advanced communication research and development to develop, and periodically update, coordinated technical roadmap for advanced communication research in priority areas, to be published 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 head of other Federal agencies, as appropriate, shall operate a national network of government, academic, and commercial expertise 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 purpose of facilitating and coordinating the use of intellectual capacity, modeling and simulation, laboratory facilities, and other facilities to meet national spectrum needs and challenge, including

“(A) measurement and analysis of electromagnetic propagation, radio frequency 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 area of responsibility;

“(B) conducting research and analysis in the general field of electromagnetic science in support of the Initiative mission and in support of other Government agencies;

“(C) developing methodology for testing, measuring, and engineering guidelines for interference;

“(D) conducting interference evaluation to be undertaken and the impact of current and proposed Federal and commercial spectrum activities;

“(E) conducting research and engineering 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 transition plan for the reactor, including a roadmap, a timeline and milestones;

(2) conceptual design of a new reactor and accompanying facilities, as appropriate; and

(3) a plan to minimize the disruption to the other 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 interstate relations of Federal support for nuclear science, including the elimination of long-term need for research and development, and planning efforts for future facilities to meet such need.

(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 additional guidance or 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 Initiative's capabilities, including scientific and research infrastructure;

(2) supporting measurement research and development for advanced computer chip and hardware designed for artificial intelligence systems;

(3) supporting the development of technical standards and guidelines to promote safety and security, or for 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 risk associated with artificial intelligence systems; and

(5) developing and publishing cybersecurity tool, encryption methods, and best practices for artificial intelligence and data science.

(b) AI TESTBEDS. Section 22A of the National Initiative 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 primary sector, and in addition of higher education (as each term is defined in section 101 of the Higher Education Act of 1965 (20 U.S.C. 1001)), the Director may establish testbeds, including virtual environments, to support the development of robust and secure, or for artificial intelligence and machine learning systems, including testbeds that examine the vulnerability and conditions that may lead to failure in, malfunction of, or a lack of 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 promote clean, safe, and economic alternatives, technologies, and methodologies of rational chemical production 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—

(1) conduct methodology research on premise plumbing in relation to safety, 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 installation of local piping within the proper line of a proper, including all building and permanent structure on such property. Such term includes building supply and distribution pipes, fixtures, fittings, water heaters, water-repairing and water-using equipment, and all related piping, connection, device, and appliance.

SEC. 10235. DR. DAVID SATCHER CYBERSECURITY EDUCATION GRANT PROGRAM.

(a) AUTHORIZATION OF GRANTS.

(1) IN GENERAL. Subject to the availability of appropriation, the Director shall carry out the Dr. David Satcher Cybersecurity Education Grant Program by—

(A) awarding grants to a institution of higher education that has an enrollment of need-based, historically Black college and university, Tribal College and University, and minority-serving institution, or established or expanded cybersecurity program, or building and upgrading institutional capacity to better prepare or educating cybersecurity program, including cybersecurity partnership with public and private entities, and other programs in institution on the path of producing qualified personnel in the cybersecurity workforce or becoming a National Center of Academic Excellence in Cybersecurity; and

(B) awarding grants to build capacity in institution of higher education that has an enrollment of need-based, historically Black college and university, Tribal College and University, and minority-serving institution, or expanded cybersecurity education opportunity, cybersecurity program, cybersecurity research, and cybersecurity partnership with public and private entities.

(2) RESERVATION. The Director shall award not less than 50 percent of the amount available for grant under this section to historically Black college and university, Tribal College and University, and minority-serving institution.

(3) COORDINATION. The Director shall carry out this section in coordination with appropriate Federal agencies, including the Department of Homeland Security, Education, and Labor.

(4) SUNSET. The Director shall terminate any award grant under paragraph (1) shall terminate on the date that is 5

ear after the date the Director first awards a grant under paragraph (1).

(b) APPLICATIONS. An eligible institution seeking a grant under this section (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 career education opportunities available to eligible institutions.

(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 be eligible for or participating in career education program, including career partnership, public and private entities;

(2) building and upgrading institutional capacity to provide hands-on research and training experience for undergraduate and graduate students; and

(3) outreach and recruitment efforts that are a part of such program or participating in career education program, including career partnership, public and private entities.

(d) REPORTING REQUIREMENTS. No later than

(1) one year after the effective date of this section, a period included 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 demographic of institutions participating, the number and nature of students enrolled in career education program that institutions receiving grants, a list of the number of certificates or degrees awarded through such career education program, the level of funding provided to grant recipients, the type of activities being funded by the grant program, and plan for future implementation and development; and

(2) five years after the effective date of this section, a period included in subsection (f), the Director shall prepare and submit to Congress a report on the status of career education programming and capacity building at institutions receiving grants under this section, including change in the scale and scope of the program, associated facilities, or in accreditation status, and on the educational and employment outcomes of students participating in career education program that have received support under this section.

(e) PERFORMANCE METRICS. The Director shall establish performance metrics for grant 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 "major" and inserting "major"; and

(B) by striking "academia" and inserting "diverse types of institutions of higher education, including historically Black college and universities, Tribal College and Universities, and minority-serving institutions, and community college"; 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 research and develop research collaboration with historically Black college and universities, Tribal College or Universities, and minority-serving institutions, including through the recruitment and faculty attachment in institution of participation in program developed under paragraph (3);

"(7) conduct research and develop research collaboration with community college, including through the recruitment of faculty attachment in institution of participation in program developed under paragraph (3);

"(8) carry out research in increasing the participation of persons historically underrepresented in STEM in the Initiative program; and

"(9) conduct research and develop collaboration with non-radiation educational organization, including those that offer training through non-profit association and professional association or professional societies, to engage persons historically underrepresented in STEM through program developed under this subsection."

SEC. 10242. OTHER TRANSACTIONS AUTHORITY.

(a) IN GENERAL. Paragraph (4) of section 2(b) of the National Initiative of Standard and Technology Act (15 U.S.C. 272(b)) is amended to read as follows:

"(4) to enter into and perform 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 contracts made to determine appropriate, in furtherance of the purpose of this Act;"

(b) REPORTING. No later than one year after the date of the enactment of this Act and no later than annually hereafter, the Secretary shall submit to the Committee on Science, Space, and Technology and the Committee on Appropriation of the House of Representatives and the Committee on Commerce, Science, and Transportation and the Committee on Appropriation of the Senate a report on the effectiveness of agreements, activities, and activities funded for transactions (other than contracts, cooperative agreements, and grants) described in paragraph (4) of section 2(b) of the National Initiative of Standard and Technology Act (as amended by subsection (a)), including the following elements:

(1) A description of when the other transaction is authorized, described in each amended paragraph, added and for the purpose.

(2) Adequacy of the challenge authority shall be required.

(3) Steps taken to ensure and efficiency of Federal Government requirements implementing challenge 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 Appropriation of the House of Representatives and the Committee on Commerce, Science, and Transportation and the Committee on Appropriation of the Senate describing the Institute's challenge authority requirements for collaboration between the Institute and other Federal agencies. The report shall include, as a minimum:

(1) an assessment of the challenge authority, including inter-agency collaboration, including transfer of funds, within a limited period of availability of the Institute and its employees, including personnel, facilities, and proper, including collaborating agency; and

(2) description of projects have been directed to the challenge authority 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 officer and employee of the Institute, except the director, shall be appointed by the Secretary and challenge authority requirements shall become necessary.

"(b) HIRING CRITICAL TECHNICAL EXPERTS. Notwithstanding section 3104 of title 5 of the provisions of an authority relating to the appointment, number, classification, or compensation of employee, 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 a rate no in excess of the highest annual compensation payable at the rate determined under section 104 of title 5, United States Code. The Director shall appoint no 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 principle of openness, transparency, due process, balance of interests, appeal, and consultation in the development of international standards are critical;

(2) international standards, developed through an industry-led process, are at the cornerstone 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 partnership approach to standard development is critical to United States economic competitiveness; and

(4) The United States Government holden + re cooperation and coordination across Federal agencies of partner, high and + pprior private sector stakeholder consultation opportunities in international dialogue in regard to standard 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 enhance effective Federal engagement in the development and use of international technical standards.

(2) REQUIREMENTS. To + pprior private sector-led engagement and enhance effective Federal engagement in the development and use of international technical standards, the Director shall consider

- (A) the role and need of the Federal Government in international technical standards;
- (B) organization development in international technical standards of interest to the United States, United States representation and influence in the organization, and cooperation for technical and leadership expertise in the organization;
- (C) + pprior for persons in the domain subject matter expertise, especially from small business located in the United States, of influence and engagement in technical standard leadership position, working group and meeting;
- (D) opportunities for partnership for + pprior international technical standards from across the Federal Government, Federal funded research and development centers, + niversity-affiliated research centers, institutions of higher education, industry, industry association, nonprofit organization, and other cooperation;
- (E) + pprior for activities to encourage the adoption of technical standards developed in the United States to be adopted by international standard organization; and
- (F) other activities determined by the Director to be necessary to + pprior United States participation in international standard development, economic competitiveness, and national security in the development and use of international technical standards.

(c) CAPACITY BUILDING GUIDANCE. The Director shall + pprior education and workforce development efforts to promote United States participation in international standard organization. The Director shall

- (1) identify and create, as appropriate, technical standard education and training resources for interested business, industry association, academia, nonprofit organization, Federal agencies, and other relevant standard cooperation, including activities targeted at increasing standard content in undergraduate and graduate curricula in science, engineering, business, public policy, and law;
- (2) conduct outreach, including opportunities for private sector leader, to + pprior engagement by more United States stakeholder in international technical standard development; and
- (3) other activities determined necessary by the Director to + pprior 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 head 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 of award grants, on a merit-reviewed, competitive basis, to private corporations, institutions of higher education, or nonprofit institutions based in the United States to support increased participation and leadership by small business and academic institutions in international standard organizations.

(2) USE OF FUNDS. Grants awarded to eligible entities under this section may be used to cover reasonable costs, up to a specified ceiling established by the Director, of appropriate increased engagement and leadership of eligible entities in international standard organizations, which may include costs associated with

(A) travel;

(B) education and training;

(C) direct or fee related to participation in technical standard development activities; and

(D) other such costs as the Director determines may be reasonable support participation of the eligible entity in international standard organizations.

(3) AWARD CRITERIA. The Director shall enter into award decisions made under this section take into account the extent to which the eligible entity

(A) employs full-time an individual or individuals who demonstrate deep technical standard expertise;

(B) employs full-time an individual or individuals who demonstrate knowledge in the process of the standard development organizations in which the eligible entity intend to engage in grant funding;

(C) propose a feasible schedule of standard deliverable to be completed over the period of the grant;

(D) explain how the eligible entity will fund additional standard-related activities necessary to achieve the deliverable referred to in subparagraph (C) if the grant funds are insufficient to cover all costs of such activities;

(E) commit personnel with appropriate expertise to regular engagement in relevant international organizations responsible for developing technical standards over the period of the grant; and

(F) identify a clearly defined current or anticipated market need or gap that should be addressed by their standard development proposal.

(4) ELIGIBILITY. A small business concern (as that 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 that term is defined in section 4 of the Secretary of Commerce Technology Innovation Act of 1980 (15 U.S.C. 3703)) shall be eligible to receive grant under this program.

(5) GUIDANCE ON APPLICATION AND AWARD PROCESS. The Director shall develop, and periodically update, guidance,

including eligibili , applican di clo + re req iremen , gran amon and d r a ion, he meri re iq proce , priori area for andard de elopmen , and an addi ional req iremen for ho gran are a arded + nder hi + b ec ion.

(6) MERIT REVIEW PROCESS. The Direc or hall en + re ha gran + nder hi + b ec ion are a arded ba ed on a compe i i e, meri re iq proce incl ding he + e of meri re iq panel ha ma incl de ex per from bo h go ernmen , he pri a e ec or, and, a appropria e, academic, nonprofi , or o her organi a ion a he Direc or de ermine appropria e.

(7) CONSULTATION. In carr ing o he pilo program e abli hed + nder hi + b ec ion, he Direc or hall con + l i h o her Federal agencie , pri a e ec or organi a ion , in i + ion of higher ed ca ion, and nonprofi organi a ion o help inform he pilo program, incl ding he g idance de eloped + nder paragraph (5).

(8) REPORT TO CONGRESS. The Direc or hall brief Congre a er he econd ear of he pilo program and each ear follq ing ha incl de he follq ing:

(A) An a e men of he effec i ene of he pilo program for impro ing he participa ion of Uni ed S a e mall b ine e , Uni ed S a e in i + ion of higher ed ca ion, or o her nonprofi re arch in i + ion in in erna ional andard organi a ion, incl ding

(i) he pe of ac i i e + ppor ed, incl ding leader hip role ;

(ii) he in erna ional andard organi a ion participa ed in; and

(iii) he echnical area co ered b he ac i i e .

(B) If de ermined effec i e, a plan for permanen implemen a ion of he pilo program.

SEC. 10246. STANDARD TECHNICAL UPDATE.

(a) NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY ACT UPDATES. The Na ional In i + e of S andard and Technolog Ac (15 U.S.C. 271) i amended

(1) b amending + b ec ion (a) of ec ion 17 (15 U.S.C. 278g) o read a follq :

“(a) The Secre ar i a hori ed, no i h anding an o her pro i ion of la , o ex pend + ch + m , i hin he limi of appropria ed f nd , a he Secre ar ma de ermine de irable hrø gh direc + ppor for ac i i e of in erna ional organi a ion and foreign na ional me rolog in i + e , i h , hich he In i + e coopera e o ad ance mea + remen me hod , echnical andard , and rela ed ba ic echnologie , for official repre en a ion, o ho official recep ion , dinner , and imilar e en , and o o her i e ex end official cø r e ie , incl ding ran por a ion of foreign digni arie and repre en a i e of foreign na ional me rolog in i + e o and from he In i + e, for he p rpo e of main aining he anding and pre i ge of he Depar men of Commerce and he In i + e, hrø gh he gran of fellq hip or o her appropria e form of financial or logi cal a i ance or + ppor o foreign na ional no in er ice o he Go ernmen of he Uni ed S a e hile he are performing cien ific or engineering , ork a he In i + e or participa ing in he ex change of cien ific , or echnical informa ion a he In i + e.”; and

(2) in ec ion 20 (15 U.S.C. 278g 3)

- (A) in subsection (c), by amending paragraph (3) to read as follows:
- “(3) to be the standard and guideline of 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, in the standard to be promulgated by the Director” and inserting “Secretary of Commerce, in the standard to be promulgated by 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 paragraphs (D) and (E) to the end of the section; and
- (B) by adding at the end of the section:
- “(G) Commerce.”; 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 report 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 it here and wherever it appears and inserting “Consumer Product Safety Commission”;
- (2) by redesignating the second subsection (c) as subsection (e); and
- (3) in subsection (g), by redesignating clause (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 subsection (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 standard and guideline developed by the National Institute of Standards and Technology pursuant to paragraph (2) and (3) of section 20(a) of the National Institute of Standards and Technology Act (15 U.S.C. 278g-3(a)), prescribe standard and guideline pertaining to Federal information systems.”

“(2) NATIONAL SECURITY SYSTEMS. Standard and guideline for national security systems shall be developed, prescribed, enforced, and otherwise authorized by law and administered by the President.

“(b) MANDATORY REQUIREMENTS.

“(1) AUTHORITY TO MAKE MANDATORY. Except as provided under paragraph (2), the Secretary of Commerce shall make standard prescribed under subsection (a)(1) compulsory and binding on 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. Standard prescribed under subsection (a)(1) shall include information security standard having

“(i) provide minimum information security requirements determined under section 20(b) of the National Intelligence of Standard 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 standard described in paragraph (A) shall be compulsory and binding.

“(c) AUTHORITY TO DISAPPROVE OR MODIFY. The President may disapprove or modify the standard and guideline 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 standard and guideline 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 standard or guideline as directed by the President.

“(d) EXERCISE OF AUTHORITY. To enforce fiscal and policy concerns, 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 standard for the collection of information security for Federal information systems, in which or under the supervision of that agency, that are more stringent than the standard the Secretary prescribe under this section if the more stringent standard

“(1) contain a less applicable standard made compulsory and binding by the Secretary of Commerce; and

“(2) are otherwise consistent with policy and guideline issued under section 3553 of title 44.

“(f) DECISIONS ON PROMULGATION OF STANDARDS. The decision by the Secretary of Commerce regarding the promulgation of an standard under this section shall occur no later than 6 months after the submission of the proposed standard to the Secretary by the National Intelligence of Standard and Technology, as provided under section 20 of the National Intelligence of Standard 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 owned 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 litigation, without compromising a Team’s integrity or the evidence preservation activities described in this section.”; and

(2) in subsection (d)

(A) in the subsection heading, by striking “INTER-AGENCY” and inserting “INVESTIGATION”; and

(B) in paragraph (1), by inserting “or an civil liability 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 on procurement research and combatting 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 reported 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 request process for foreign national assistance.

(4) An assessment of the Institute’s policies and procedures relating to employee and assistance participating in foreign alien recruitment program.

(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 agreement of the Institute, the Department of Commerce' Office of Security, the Department of Commerce' Office of Intelligence, and the Department of Commerce' Office of Inspector General' 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 agreement of the Institute, the Department of Commerce', and the Department of Commerce' Office of Inspector General' ability to conduct risk assessment of research and development and application and disclosure of the Institute.

(8) An agreement of the Institute' research regarding program for both internal and external - + prepared researchers and academia, including regarding focused on international collaboration, and international travel, foreign interference, and role for protection of funds, disclosure, conflict of interest, and conflict of interest.

(9) An analysis and summary of incidents of notable foreign influence at Institute - + prepared research facilities and program operations per paragraph 10.

(10) Recommendation for the Institute' overall research regarding policies and protocol.

(11) Other matters the Comptroller General determine appropriate.

(c) CONGRESSIONAL BRIEFING. No 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. No later than 18 months after the date of enactment of this Act, the Comptroller General shall submit to the congressional committee specified in subsection (c) a report on the findings and recommendation 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 standard development organization" means a nongovernmental standard 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 standard in conformity with the American National Standard Institute (ANSI) Essential Requirements for Due Process for American National Standard).

(b) GRANT AUTHORITY. The Secretary of Commerce, acting through the Director, shall establish a competitive program of grants for nongovernmental standard development organization for the purposes described in subsection (c).

(c) PURPOSES. A grant awarded under subsection (b) shall be used to develop, approve, disseminate, maintain, and require

forensic science of n ar con en+ andard and be prac ice ha hall be a ailable o he p blic free of charge.

(d) ADDITIONAL REQUIREMENTS. The Direc or ma prom lga e + ch req iremen , g ideline , and proced re a ma be nece ar o carr o hi ec ion.

(e) AUTHORIZATION OF APPROPRIATIONS. There are a hori ed o be appropria ed o carr o hi ec ion \$2,000,000 for each of fi cal ear 2022 hro gh 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 Na ional In i+ e of S andard and Technolog Ac (15 U.S.C. 271 e eq.) i amended b in er ing af er ec ion 25A (15 U.S.C. 278k 1) he follq ing:

“SEC. 25B. EXPANSION AWARDS PILOT PROGRAM.

“(a) DEFINITIONS. The erm + ed in hi ec ion ha e he meaning gi en he erm in ec ion 25.

“(b) ESTABLISHMENT. The Direc or hall e abli h, + bjec o he a ailabili of appropria ion , a a par of he Holling Man fac+ ring Ex en ion Par ner hip + nder ec ion 25 and 25A, a pilo program of ex pan ion a ard among par icipan de cribed in + b ec ion (c) for he p rpo e de cribed in + b ec ion (e).

“(c) PARTICIPANTS. Par icipan recei ing a ard + nder hi ec ion hall be Cen er , or a con or i m of Cen er (a + ch erm i defined in ec ion 25).

“(d) AWARD AMOUNTS. S bjec o he a ailabili of appropria ion , an a ard for a recipien + nder hi ec ion hall be in an amon eq al o he + m of he follq ing:

“(1) S ch amon a he Direc or con ider appropria e a a minim m ba e f nding le el for each a ard + nder hi ec ion.

“(2) S ch addi ional amon a he Direc or con ider in propor ion o he man fac+ ring den i of he region of he recipien .

“(3) S ch + pplemen al amon a he Direc or con ider appropria e.

“(e) PURPOSE OF AWARDS. An a ard + nder hi ec ion hall be made for one or more of he follq ing p rpo e :

“(1) To pro ide , orker ed ca ion, raining, de elopmen , and en repreor hip raining and o connec indi id al or b ine i h + ch er ice offered in heir comm ni , hich ma incl de emplo ee q ner hip and , orkforce raining, incl ding connec ing man fac+ rer , i h career and echnical ed ca ion en i ie , in i+ ion of higher ed ca ion (incl ding comm ni college), , orkforce de elopmen board , labor organi a ion , and nonprofi job raining pro ider o de elop and + ppor raining and job placemen er ice , incl ding appren ice hip and online learning pla form , for ne and ino mben , orker , programming o pre en job lo e , hen

adopting new technologies and processes, and development of employment opportunities.

“(2) To provide services to improve the resilience of domestic supply chain.

“(3) To mitigate vulnerabilities to cyber attack, including helping to offset the cost of cyber risk 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 need, including a focus on the demonstration of technology developed by companies based in the United States;

“(C) services for the adoption of advanced technology, including manufacturing technology and practices; and

“(D) establishing partnerships, for the development, demonstration, and deployment of advanced technology, which

“(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 initiatives (as described in section 34(d)); and

“(iv) initiatives of higher education.

“(5) To build capabilities across the Holling Manufacturing Extension Partnership for domestic supply chain resilience and optimization, including

“(A) assessment of domestic manufacturing capabilities, expanded capacity for researching and developing information on supply chain risk, hidden costs of reliance on offshore suppliers, redesigning products and processes to encourage resiliency, and other relevant topics; and

“(B) expanded services to provide industry support through the United States Manufacturing Initiative regarding manufacturing to strengthen the resilience of domestic supply chain, including in critical technology areas and foundational manufacturing capabilities that are key to domestic manufacturing competitiveness and resilience, including forming, casting, machining, joining, surface treatment, cooling, and metal or chemical refining.

“(f) REIMBURSEMENT. The Director may reimburse the Center for costs incurred by the Center under this section.

“(g) APPLICATIONS. Application for award under this section shall be submitted in such manner, at such time, and containing such information as the Director shall require in connection 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 elected proposals.

“(3) CRITERIA. The Director shall elect application consistent with the preproposed identified parameters of election

(e) to receive a award shall have the Director determine, in accordance with one or more of the following:

“(A) Improvement of the competitiveness of industry in the region in which the Center or Centers are located.

“(B) Creation of job or training of newly hired employees.

“(C) Promotion of the transfer and commercialization of research and technology from institution of higher education, national laboratories, or other federally funded research program, and nonprofit research institute.

“(D) Recruitment of additional manufacturing workforce, including through outreach to underrepresented populations, including individuals identified in section 33 or section 34 of the Science and Engineering Equal Opportunity Act (42 U.S.C. 1885a, 1885b).

“(E) Any other relevant the Director determine will advance the objective set forth in section 25(c) or 25A.

“(i) PROGRAM CONTRIBUTION. Recipient of award 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 make in consultation with the Secretary an application has significant potential for enhancing the competitiveness of small and medium-sized United States manufacturing in the global marketplace.

“(k) DURATION. The Director shall enter into the duration of an award under this section in alignment and consistent with a Center's cooperative agreements established in section 25(e).

“(l) REPORT. Not later than October 1, 2025, the Director shall submit to Congress a report that include

“(1) a summary description of the activities, were funded and the measurable outcomes of activities;

“(2) a description of which portion of activities under paragraph (1) could remain a part of a permanent expansion award program;

“(3) a description of which portion of activities under paragraph (1) could be incorporated into, and supported under, the program under section 25;

“(4) a description of which portion of activities under paragraph (1) could be incorporated into, and supported under, the competitive award 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 amount authorized for the Holling 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 section 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 appropriation, in order to maximize Center activities defined in such section 25) participation activities, competitiveness, productivity, and technological performance in United States manufacturing.

SEC. 10252. UPDATE TO HOLLINGS MANUFACTURING EXTENSION PARTNERSHIP.

(a) ACCEPTANCE OF FUNDS. Subsection (1) of section 25 of the National Institute of Standards and Technology Act (15 U.S.C. 278k) is amended to read as follows:

“(1) ACCEPTANCE OF FUNDS.

“(1) IN GENERAL. To the extent provided in advance in appropriation Act, other Federal departments and agencies may transfer monies 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 his 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 his section or section 25A, or a non-competitive contract, as appropriate, if the Secretary and Director determine that

“(A) the manufacturing market is or is being developed in limited geographical scope;

“(B) the number of States (or territories, in the case of Puerto Rico), in the center serving manufacturing of that market is or is being increased; and

“(C) such center has or centers have received a position of leadership 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 contract” hereof; and

(B) by inserting “or a contract” 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 “a United States-based industrial facility, 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 “manufacturer”.

(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 college and area career and technical education school” and

in er ing he follq ing: “ econdar chool , comm† ni col-
lege , and area career and echnical ed† ca ion chool ,
incl† ding ho e in† nder er ed and † ral comm† ni ie ,”;
and

(B) in paragraph (7)

(i) b† riking “and local college ” and in er ing
“local econdar chool and local college , incl† ding
hi oricall Black college and† ni er i ie , Tribal Col-
lege or Uni er i ie , minori - er ing in i† ion ,
comm† ni college , and econdar chool and college
in† nder er ed and † ral comm† ni ie ,” ; and

(ii) b† in er ing “or o her applied learning
oppor† ni ie ” af er “appren ice hip ” ; and

(2) in † b ec ion (d)(3), b† riking “, comm† ni college ,
and area career and echnical ed† ca ion chool ,” and in er ing
he follq ing: “and local high chool , comm† ni college , and
area career and echnical ed† ca ion chool , incl† ding ho e
in† nder er ed and † ral comm† ni ie ,” .

SEC. 10253. NATIONAL SUPPLY CHAIN DATABASE.

(a) ESTABLISHMENT OF NATIONAL SUPPLY CHAIN DATABASE.
The Direc or hall e abli h a o† n ar Na iona l S† ppl Chain
Da aba e, † bjec o he a ailabili of appropria ion .

(b) PURPOSE. The p† rpo e of he o† n ar Na iona l S† ppl
Chain Da aba e hall be o a i he Federal Go ernmen and
ind† r ec or in minimi ing di † p ion o he Uni ed S a e
† ppl chain b ha ing an a† e men of Uni ed S a e man† fac† r-
er† capabili ie .

(c) STUDY ON NATIONAL SUPPLY CHAIN DATABASE. In e ab-
li hing he Na iona l S† ppl Chain Da aba e, he Direc or hall
con ider he finding and recommenda ion from he † d † hor-
ied p† r† an o ec ion 9413 of he Na iona l Defen e † hori a ion
Ac for Fi cal Year 2021 (P† blic La† 116 283), incl† ding mea† re
o e† re and pro ec he Da aba e from ad er arial a† ck and
† lnerabili ie .

(d) DATABASE AND MANUFACTURING EXTENSION PARTNERSHIP.

(1) IN GENERAL. The Direc or hall e abli h he infra-
† c† re for he Na iona l S† ppl Chain Da aba e hr† gh
he Holling Man† fac† ring Ex† en ion Par ner hip, e abli hed
p† r† an o ec ion 25 of he Na iona l In i† e of S andard
and Technolog Ac (15 U.S.C. 278k), b† connec ing informa ion
from he Cen er (a† ch erm i defined in † ch ec ion)
hr† gh he Da aba e.

(2) NATIONAL VIEW. The Direc or hall en† re ha connec-
ion † nder paragraph (1)

(A) pro ide a na iona l o er iq† of he ne† ork of
† ppl chain of he Uni ed S a e ; and

(B) † ppor † nder anding of, he her here i a need
for ome man† fac† rer o re ool in ome critical area
o mee he† rgen need for ke prod† c .

(3) INDIVIDUAL HOLLINGS MANUFACTURING EXTENSION PART-
NERSHIP CENTER DATABASES.

(A) IN GENERAL. The Direc or hall en† re ha

(i) each Cen er i connec ed o he Na iona l S† ppl
Chain Da aba e ; and

(ii) each † ppl chain da aba e main ained b† a
Cen er i in er operable, i h he Da aba e.

(B) RULE OF CONSTRUCTION. Nothing in this section shall be construed to require a State or territory of the United States to establish a national supply chain database through the Holling Manufacturing Extension Partnership program.

(e) MAINTENANCE OF NATIONAL SUPPLY CHAIN DATABASE. The Director, acting through the Holling 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) maintain the Database, which information from partners or clients of the Center; and

(3) maintain the Database information of non-identified non-client private sector entities based and operating in the United States, as applicable and appropriate.

(f) DATABASE CONTENT. The National Supply Chain Database shall include the following:

(1) Basic private sector entity information.

(2) Authority of capability, accreditation, and production.

(3) Proprietary information.

(g) STANDARD CLASSIFICATION SYSTEM. The National Supply Chain Database shall, where applicable, use the North American Industry Classification System (NAICS) Code 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-levelled as agreed 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 authority in capability, production, and accreditation and shall be available to all companies having a connection 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 herein shall have no public release under the Information Act, 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 any information private sector entity's nonpublic content in the National Supply Chain Database shall be limited to

(A) the controlling private sector entity, the Information Act, and staff from a Center, foreign nondisclosure agreements, 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 controlling companies, Centers, or the public, as the Director considers appropriate, in support of the purpose 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 has a national and lawfully obtained from the National Supply Chain Database by a private 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 an Federal, State, local, or Tribal authority pursuant to an Federal, State, local, or Tribal law requiring public disclosure of information or record; and

(C) may not, in the event of the private entity submitting information, be disclosed by the Director, or any other Federal, State, or local authority in an civil enforcement action brought by a Federal, State, Tribal, or local authority.

(2) EXPRESS STATEMENT. The express statement described in this paragraph, in respect to information or record, is

(A) in the case of written information or record, a written marking on the information or record substantially similar to the following: "This information is obtained from the Federal Government in expectation of protection from disclosure as provided by the provision 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 paragraph (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 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 regulation or standard on manufacturer, based on data within the National Supply Chain Database, that is not in effect on the date 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 Service Administration and the Secretary of Commerce, acting through the Under Secretary of Commerce for Standard and Technology, shall jointly determine which enterprises have participated in the Hollings Manufacturing Extension Partnership, and, of course, are automatically enrolled in General Service Administration Advantage.”.

SEC. 10255. AMENDMENT TO THE HOLLINGS MANUFACTURING EXTENSION PARTNERSHIP RELATING TO INSTITUTIONS OF HIGHER EDUCATION.

Section (a) of section 25 of the National Institute of Standard 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 paragraph:

“(6) HISTORICALLY BLACK COLLEGE AND UNIVERSITY. The term ‘historically Black college and university’ has the meaning given the term ‘public 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 paragraph:

“(7) INSTITUTION OF HIGHER EDUCATION. The term ‘institution of higher education’ has the meaning given to that 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 paragraph:

“(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 that 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 non-tribal institution as defined in section 371(c) of that Act (20 U.S.C. 1067q(c)).

“(10) SECONDARY SCHOOL. The term ‘secondary school’ has the meaning given to that 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 Standard and Technology Act (15 U.S.C. 278 (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 initiative, an agency head shall give special consideration to Manufacturing USA initiatives 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 head of each other Federal agency at the Secretary of Commerce considers relevant, shall coordinate, with existing and new Manufacturing USA initiatives, to encourage coordinated initiatives a direct member of the Manufacturing USA initiative, including through the development of preference in election criteria for proposal to create new Manufacturing USA initiative or renew existing Manufacturing USA initiative that include one or more coordinated initiatives.

(b) COVERED ENTITIES. For purposes of this subsection, a coordinated initiative

(1) an historically Black college and university;

(2) a Tribal College or University;

(3) a minority-serving institution;

(4) a minority business enterprise (as that 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 that 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 that term is defined in section 34(a) of the National Institute of Standards and Technology Act (15 U.S.C. 278 (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) Measure to partner domestic developer of good, service, or technology by Manufacturing USA Network activities with domestic manufacturer and source of financing.

(ii) Measure to develop and provide incentive to promote transfer of intellectual property and good, service, or technology developed by Manufacturing USA Network activities to domestic manufacturer.

(iii) Measure to assist in the supply of goods and other supply chain development, including the of the Hologram Manufacturing Extension Partnership under section 25 of the National Institute of Standards and Technology Act (15 U.S.C. 278k) to carry out the measure.

(i) A procedure to review and approve or deny membership in a Manufacturing USA initiative by foreign-owned entities, especially from countries of concern, including the People's Republic of China.

() Measure 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 procedures to permit waiver, on a case-by-case basis, for policies that promote domestic production based on cost, availability, security of technical and mission requirements, emergency requirements, operational need, other legal or international real 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, in accordance with the provisions described in paragraph (1)(C).

(B) COMPANY DEFINED. In this paragraph, the term "company" has the meaning given 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. Section (h) of section 34 of the National Institute of Standards and Technology Act (15 U.S.C. 278) 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 all Manufacturing USA initiatives receiving Federal funding and a member of the other collaboration between Manufacturing USA initiatives.

"(B) MEETINGS. The council established or designated pursuant to paragraph (A) shall meet no less frequently than once each year.

"(C) DUTIES OF THE COUNCIL. The council established pursuant to paragraph (A) shall advise the National Program Office in carrying out the function 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. Section 34(h)(2) of the National Institute of Standards and Technology Act (15 U.S.C. 278 (h)(2)) is amended by inserting "including a strategy for retaining domestic public benefit from Manufacturing USA initiatives once Federal funding has been discontinued" after "Program".

(d) MODIFICATION OF FUNCTIONS OF NATIONAL PROGRAM OFFICE TO INCLUDE DEVELOPMENT OF INDUSTRY CREDENTIALS. Section 34(h)(2) of the National Institute of Standards and Technology Act (15 U.S.C. 278 (h)(2)) is amended by inserting “, including the development of industry credential” 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 implementation 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 the National Laboratories, and other key Federal agencies have carried out vital work supporting basic and applied research to create knowledge that is a keystone of the economy of the United States and a critical component of national security;

(2) openness, diversity, and a focus on freedom from censorship and political bias will continue to make educational and research institutions in the United States beacons of hope and of progress from across the world;

(3) increasing research and technology transfer in energy, building regional capacity and reducing geographic disparities, strengthening supply chains, and increasing capabilities in key technology 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 addressing geographic concentration of research and STEM education funding, encouraging broader participation of populations underrepresented in STEM, and collaborating with nongovernmental partners to enhance the leadership of the United States in technological innovation; and

(5) authorization and funding for investments in research, education, technology transfer, intellectual 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 nationwide, ork, consortium, or multi-institutional partnership, which may be led or co-led by a non-profit organizational entity, having its operations in the United States, with the goal of supporting participation in STEM fields, 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 Partnership;

(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 Traineehip 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 CBERcorp Scholarship for Service Program; and

(v) \$350,000,000 is authorized to be appropriated for fellowship, traineehip, and scholarship 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 operation 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 Partnership;

(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 Traineehip 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 Cybercorp Scholarship for Service Program;

and

- (v) \$800,000,000 is authorized to be appropriated for fellowship, traineehip, and scholarship 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 operation 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 Partnership;

(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 Traineehip 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 Cybercorp Scholarship for Service Program;

and

() \$900,000,000 i a h o r i e d o b e a p p r o p r i a e d f o r f e l l o w s h i p , t r a i n e e s h i p , a n d s c h o l a r s h i p d e c r i b e d i n s e c t i o n 10393;

(C) \$370,000,000 i a h o r i e d o b e a p p r o p r i a e d f o r m a j o r r e s e a r c h e q u i p m e n t a n d f a c i l i t y c o n s t r u c t i o n , o f w h i c h \$85,000,000 i a h o r i e d o b e a p p r o p r i a e d f o r t h e M i d - S c a l e R e s e a r c h I n f r a s t r u c t u r e P r o g r a m ;

(D) \$750,000,000 i a h o r i e d o b e a p p r o p r i a e d f o r a g e n c y o p e r a t i o n a n d a d m i n i s t r a t i o n ;

(E) \$5,560,000 i a h o r i e d o b e a p p r o p r i a e d f o r t h e O f f i c e o f t h e N a t i o n a l S c i e n c e B o a r d ; a n d

(F) \$31,110,000 i a h o r i e d o b e a p p r o p r i a e d f o r t h e O f f i c e o f t h e I n s p e c t o r G e n e r a l .

(d) FISCAL YEAR 2026.

(1) IN GENERAL. There are a h o r i e d o b e a p p r o p r i a e d o f t h e F o u n d a t i o n \$17,832,420,000 f o r f i s c a l y e a r 2026.

(2) SPECIFIC ALLOCATIONS. O f t h e a m o u n t a h o r i e d u n d e r p a r a g r a p h (1)

(A) \$13,800,000,000 i a h o r i e d o b e a p p r o p r i a e d t o c a r r y o u t r e s e a r c h a n d r e l a t e d a c t i v i t i e s , o f w h i c h

(i) \$75,000,000 i a h o r i e d o b e a p p r o p r i a e d f o r t h e M i d - S c a l e R e s e a r c h I n f r a s t r u c t u r e P r o g r a m ; a n d

(ii) \$3,800,000,000 i a h o r i e d o b e a p p r o p r i a e d f o r t h e D i r e c t o r a t e f o r T e c h n o l o g y , I n n o v a t i o n , a n d P a r t n e r s h i p ;

(B) \$2,850,000,000 i a h o r i e d o b e a p p r o p r i a e d f o r S T E M e d u c a t i o n , o f w h i c h

(i) \$93,800,000 i a h o r i e d o b e a p p r o p r i a e d f o r t h e R o b e r t N o c e T e a c h e r S c h o l a r s h i p P r o g r a m ;

(ii) \$75,730,000 i a h o r i e d o b e a p p r o p r i a e d f o r t h e N S F R e s e a r c h T r a i n e e s h i p P r o g r a m ;

(iii) \$529,830,000 i a h o r i e d o b e a p p r o p r i a e d f o r t h e G r a d u a t e R e s e a r c h F e l l o w s h i p P r o g r a m ;

(i) \$84,000,000 i a h o r i e d o b e a p p r o p r i a e d f o r t h e C o r p o r a t e S c h o l a r s h i p f o r S e r v i c e P r o g r a m ; a n d

() \$950,000,000 i a h o r i e d o b e a p p r o p r i a e d f o r f e l l o w s h i p , t r a i n e e s h i p , a n d s c h o l a r s h i p d e c r i b e d i n s e c t i o n 10393;

(C) \$372,000,000 i a h o r i e d o b e a p p r o p r i a e d f o r m a j o r r e s e a r c h e q u i p m e n t a n d f a c i l i t y c o n s t r u c t i o n , o f w h i c h \$90,000,000 i a h o r i e d o b e a p p r o p r i a e d f o r t h e M i d - S c a l e R e s e a r c h I n f r a s t r u c t u r e P r o g r a m ;

(D) \$770,000,000 i a h o r i e d o b e a p p r o p r i a e d f o r a g e n c y o p e r a t i o n a n d a d m i n i s t r a t i o n ;

(E) \$5,810,000 i a h o r i e d o b e a p p r o p r i a e d f o r t h e O f f i c e o f t h e N a t i o n a l S c i e n c e B o a r d ; a n d

(F) \$34,610,000 i a h o r i e d o b e a p p r o p r i a e d f o r t h e O f f i c e o f t h e I n s p e c t o r G e n e r a l .

(e) FISCAL YEAR 2027.

(1) IN GENERAL. There are a h o r i e d o b e a p p r o p r i a e d o f t h e F o u n d a t i o n \$18,919,180,000 f o r f i s c a l y e a r 2027.

(2) SPECIFIC ALLOCATIONS. O f t h e a m o u n t a h o r i e d u n d e r p a r a g r a p h (1)

(A) \$14,700,000,000 i a h o r i e d o b e a p p r o p r i a e d t o c a r r y o u t r e s e a r c h a n d r e l a t e d a c t i v i t i e s , o f w h i c h

- (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 Partnership;
- (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 Traineehip 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 Corcoran Scholarship for Service Program; and
 - (v) \$1,000,000,000 is authorized to be appropriated for fellowship, traineehip, and scholarhip described in section 10393;
- (C) \$375,000,000 is authorized to be appropriated for major research equipment and facility 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 operation 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

(1) to identify the research literature and identify research gaps regarding the interconnected factors that foster and hinder effective implementation of promising, evidence-based PreK-12 STEM education innovation at the local, regional, and national levels;

(2) to prepare a compendium of promising, evidence-based PreK-12 STEM education practice, model, program, and technologies;

(3) to identify barriers to widespread and sustained implementation of such innovation; and

(4) to make recommendations to the President, the Department of Education, the National Science and Technology Council Committee on Science, Technology, Engineering, and Mathematical 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 a grant, through existing programs where appropriate, to institutions of higher education and non-profit organizations (or consortia of institutions 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 students 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. A grant 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 skill 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 this paragraph (A) may include

“(i) the provision of programming described in this paragraph for the purpose of research described in this paragraph;

“(ii) the use of alternative engagement methods, including cooperative and hands-on learning;

“(iii) exposure of students to role models in the field of STEM and near-peer mentors;

“(iv) training of informal learning educators, emerging professionals, and others who lead informal STEM programs in emerging evidence-based methods consistent with the age of the 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, compete in, and academic programs that provide content expertise and encourage career exposure in STEM, which may include the purchase of materials and supplies needed to prepare for participation in such competition;

“(ii) activities designed to engage parents and families of children in PreK-12 in STEM;

“(iii) innovative strategies to engage children, teachers, and leadership and community members to improve their confidence in the STEM workforce and academic standards;

“(iv) coordination with STEM-rich environments, including non-profit, non-governmental organizations, after-school programs, in addition to higher education, vocational facilities, corporations, and military; and

“(v) the acquisition of instructional materials or technology-based tools to conduct applicable quality activities.

“(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 shall include or partner with a non-profit, non-governmental organization that has experience and expertise in increasing the participation of children in PreK-12 in STEM are encouraged. At a minimum, the application shall include the following:

“(A) A description of the targeted audience to be served by the research activities or activities for which funding is sought.

“(B) A description of the process for recruitment and election of children to participate in such activities.

“(C) A description of how such activities or activities may inform programming that engages children in PreK-12 in STEM.

“(D) A description of how such activities or activities may inform programming that promotes children's 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 each reporting period, which the award funds are received, a report in a form prescribed by the Director.

“(6) ENCOURAGEMENT APPLICATIONS. In making awards under this subsection, the Director shall encourage applications, which, for the purpose of the activities or activities funded through the award, are from or include eligible non-profit programming that children have a fundamental school or secondary school (including high school) 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 children 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 school that feeds into the high school).

“(7) ACCOUNTABILITY AND DISSEMINATION.

“(A) EVALUATION REQUIRED. The Director shall evaluate the activities established under this section. Schedule A shall

“(i) set a common set of benchmark and goals for the results of research conducted under this Act; and

“(ii) ensure that the findings of the research resulting from the activities or activities funded through the Act, including the research on entering and exiting the workforce of degree or career in STEM, including underrepresentation and racial diversity, in PreK-12.

“(B) REPORT ON EVALUATIONS. Not later than 180 days after the completion of the evaluation under paragraph (A), the Director shall submit to Congress and make 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 improve the effectiveness of the program under this section.

“(8) COORDINATION. In carrying out this section, the Director shall, for the purpose of enhancing program effectiveness and avoiding duplication of activities, 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 section to evaluate the profession of STEM teaching by establishing a National STEM Teacher Corps pilot program to recognize and award STEM teachers in our Nation's classrooms, reward them for their accomplishments, evaluate their public profile, and create rewarding career paths, which all STEM teachers can aspire to, both to prepare future STEM researchers and to create a scientifically literate public.

(2) DEFINITIONS. In this section:

(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 educational nonprofit Association.
 - (IV) A corporate or 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 regional or locally based partnership.

(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 Federal Government, a National STEM Teacher Corps 10-year pilot program to be administered by the Administrator, who shall be appointed by the Director. An appropriate, the Director may establish an NSF program to establish and evaluate the program.

(4) DUTIES OF THE ADMINISTRATOR. The Administrator shall

(A) create a procedure and standard for election of eligible applicants to become members of the National STEM Teacher Corps, including

(i) uniform election criteria, including

(I) deep knowledge of STEM content and pedagogy;

(II) a passion for STEM subject and dedication to teaching, evidence of leadership skill, and potential for continued career growth in an educational setting; and

(III) demonstrated experience increasing STEM student achievement and STEM participation rate for all students, particularly those from rural and high-need schools; and

(ii) a uniform election procedure, including a comprehensive application and selection recommendation and other relevant professional information;

(B) promote the National STEM Teacher Corps and evaluate its practice that emerge from the National STEM Teacher Corps operational assistance;

(C) evaluate the operation and effectiveness of the Corps alliance; and

(D) evaluate the overall and long-term impact of the National STEM Teacher Corps by

(i) documenting, monitoring, and assessing the program's impact on the STEM career of participants; and

(ii) documenting, monitoring, and assessing the program's impact on the STEM educational 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 leader, STEM researcher, STEM education researcher, Business leader, PreK-12 STEM educator, and Student participating in a postsecondary STEM degree; and

(III) be geographically diverse.

(ii) EXISTING COMMITTEE. The Director may designate one of the National STEM Teacher Corps Advisory Board members as an alternate member 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-based, non-exclusive Corps alliance basis. Activities carried out by each alliance shall include

(A) engaging local partners, which may include local educational agencies, institutions of higher education, STEM organizations, or education nonprofit organizations,

(i) develop and execute the community of National STEM Teacher Corps members within the region or topic area, in coordination with local partners to carry out data-driven activities;

(ii) coordinate professional development activities, including activities led by National STEM Teacher Corps members;

(iii) connect National STEM Teacher Corps members with existing education professional development programs and coordinate members' involvement in cooperative learning environments;

(i) seek opportunities in order to ensure that all members of the National STEM Teacher Corps participate in National STEM Teacher Corps activities; and

(ii) build partnerships with existing education organizations and other efforts by State educational agencies and local educational agencies to 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, 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 for 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 rate for all children, 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 shall be elected by a Corps alliance to be a member of the National STEM Teacher Corps shall

(A) serve a 4-year term, with the possibility of reappointment;

(B) receive an annual stipend in an amount not less than \$10,000; and

(C) have the following responsibilities, including

(i) working with other members of the National STEM Teacher Corps to develop and improve innovative teaching practices, including practice-based learning;

(ii) participating in professional development in innovative teaching methodology and mentorship; and

(iii) contributing to excellence in teaching the member's own children, with a focus on advancing equity by providing additional time teaching and coaching under-served children to increase STEM achievement and STEM participation rate for children 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 including

(A) an assessment, drawing on the evaluation of the Administrator and under paragraph (C) and (D) of paragraph (4), and other source of information, of the effectiveness of the pilot program in recruiting and retaining high-quality STEM teachers in the elected region or topic area, 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 section 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 section.

SEC. 10312. UNDERGRADUATE STEM EDUCATION.

(a) RESEARCH ON STEM EDUCATION AND WORKFORCE NEEDS.

The Director shall make a study, on a competitive basis, of research in support of higher education or nonprofit organization (or consortium of 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 learning experience, 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 the workforce;

(3) increase the 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 a grant for the establishment of centers of excellence, in advanced-technology field, among associate-degree-granting colleges. Centers shall meet one or both of the following criteria:

“(A) Exceptional in national program in advanced-technology field.

“(B) Excellence in undergraduate STEM education.

“(2) PURPOSES. The center shall serve as a national and regional clearinghouse and model for the benefit of both college and secondary school, and shall provide seminar and program of dissemination model criteria and model teaching methods and instructional materials to other associate-degree-granting colleges.

“(3) NETWORKS. The center may enter into partnership with other institution of higher education, nonprofit organization, and stakeholder group, or contractor hereof, to develop network

“(A) coordinate research, training, and education activities funded by grant under subsection (a);

“(B) share information and best practices; or

“(C) promote collaboration between academic institution, workforce development program, labor organization, 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 a grant on a merit-review, competitive basis to institution of higher education or nonprofit organization (or contractor of institution or organization) to advance research on the nature of learning and teaching at community college and to improve outcomes for students who enter the workforce upon completion of their STEM degree or credential or transfer to 4-year institution, including

(A) examining how to scale successful program at community college that are improving student outcomes in foundational STEM courses;

(B) supporting research on effective STEM teaching practices in community college setting;

(C) designing and developing new STEM criteria;

(D) providing STEM students with hands-on training and research experience, internships, and other experiential learning opportunities;

(E) increasing access to high-quality STEM education through new technologies;

(F) re-killing or re-killing incubators for new STEM jobs;

(G) building STEM career and pipeline transfer pathways; and

(H) developing novel mechanisms to identify and recruit talent into STEM program, in particular talent from groups historically underrepresented in STEM.

(2) PARTNERSHIPS. In carrying out activities under this subsection, the Director shall encourage application 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 a study, on a competitive basis, of 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 a study under this subsection, the Director shall give priority to institutions that demonstrate effective strategies to recruit and provide career and technical education to veteran and member 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 a study, on a competitive basis, of institutions of higher education and nonprofit organizations (or consortia of such institutions or organizations) to establish a national of no fewer than five Centers to develop and scale up a successful model for providing undergraduate student research experience.

(2) USE OF FUNDS. Amount made under this paragraph shall be used to

(A) develop, assess, and disseminate model for providing undergraduate student research experience across STEM disciplines and education levels;

(B) identify and address opportunities and challenges in facilitating implementation across a broad range of institutions, 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 to faculty, including institutional culture, resource, and incentive structure;

(D) identify and address factors that may facilitate or discourage participation by students from all backgrounds;

(E) provide faculty with grant funding, 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 impact of career-based undergraduate research experience on the STEM workforce.

(3) PARTNERSHIPS. In making a grant under this paragraph, the Director shall consider the extent to which the proposed Center will establish partnership among multiple types of academic institutions, including community college, emerging research institutions, EPSCoR institutions, historically Black college and universities, Tribal Colleges or Universities, and minority-serving institutions, the private sector, and other relevant stakeholder in supporting program and activities to facilitate workforce training and the widespread and sustained implementation of promising, evidence-based practice, model, program, and arrangement.

(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 include

(A) an assessment, that include 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 “education” 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 field”; and

(ii) in paragraph (4), by striking “mathematics and science in action” and inserting “STEM in action”.

(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 demand” before “, and improve”;

(II) b r i k i n g “c o r e e d u c a t i o n c o r r e s p o n d e n c e a n d m a t h e m a t i c s ” a n d i n c l o s i n g “c o r e e d u c a t i o n c o r r e s p o n d e n c e i n S T E M f i e l d ”;

(III) b e i n g e n g a g e d i n “ e r a n a n d i n d i c a t o r a n g e ” b e f o r e “ w o r k i n h o m e ”; a n d

(IV) b e i n c l o s i n g “a n d o n b u i l d i n g a p a t h a f r o m e c o n d a r s c h o o l t o a c c i d e n t a l d e g r e e - g r a n i n g i n i t i a t i o n , w h e r e c a r e e r o p p o r t u n i t i e s a r e e c h n i c a l l y r a t e d ” b e f o r e “ , a n d s h a l l b e d e s i g n e d ”;

(iii) i n p a r a g r a p h (1)

(I) b e i n c l o s i n g “a n d a d d e d ” a f t e r “d e v e l o p m e n t s ”; a n d

(II) b r i k i n g “c o r e s c i e n c e a n d m a t h e m a t i c s c o r r e s p o n d e n c e ” a n d i n c l o s i n g “c o r e S T E M c o r r e s p o n d e n c e ”;

(i) i n p a r a g r a p h (2) , b r i k i n g “ s c i e n c e , m a t h e m a t i c s , a n d a d v a n c e d - t e c h n o l o g y f i e l d s ” a n d i n c l o s i n g “S T E M a n d a d v a n c e d - t e c h n o l o g y f i e l d s ”;

() i n p a r a g r a p h (3) (A) , b e i n c l o s i n g “ o p p o r t u n i t i e s i n t h e a d v a n c e d - t e c h n o l o g y i n d u s t r i e s t o i n c r e a s e t h e c o m p e t i t i v e n e s s o f t h e U n i t e d S t a t e s i n t h e g l o b a l e c o n o m y ” b e f o r e t h e e m d a s h ;

(i) i n p a r a g r a p h (4) , b r i k i n g “ c i t i z e n s h i p a n d a d v a n c e d - t e c h n o l o g y f i e l d s ” a n d i n c l o s i n g “S T E M a n d a d v a n c e d - t e c h n o l o g y f i e l d s ”; a n d

(i i) i n p a r a g r a p h (5) , b r i k i n g “a d v a n c e d c i t i z e n s h i p a n d t e c h n i c a l e d u c a t i o n ” a n d i n c l o s i n g “a d v a n c e d S T E M a n d a d v a n c e d - t e c h n o l o g y ”;

(C) i n s e c t i o n (c)

(i) i n p a r a g r a p h (1)

(I) i n s e c t i o n (A)

(a a) i n t h e m a r g i n p r e c e d i n g c l a u s e (i) , b r i k i n g “ o p p o r t u n i t i e s ” a n d a l l h a v e f o l l o w i n g m e a n i n g “ o p p o r t u n i t i e s i n t h e d e v e l o p m e n t o f c a r e e r a n d e d u c a t i o n a l p a t h s , i n c l u d i n g m u l t i p l e e n t r y p o i n t s l e a d i n g t o c r e d e n t i a l a n d d e g r e e , a n d o a i d e n t i f i c a t i o n p a t h s i n S T E M f i e l d s o r a n i t i o n f r o m a c c i d e n t a l d e g r e e - g r a n i n g c o l l e g e t o b a c h e l o r - d e g r e e - g r a n i n g i n i t i a t i o n , h o w e v e r ”;

(b b) i n c l a u s e (i) , b r i k i n g “ o p p o r t u n i t i e s ” a n d i n c l o s i n g “ o p p o r t u n i t i e s a g r e e m e n t s ”; a n d

(c c) i n c l a u s e (i i) , b r i k i n g “c o r r e a t i o n o f t h e b a c h e l o r - d e g r e e - g r a n i n g i n i t i a t i o n ” a n d i n c l o s i n g “ t h e c a r e e r a n d e d u c a t i o n a l p a t h s o p p o r t e d b y t h e a g r e e m e n t s ”;

(II) i n s e c t i o n (B)

(a a) i n c l a u s e (i) , b e i n c l o s i n g “ e r a n a n d i n d i c a t o r a n g e ” b e f o r e “ w o r k i n h o m e ”;

(b b) i n c l a u s e (i i i)

(A A) b r i k i n g “ b a c h e l o r - d e g r e e - g r a n i n g i n i t i a t i o n ” a n d i n c l o s i n g “ i n i t i a t i o n o r w o r k i n g ”; a n d

- (BB) b in er ing “or incl r in ern-hip ” af er “ + mmer program ”; and
- (cc) b riking he ft h e f follq ing cla e (i); and
- (III) b riking + bparagraph (C);
- (ii) in paragraph (2)
 - (I) b riking “ma hema ic and cience program ” and in er ing “STEM program ”;
 - (II) b in er ing “and, a appropria e, elemen ar school ,” af er “ i h econdar school ”;
 - (III) b riking “ma hema ic and cience ed -ca ion” and in er ing “STEM ed ca ion”;
 - (IV) b riking “ econdar school + den ” and in er ing “ + den a he e school ”;
 - (V) b riking “ cience and ad anced- echnolog field ” and in er ing “STEM and ad anced- echnolog field ”; and
 - (VI) b riking “agreemen i h local ed -ca ional agencie ” and in er ing “ar i la ion agreemen or d al credi co r e i h local econdar school , or o her mean a he Direc or de ermine appropria e,”; and
- (iii) in paragraph (3)
 - (I) b riking + bparagraph (B);
 - (II) b riking “ hall ” and all ha follq hrø gh “e abli h a” and in er ing “ hall e abli h a”;
 - (III) b riking “ he field of cience, echnolog , engineering, and ma hema ic ” and in er ing “STEM field ”; and
 - (IV) b riking “; and” and in er ing “ , incl ding job a Federal and academic labora-orie .”;
- (D) in + b ec ion (d)(2)
 - (i) in + bparagraph (D), b riking “and” af er he emicolon;
 - (ii) in + bparagraph (E), b riking he period a he end and in er ing a “; and”; and
 - (iii) b adding a he end he follq ing:
“(F) a appropria e, applica ion ha appl he be prac ice for STEM ed ca ion and echnical kill ed ca ion hrø gh di ance learning or in a im la ed ork en iron- men , a de ermined b re earch de cribed in + b ec ion (f); and”;
- (E) in + b ec ion (g), b riking he econd en ence;
- (F) in + b ec ion (h)(1)
 - (i) in + bparagraph (A), b riking “2022” and in er ing “2026”;
 - (ii) in + bparagraph (B), b riking “2022” and in er ing “2026”; and
 - (iii) in + bparagraph (C)
 - (I) b riking “ p o \$2,500,000” and in er ing “no le han \$3,000,000”; and
 - (II) b riking “2022” and in er ing “2026”;
- (G) in + b ec ion (i)
 - (i) b riking paragraph (3); and

(ii) by redesignating paragraph (4) and (5) a paragraph (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 field such as advanced manufacturing, agricultural, biological and chemical-technology, energy and environmental technology, engineering technology, information technology, micro and nano-technology, cyber security technology, geospatial technology, and new, emerging technology;”

(ii) in paragraph (4), by striking “epa degree bachelor-degree-granting institution” and inserting “otherwise”;

(iii) by striking paragraph (7);

(i) by redesignating paragraph (8) and (9) a paragraph (7) and (8), respectively;

() in paragraph (7), a redesignated clause (i), by striking “and” after the semicolon;

(i) in paragraph (8), a redesignated clause

(i)

(I) by striking “mathematical, science, engineering, or technology” and inserting “science, technology, engineering, or mathematical”; and

(II) by striking the period at the end and inserting “; and”;

(ii) 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 Innovation in Mentoring, Training, and Apprenticeship 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 section 2 through 4 \$150,000,000 for each of fiscal year 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 Opportunity to Meaningful 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 individual with access to mentor, including individual notified on the award.” after “requirement.”

(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 requirements for improving mentoring for Federal-funded postdoctoral researchers.

(2) CAREER EXPLORATION.

(A) IN GENERAL. The Director shall make a grant, on a competitive basis, to institutions of higher education and nonprofit organizations (or consortia of institutions or organizations) to develop innovative approaches for facilitating career exploration of academic and nonacademic career options and for providing opportunities for broadening experience, including work-integrated opportunities, for graduate students and postdoctoral scholars who can then be considered, adopted, or adapted by others in institutions and organizations to research on the impact and outcomes of such activities.

(B) REVIEW OF PROPOSALS. In selecting grant recipients under this paragraph, the Director shall consider, as a minimum:

(i) the extent to which the administrators of the institutions are committed to making the proposed activities a priority; and

(ii) the likelihood that the institutions or organizations will sustain or expand the proposed activities effort beyond the period of the grant.

(3) DEVELOPMENT PLANS. The Director shall require grantee annual progress reports for grants supporting graduate students and postdoctoral scholars include certification by the principal investigator that each graduate student and postdoctoral scholar receiving financial support from such a grant, as determined by the deans and approved by the 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 of a grant to provide 2,500 administrators and postdoctoral research assistants, on a competitive basis, to support professional development experience for graduate students and postdoctoral researchers who receive additional support from such a grant, as determined by the Director. No more than 10 percent of the supplement awarded under this paragraph may be used to support professional development experience for postdoctoral researchers.

(5) GRADUATE EDUCATION RESEARCH. The Director shall make a grant, on a competitive basis, to institutions of higher education or nonprofit organizations (or consortia of institutions or organizations) to support research on the graduate education and outcomes of various interventions and policies, including:

(A) the effectiveness of traineeships, fellowships, internships, and teaching and research assistantships and outcomes for graduate students;

(B) the effectiveness 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 to improve mentoring relationships, develop conflict management skills, and promote health research teams; and

(D) research, data collection, and achievement of the area of graduate student mental health and well-being, factors contributing to and consequences of poor graduate student mental health, and the development, adaptation, and achievement of evidence-based strategies and policies to promote emotional well-being 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 fellowships provided annually over the next 5 years to no fewer than 3,000 fellowships.

(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 a bill addressing national workforce demand in critical STEM fields" after "through the United States";

(B) in subsection (b), by striking "of \$12,000" and inserting "of a least \$16,000"; and

(C) by adding at the end the following:

"(c) OUTREACH. The Director shall ensure the program reaches a greater number of graduate research fellowships from field of study areas 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 graduate students with master's degree and doctoral degree in field relating to cybersecurity are eligible to apply for scholarship 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. No 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 providing graduate student education and training through fellowships, traineeships, and other funding models; and

(B) the impact of different funding mechanisms on graduate student experience and outcome, including whether each mechanism has a differential impact on the behavior of the student population.

(2) REPORT. No 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. No 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, plan to implement a program to recruit and train the next generation of artificial intelligence professional to meet the need 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 Artificial Intelligence workforce, including an assessment of current and future demand for additional AI professional across the Federal Government;

(B) an assessment of the capacity of institutions of higher education to produce graduate, high degree, certification, and relevant skill related to artificial intelligence to meet the current and future need of the Federal workforce; and

(C) an evaluation of the need for and feasibility of establishing a scholar ship-for-service program to recruit and train the next generation of artificial intelligence professional to meet the need 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 funding a pilot program.

(3) PROGRAM ESTABLISHMENT. Upon transmitting 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 head of other agencies, in appropriate consultation, shall identify and establish a Federal artificial intelligence scholar ship-for-service program (referred to in this section as the Federal AI Scholar ship-for-Service Program) to recruit and train artificial intelligence professional to lead and support the application of artificial intelligence to the mission of Federal, State, local, and Tribal governments.

(4) QUALIFIED INSTITUTION OF HIGHER EDUCATION. The Director, in coordination with the head of other agencies, in appropriate consultation, shall establish criteria to designate qualified institutions of higher education that shall be eligible to participate in the Federal AI Scholar ship-for-Service program. Such criteria shall include

(A) measure of the institution's demonstrated excellence in the education of students in the field of artificial intelligence; and

(B) measure of the institution's ability to attract and retain a diverse and non-radiation dependent population in the field 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 Scholar ship-for-Service Program shall

(A) provide scholarship through qualified institution of higher education of students who are enrolled in program of study in institution of higher education leading to degree or concentration in or related to the artificial intelligence field;

(B) provide the scholarship recipient with summer internship opportunity or other meaningful temporary appointment in the Federal workforce focusing on AI project or research;

(C) prioritize the employment placement of scholarship recipient in executive agencies;

(D) identify opportunity to promote multidisciplinary program of study in undergraduate or advanced AI training in other field 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 program that will enable postsecondary educational institutions to expand their ability to train the next-generation AI workforce, including AI researchers and practitioners;

(F) create core or training program in technology for students receiving scholarship; and

(G) award fellowship to master and doctoral students who are pursuing degree or research in artificial intelligence and related field, including in the field of technology ethics.

(6) SCHOLARSHIP AMOUNTS. Each scholarship under paragraph (5) shall be in an amount that does not exceed the student's tuition and fees at the institution for no more than 3 years and provide 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 an agency, entity, office, or committee established in the legislative branch;

(C) an interagency;

(D) a State, local, or Tribal government, which may include in connection in AI-related activities in a public school system; or

(E) a State, local, or Tribal government-affiliated nonprofit 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 appointment 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 paragraph (D), upon fulfillment of the service term,

an employee appointed under paragraph (A) may be considered noncompetitive term, career-conditional, or career appointment.

(C) TIMING OF CONVERSION. An eligible agency may noncompetitively consider an employee appointed under paragraph (B) to a career-conditional or career appointment before the term appointment expires.

(D) AUTHORITY TO DECLINE CONVERSION. An eligible agency may decline to make the noncompetitive consideration or appointment under paragraph (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 authorized in section 101 of the Higher Education Act, 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 or an aboriginal descendant knowledgeable 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 authorized institution of higher education, in an identifiable document a portion of postsecondary employment and postsecondary education 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 as 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;

(i) declare that the individual does not intend to fulfill the postsecondary employment obligation under this section; or

(ii) fail to fulfill the postsecondary employment obligation of the individual under this section.

(11) MONITORING COMPLIANCE. As a condition of participating in the program, an authorized institution of higher education shall

(A) enter into an agreement with the Director to monitor the compliance of scholarship recipients with respect to their postsecondary employment obligation; and

(B) provide to the Director, on an annual basis, the postsecondary employment documentation required under paragraph (10) for scholarship recipients through the completion of their postsecondary employment obligation.

(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 postsecondary employment obligation under his education, the total amount of scholarship awards received by the individual under his education shall

(i) be repaid; or

(ii) be repaid as a loan to be repaid in accordance with paragraph (13).

(B) 1 OR MORE YEARS OF SERVICE. If a circumstance described in clause (i) or (ii) of paragraph (10)(B) occurs after the completion of 1 or more years of a postsecondary employment obligation under his education, the total amount of scholarship awards received by the individual under his education, 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 repaid as a loan to be repaid in accordance with paragraph (13).

(13) REPAYMENTS. A loan described in paragraph (12) shall

(A) be repaid 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 hereon accruing from the date of the scholarship award, in accordance with the 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 his education, he qualified in connection of higher education providing the scholarship shall

(i) determine the repayment amount and notify the recipient and the Director of the amount owed; and

(ii) collect the repayment amount within a period of time as determined by the Director, or the repayment amount shall be repaid as a loan in accordance with paragraph (13).

(B) RETURNED TO TREASURY. Except as provided in paragraph (C), any repayment under his education shall be returned to the Treasurer of the United States.

(C) RETAIN PERCENTAGE. A qualified in connection of higher education may retain a percentage of any repayment he in connection collect under his education to defray administrative costs associated with the collection. The Director shall establish a fixed percentage that will apply to all eligible entities, and may reduce his 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 his education, where compliance by the individual with the obligation is impossible or would impose an excessive hardship on the individual, or if enforcement of such obligation, in 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 announce all awards and make public, in a manner that protects the personally identifiable information of scholarship recipients, information on the success of recruiting individuals for scholarship under his section and on hiring and retaining those individuals in the public sector AI workforce, including information on

- (i) placements;
- (ii) where candidates are placed, including job title and description;
- (iii) salary range for candidates not released from obligation under his section;
 - (i) how long after graduation candidates are placed;
 - (ii) how long candidates remain in the position before reapplying for graduation;
 - (iii) how many candidates are released from obligation; and
 - (iv) how many, if any, remedial training is required.

(B) REPORTS. The Director, in coordination with the Office of Personnel Management, shall submit, no later 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 paragraph (A) and an executive summary 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 prospective 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 career.

(17) REFRESH. No later than once every 2 years, the Director, in coordination with the Director of the Office of Personnel Management, shall reissue 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. No 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 in the men across all Directorates in the area of education, research, infrastructure, data collection, and analysis.

(2) REPORT. No later than 180 days after the date of the reissue under paragraph (1) is complete, the Director shall

to be made available to the public as a summary report of the proceedings.

(b) SURVEY DATA.

(1) ROTATING TOPIC MODULES. To meet the ongoing need for data on the state of the science and engineering workforce, the Director shall, through coordination with other Federal statistical agencies and drawing on input from relevant stakeholders, the feasibility and benefits of incorporating a rotation of topic modules into the existing National Center for Science and Engineering Statistical Trends and Indicators from the Office.

(2) NEW DATA. No 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 drawing on input from relevant stakeholders, of the feasibility and benefits of incorporating new topic modules into the existing National Center for Science and Engineering Statistical Trends and Indicators 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 topic as determined by the Director.

(3) LONGITUDINAL DESIGN. The Director shall continue and accelerate efforts to enhance the effectiveness of National Center for Science and Engineering Statistical Trends and Indicators for longitudinal research and analysis.

(4) GOVERNMENT ACCOUNTABILITY OFFICE REVIEW. No 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) evaluate the Foundation process for entering the data and analysis produced by the National Center for Science and Engineering Statistical Trends and Indicators; and
- (B) include 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 a study on a merit-based, competitive basis on initiation of higher education or nonprofit organization (or consortium 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

- (1) under and the retention rate of the cyber workforce, including factors that influence growth, retention, and development of the workforce;
- (2) examine pathways to enter and re-enter into the cyber workforce;
- (3) under and trends of the cyber workforce, including demographic representation, educational and professional background, preparation, competence available, and factors that have employment recruitment, development, and retention and quality.

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 deems 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, in whole or in part, with 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) increasing cybersecurity risks are continuing in the growing digital world, it is critical that the United States stay ahead of malicious cyber activities, which a workforce has can afford to train, research, and work on ironmen; and

(2) Federal investments in the Federal Cyber Scholarship-for-Service Program as the National Science Foundation play a critical role in preparing and training a strong, skilled, 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) assess the feasibility of providing nationally representative and statistical information on the cybersecurity workforce;

(2) utilize the National Initiative for Cybersecurity Education (NICE) Cybersecurity Workforce Framework (NIST Special Publication 800-181), or other framework, as appropriate, to enable a continuous measurement of the cybersecurity workforce;

- (3) utilize and complement existing data on employer requirements and unfilled positions in the cybersecurity workforce;
- (4) continue to work with the broader community of practice in cybersecurity workforce development to determine data requirements needed to strengthen the cybersecurity workforce;
- (5) evaluate existing Federal data for information pertinent to developing national estimates of the cybersecurity workforce;
- (6) evaluate administrative data and other complementary data, as available, to describe and measure the cybersecurity workforce; and
- (7) collect additional 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 a study of initiatives of higher education, non-profit organizations, or consortia hereof, for research, development, and related activities to advance innovative approaches to developing, improving, and expanding evidence-based education and workforce development activities and learning experience at all levels of education in field and discipline 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 need of industry, academia, government, and Federal laboratories.

(3) USES OF FUNDS. Amount made available under this section shall be used to support activities, such as

(A) development of industry-oriented curricula and teaching models for topics relevant to microelectronics, including those that provide meaningful hands-on learning experience;

(B) dissemination of material 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 experience that provide practical, immediate, or remote access to training facilities and industry-standard processes and tools, including equipment and software for 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 microelectronic technology by increasing the hiring of faculty in field critical to microelectronics;

(G) Support for innovative industry partnerships that connect high school, vocational, military, college, and graduate programs; and

(H) Providing informal hands-on microelectronic learning opportunities for PreK-12 students in different learning environments, including competition.

(4) ADVANCED MICROELECTRONICS TRAINEESHIPS.

(A) IN GENERAL. The Director shall make available to institutions of higher education or nonprofit organizations (or consortia of institutions and organizations) an available traineeship program for graduate students who pursue microelectronic research leading to a master's or doctoral degree by providing funding and other assistance, and by providing graduate students with opportunities for research experience in government or industry related to their microelectronic studies.

(B) USE OF FUNDS. In institutions of higher education or nonprofit organizations (or consortia of institutions and organizations) shall use available funds provided under this paragraph (A) for the purpose of

(i) paying tuition and fees, and providing stipend, for students receiving traineeship who are citizens, nationals, or alien lawfully admitted for permanent residence;

(ii) facilitating opportunities for scientific internships for students receiving traineeship in microelectronic areas in industry, nonprofit research institutions, or Federal laboratories; and

(iii) choosing other cost-effective ways to administer the program.

(5) MICROELECTRONICS SKILLED TECHNICAL WORKFORCE PROGRAMS. The Director shall make available under the Scientific and Advanced-Technology Act of 1992 (42 U.S.C. 1862h-j) a support program for skilled technical workers in STEM disciplines that are aligned with the skilled workforce need of the microelectronic industry and lead to an associate degree, or equivalency certification, by providing funding and other assistance, including opportunities for internships and other hands-on experience in industry related to their microelectronic studies.

(6) MICROELECTRONICS RESEARCH EXPERIENCES THROUGH EXISTING PROGRAMS. The Director shall seek to increase opportunities for microelectronic research for students and trainees at all levels by encouraging proposals in microelectronic research through existing programs including

(A) research experience for undergraduate students pursuant to section 514 of the America COMPETES Reauthorization Act of 2010 (42 U.S.C. 1862p 6);

(B) postdoctoral fellowship program 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 program 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 in mathematics program established pursuant to section 7036 of the America COMPETES Act (42 U.S.C. 1862o-14); and

(G) low-income scholar ship 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 a wide number of partnerships and other private sector organizations to facilitate the expansion of workforce pipeline and enable access to industry-standard equipment and software for undergraduate and graduate microelectronic education program.

(8) INTERAGENCY COORDINATION. In carrying out activities under this section, the Director shall collaborate with the Subcommittee on Microelectronic 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 microelectronic 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-based basis, make a grant or investment of higher education and non-profit organization (or consortium of such investment and organization) to establish partnership to enhance and broaden participation in microelectronic education.

(2) ACTIVITIES. A grant made under this subsection shall be used for the following:

(A) To conduct training and education activities funded by a grant 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 a grantee.

(B) To develop regional partnership among associate-degree-granting college, bachelor-degree-granting institution, workforce development program, labor organization, and industry to create a diverse national technical workforce trained in microelectronic and related education and training in meeting the evolving need of industry.

(C) To develop local workforce pipeline to align with capacity in the market made by industry and the Federal government, including vocational and high school training program, community college degree and certificate, career preparation opportunities, and mentoring.

(D) To facilitate partnership, in which employer, employer consortium or other private sector organization has offered apprenticeship, internship, or applied learning experience in the field of microelectronics.

(E) To develop shared infrastructure available to institutions of higher education, vocational college, and private organization 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 opportunities, including through outreach to PreK-12 school and STEM-related organizations.

(G) To collaborate and coordinate, in which industry and engineering public and private organizations conducting microelectronics education and workforce development activities, a practicable.

(3) NETWORK COORDINATION HUB. The Director shall make an award on a competitive, merit-based basis to an institution of higher education or nonprofit organization (or a consortium hereof) to establish a national network of partnership (referred to in this section as the "National Network for Microelectronics Education") to coordinate activities, be practicable, and access to facilities across the partnership established in accordance with paragraph (1).

(4) INCENTIVIZING PARTICIPATION. To be effective, 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 formation of proposals that are led by historically Black college and universities, Tribal College or Universities, and minority-serving institutions or have included partnership, in which or among which institutions increase the recruitment of students from groups historically underrepresented in STEM professions and graduate students in microelectronics.

(6) OUTREACH. In addition to any other requirements determined appropriate by the Director, the Director shall require that proposals for award funding 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 encourage coordination, in which, and avoid unnecessary duplication of, the activities carried out under this section, in which 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, in which 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 opportunities that incorporate 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 program.”; 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 engineering of programming hardware 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 Opportunity Meaningful Promotion Excellence in Technology, Education, and Science Act (42 U.S.C. 1862o-14(c)) for the Major Research Initiatives Program and under section 10A(i) of the National Science Foundation Authorization Act of 2002 (42 U.S.C. 1862n-1a(i)) for each 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, including feedback from the research community, of the impact of the waiver provided under subsection (a), including

- (1) programmatic and scientific goal;
- (2) institutional commitment and leadership of Federal research;
- (3) institutional strategic planning and administrative burden;
- (4) equity among recipients in institution; and

(5) recommendation for or against extending or making permanent changes.

SEC. 10321. PROGRAMS TO ADDRESS THE STEM WORKFORCE.

(a) **IN GENERAL.** The Director shall initiate undergraduate scholar-ship, including a community college, graduate fellowship and traineeship, postdoctoral award, 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 conferred with a secondary school diploma, which are 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 delivery of the STEM workforce, and study the impact of such innovation and support. To do so, the Director may use postdoctoral awards established under this section (a) or leveraged under this section (d)(1) for fellowship or other temporary rotational posting of no more than 2 years. Such fellowship or temporary rotational posting shall be awarded

(1) to qualified individuals who have a doctoral degree and received such degree no earlier than 5 years before the date 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 an Federal agency may appoint, with regard to the provision of this chapter I of chapter 33 of title 5, United States Code, other than section 3303 and 3328 of that title, a qualified candidate described in paragraph (2) directly to a position in the competitive service within the Federal agency for which the candidate meets Office of Personnel Management qualification standards.

(2) **FELLOWSHIP OR TEMPORARY ROTATIONAL POSTING.**

Paragraph (1) applies in the case of a former recipient of an award under this section, who

(A) earned a doctoral degree in a STEM field from an institution of higher education; and

(B) subsequently fulfilled the requirements of the fellowship or temporary rotational posting within a Federal agency.

(3) **LIMITATION.** The direct hire authority under this section shall be exercised, in the case of a specific qualified candidate, no later than 2 years after the date the candidate completed the requirements related to the fellowship or temporary rotational posting described under this section.

(d) **EXISTING PROGRAMS.** In carrying out this section, the Director may leverage existing program, including program that is

(1) postdoctoral award;

(2) graduate fellowship and traineeship, including of the NSF Research Traineeship and fellowship award under the Graduate Research Fellowship Program;

(3) scholar-ship, research experience, and internship, including

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- (B) re earch eperience and in ern hip + nder ec-
ion 513, 514, and 515 of he America COMPETES
Rea hori a ion Ac of 2010 (42 U.S.C. 1862p 5; 1862p
6; 42 U.S.C. 1862p 7); and
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Subtitle C—Broadening Participation

SEC. 10321. PRESIDENTIAL AWARDS FOR EXCELLENCE IN MATHE- MATICS AND SCIENCE.

(a) IN GENERAL. Sec ion 117(a) of he Na ional Science
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amended

- (1) in + bparagraph (B)
 - (A) b riking “108” and in er ing “110”;
 - (B) b riking cla e (i);
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(b) EFFECTIVE DATE. The amendmen made b + b ec ion
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SEC. 10322. ROBERT NOYCE TEACHER SCHOLARSHIP PROGRAM UPDATE.

(a) SENSE OF CONGRESS. I i he ene of Congre ha
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(b) OUTREACH. To increase the diversity of participants, the Director shall support programs, 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 a award, on a competitive basis, on institutions of higher education or non-profit organizations (or consortia of institutions or organizations) to carry out a comprehensive national initiative to facilitate the development of networks and partnerships to build on and catalyze effective practices in broadening participation in STEM fields and career development opportunities for underserved individuals and careers.

(b) CHANGE OF NAME. The initiative established under subsection (a) shall be known as the "Eddie Bernice Johnson Inclusion across the Nation of Communities of Learners of Underrepresented Disciplines 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 operation and maintenance of a Foundation project to demonstrate prior experience and current capabilities in order to have a plan for employing best practices in broadening participation in science and engineering and implementing a plan of best practices considered in order to achieve 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 in 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 proportional access rates to emerging research institutions throughout the United States and, in the preceding accordance, award 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 paragraph (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 each; 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 amount appropriated to the Foundation for research and related activities, and science, mathematics, and engineering education and human resource program and activities, including the amount made available for polar research and operations support (and operations and maintenance of research facilities), shall be awarded to EPSCoR in its entirety.

(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 amount appropriated to the Foundation for scholarship (including a community college), graduate fellowship and traineeship, and postdoctoral award shall be awarded to support EPSCoR in its entirety.

(C) CONSIDERATIONS. The Director shall consider prioritizing funding and activities that enable sustainable growth in the competitiveness of EPSCoR jurisdiction, including

- (i) infrastructure investments to build research capacity in EPSCoR jurisdiction;
- (ii) scholarship, fellowship, and traineeship, internship, and visiting program, to promote the development of sustainable research and academic personnel;
- (iii) partnership between eligible organizations in EPSCoR and non-EPSCoR jurisdiction, to develop administrative, grant management, and proposal writing capabilities in EPSCoR jurisdiction;

(i) capacity building activities for emerging research institutions, historically Black college and universities, Tribal College or Universities, and minority-serving institutions, consistent with the action and section 10524 of the Department of Education;

(ii) leveraging the Partnership 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 Small Business Technology Innovation Act of 1980 as added

Section 10621, entitled Sustainable Innovation Ecosystem in EPSCoR jurisdiction.

(D) MERIT REVIEW. The Director shall achieve the percentage specified in this paragraph of the maximum extent practicable, consistent with the National Science Foundation merit review process.

(E) CONSORTIA. In the case of an award of a consortium, the Director may consider the entire award and meeting the funding requirements of this paragraph (A) if the lead institution 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 jurisdiction, including historically Black college and universities, Tribal College or Universities, minority-serving institutions, and emerging research institutions; and

(iii) if the Foundation does not meet the requirements described in this paragraph (A), an explanation relating thereto and a plan for compliance in the following fiscal year and remediation.

(G) ANALYSIS AND SUSTAINABILITY REPORT. No later than December 31, 2026, the Director shall submit to Congress a report containing an analysis of the impact of the requirements under this paragraph (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 a wide and geographically diverse set of institutions;

(ii) an analysis of any change in award amount and total funding awarded to historically Black college and universities, Tribal College or Universities, minority-serving institutions, and emerging research institutions between the date of enactment and December 31, 2026;

(iii) an analysis of the gain in academic research capacity, quality, and competitiveness and in science and technology human resource development in EPSCoR jurisdiction made between the enactment of this Act and December 31, 2026;

(iv) an analysis of EPSCoR eligibility criteria and determination on whether any eligibility criteria should be developed based on the findings from clause (i), (ii), and (iii); and

(v) a plan of action and goals for improvement in research capacity and competitiveness in EPSCoR jurisdiction.

(H) EPSCoR ELIGIBILITY.

(i) IN GENERAL. The Director shall ensure eligibility for certain EPSCoR jurisdiction for fiscal year beginning on the date of enactment of this Act, after which

the Director shall determine whether any eligible criteria shall be developed based on the finding in the report required under paragraph (G).

(ii) REPORT. Not later than December 31, 2028, the Director shall report to Congress regarding any eligible criteria determined under clause (i), any change of jurisdictional eligibility based on such criteria, and the necessity and practicality of continuing or modifying the requirements under paragraph (A) given any such change of eligibility. The report shall include an analysis of options to support research in non-EPSCoR jurisdiction, adjacent to EPSCoR jurisdiction, having historically received disproportionate levels of funding from the Foundation, including, if appropriate, options to expand the EPSCoR program or other eligible program.

(b) FOSTERING STEM RESEARCH DIVERSITY AND CAPACITY PROGRAM.

(1) IN GENERAL. The Director shall make a award on a competitive, merit-reviewed basis to eligible institutions to implement and fund innovative approaches for building research capacity in order to engage and retain talent from a range of institutions and diverse backgrounds in STEM.

(2) ELIGIBLE INSTITUTION DEFINED. In this section 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, in any year, 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 section shall be focused on achieving immediate impacts and, in addition, and in institutional level, increasing the research capacity of eligible institutions and the number of undergraduate and graduate students pursuing STEM degree from eligible institutions.

(4) REQUIREMENTS. In carrying out this program, the Director shall

(A) require eligible institutions seeking funding under this section to submit an application to the Director at such time, in such manner, containing such information and a rationale as the Director may require. The application shall include, as a minimum a description of how the eligible institution plan to attain the proposed activities be on the duration of the award;

(B) require application to identify discipline and focus area in which the eligible institution can excel, and explain how the application will use the award to build capacity to bolster the institutional research competitiveness of eligible entities to support award made by the Foundation and increase regional and national capacity in STEM;

(C) require the award funded under this section to support research and related activities, which may include

(i) development or expansion of research program in discipline and focus area in paragraph (B);

(ii) faculty research and professional development in discipline and focus area in paragraph (B), including for early-career researcher;

(iii) stipend for undergraduate and graduate student participating in research in discipline and focus area in paragraph (B);

(i) acquisition of infrastructure necessary to build research capacity and eligible in institution in discipline and focus area in paragraph (B);

() an assessment of capacity building and research infrastructure need;

(i) administrative research development support;

and

(ii) 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 funding made available under this section.

(5) ADDITIONAL CONSIDERATIONS. In making award under this section, the Director shall consider

(A) the extent to which the applicant will support student from diverse background, including first-generation undergraduate student;

(B) the geographic and institutional diversity of the applicant; and

(C) how the applicant can leverage public-private partnership and existing partnership with the Federal Research Agency.

(6) DUPLICATION. The Director shall ensure the award made under this section are complementary and not duplicative of existing program.

(7) REPORT. The Director shall submit a report to Congress after the third year of the program has included

(A) an assessment of the effectiveness of the program for growing the geographic and institutional diversity of institution of higher education receiving research award from the Foundation;

(B) an assessment of the quality, quantity, and geographic and institutional diversity of institution of higher education conducting Foundation-sponsored research in the eligible areas of the program in this section;

(C) an assessment of the quality and diversity of undergraduate and graduate student graduating from eligible institution with STEM degree; and

(D) a detailed summary of the program, including the geographic and institutional allocation of award funding, the number and diversity of supported graduate and undergraduate student, and how it contributes to capacity building 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 section.

(c) PARTNERSHIPS WITH EMERGING RESEARCH INSTITUTIONS.

(1) IN GENERAL. The Director shall establish a five-year pilot program for award of research partnership grants in order

emerging research in information and manufacturing information classified as either high research activity by the Carnegie Classification of Information 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-information collaboration for an award, including those under the title Grant of this title, has exceeded \$1,000,000, a appropriate, specifically the applicant will support a benefit, meaningful, attainable, and mutually beneficial partnership with one or more emerging research in information;

(B) require recipient funded under this section no more than 35 percent of the total award to one or more emerging research in information;

(C) require recipient funded under this section to report on the partnership activity a part of the annual reporting requirements of the Foundation; and

(D) solicit feedback on the partnership directly from partner emerging research in information, in such form as the Director deems appropriate.

(3) CAPACITY BUILDING. Fund awarded to emerging research in information under this section may be used to build research capacity, including through support for faculty salaries and training, field and laboratory research experience for undergraduate and graduate students, and maintenance and repair of research equipment and infrastructure.

(4) REPORT. The Director shall submit a report to Congress after the third year of the pilot program has included

(A) an assessment, drawing on feedback from the research community and other source of information, of the effectiveness of the pilot program for improving the quality of partnership with emerging research in information; and

(B) if deemed effective, a plan for permanent implementation of the pilot program.

SEC. 10326. DIVERSITY IN TECH RESEARCH.

The Director shall make award, on a competitive basis, to information of higher education or nonprofit organization (or consortium of such information or organization) to support basic, applied, and technology-oriented research that holds scientific evidence base for improving the design and emergence, development and deployment, and management and climate 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, police, and investigation;
- (C) equal employment opportunity; and
- (D) disability.

(b) DUTIES. The Chief Diversity Officer is responsible for providing advice on policy, oversight, guidance, and coordination, in his or her capacity as the Federal liaison related to diversity and inclusion, including ensuring the geographic diversity of the Federal program. Other duties may include:

(1) establishing and maintaining a strategic plan, highlighting the agency's definition, vision, and goal for the Federal program;

(2) defining a set of strategic metrics, which are:

(A) directly linked to the agency's organizational priorities and goal;

(B) actionable; and

(C) accelerated implementation of the strategic plan under paragraph (1);

(3) advising in the establishment of a strategic plan for diversity participation, including and inclusion of higher education, including community college, historically Black college and university, Tribal College or University, minority serving institution, inclusion of higher education, including an established STEM capacity building program focused on Native Hawaiian or Alaska Native, and EPSCoR inclusion;

(4) advising in the establishment of a strategic plan for outreach, and recruitment, targeted location and underrepresented population;

(5) advising on diversity and inclusion strategy for the Federal program portfolio of PreK-12 STEM education focused program and activities, including goal for addressing barrier to participation;

(6) advising on the application of the Federal program's broader impact requirements; and

(7) performing such additional duties and exercises as may be required by the Director.

(c) AUTHORIZATION OF APPROPRIATIONS. To carry out this section, there are authorized to be appropriated \$5,000,000 for each fiscal year 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 a grant on a competitive, merit-reviewed basis, in inclusion of higher education or non-profit organization (or consortium of such institution or organization), to enable such entity to increase the participation of women and underrepresented minorities in STEM fields and career.

(b) USE OF FUNDS. An eligible entity that receives a grant under this section shall use such grant 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 on analyzing the record-level data collected under section 10502 and 10504, concerning such policies to ensure the practical identification of such data.

(2) Research to develop practice for work-life accommodation.

(3) Research to determine the impact of policies and practices that are implemented or are otherwise implemented in the workplace of higher education.

(4) Mentoring program that facilitates engagement of STEM professionals in higher education.

(5) Research on experience 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 concerning the workplace of higher education, including

(1) collaboration with other Federal research agencies and professional associations to exchange best practices, harmonize work-life accommodation policies and practices, and overcome common barriers to work-life accommodation; and

(2) collaboration with institutions of higher education in order to clarify and facilitate the adoption 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. 1862-5) is amended

(1) by redesignating subsection (e) and (f) as subsection (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 a good faith effort to increase the recruitment, retention, and advancement of individuals from underrepresented minority groups in academic STEM careers, which may include implementing or expanding flexible tenure-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 award mechanisms, such as data analysis 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) award mechanisms of distribution of mentoring and advisory responsibilities among faculty, particularly for faculty from underrepresented minority groups, that may be made from time spent on research, publishing paper, and other activities required to achieve excellence in research or

promotion (or equivalent for non-entire track faculty) and
 a national productive research program;

“(C) development and achievement of training courses
 for administrative and research committee members designated
 to enhance the education of candidates from underrep-
 resented minorities;

“(D) development and holding of in-service or in-
 ternational workshop or propagation practices in recruiting,
 training, and advancing faculty members from underrep-
 resented minorities;

“(E) professional development opportunities for faculty
 members from underrepresented minorities;

“(F) activities aimed at making undergraduate STEM
 students from underrepresented minorities groups aware of
 opportunities for academic career in STEM field; and

“(G) activities to identify and engage exceptional grad-
 uate students and postdoctoral researchers from underrep-
 resented minorities groups as a priority area of their study
 and encourage them to enter academic career.

“(4) SELECTION PROCESS.

“(A) APPLICATION. An institution of higher education
 (or a consortium of institutions) seeking funding under
 this section shall submit an application to the Director
 of the Foundation at such time, in such manner, and con-
 taining such information and attachments as the Director
 may require. The application shall include, as 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 fac-
 ulty members from underrepresented minorities groups
 in STEM academic career, including 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
 administrative staff of the institution, which may include
 detailed information on ongoing reform effort;

“(i) how the proposed reform effort may contribute
 to change in institutional climate and policies that have
 a greater effect placed on the recruitment, retention,
 and advancement of faculty members from underrep-
 resented minorities groups;

“() how the institution of higher education is submit-
 ting an application plan to sustain the proposed
 reform effort beyond the duration of the award, if
 the effort proposed is for a limited period; and

“(i) how the success and effectiveness of the pro-
 posed reform effort will be evaluated and achieved
 in order to contribute to the national knowledge base
 about models for achieving institutional change.

“(B) AWARD DISTRIBUTION. The Director of the
 Foundation shall ensure, to the extent practicable, that
 awards under this section are made on a variety of people
 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. 1862-5), 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 a grant to an institution of higher education (or a consortium of institutions) to implement or expand research-based reform in undergraduate STEM education for the purpose of recruiting and retaining talent 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 proposed by award 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 twofold, research-based bridge, cohort, tutoring, or mentoring programs, including home visiting community college and technical school, designed to enhance the recruitment and retention of talent from underrepresented minority groups in STEM fields;

“(C) implementation or expansion of outreach programs linking institutions of higher education and PreK-12 schools in order to heighten awareness among precollege talent 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 talent 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 talent from underrepresented minority groups in STEM fields;

“(F) expansion of twofold reform aimed at increasing the number of STEM talent from underrepresented minority groups beyond a single career or group of careers to achieve reform, including an entire academic unit, or expansion of twofold reform effort beyond a single academic unit or field to other STEM academic units or fields, including an institution of higher education;

“(G) expansion of opportunities for talent from underrepresented minority groups to conduct STEM research in industry, a Federal laboratory, and a national research institution or research center;

“(H) provision of stipend for talent from underrepresented minority groups participating in research;

“(I) development of research collaboration between research-inventive and primarily undergraduate historically Black college and university, Tribal College or University, and minority engineering institutions;

“(J) support for graduate and postdoctoral fellowships from underrepresented minority groups to participate in international or domestic academic activities primarily undergraduate institutions, including primarily undergraduate historically Black college and university, Tribal College or University, and minority engineering 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 contractor hereof) seeking an award under this section shall submit an application to the Director of the Foundation at such time, in such manner, and containing such information and attachments as the Director may require. The application shall include, as 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, in the case of application for proposed 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, and support for, the proposed reform effort, including a long-term commitment to implementation of the strategy from the relevant reform beyond the academic year or years included in the award proposal;

“(iv) a description of how the proposed reform effort may contribute to, or in the case of application for proposed expansion of a previously implemented reform, contribute to, change in institutional climate and policies that have a greater effect 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 assignments that reward faculty contribution to improving the education 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 section are made on a variety of types of institutions of higher education, including historically Black college and university, Tribal College or

Universities, minority-serving institutions, and 2-year institutions of higher education.

“(5) EDUCATION RESEARCH.

“(A) IN GENERAL. All awards made under this section shall include an education research component that will support the design and implementation of a program for data collection and evaluation of proposed reform efforts in order to build the knowledge base on promising models for increasing retention and re-enrollment of students from underrepresented minority groups in STEM education at the undergraduate level across a diversity of institutions.

“(B) DISSEMINATION. The Director of the Foundation shall coordinate with the Commission on STEM Education of the National Science and Technology Council in disseminating the results of the research under this paragraph so that the 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 providers of STEM education, and the general public.

“(6) AUTHORIZATION OF APPROPRIATIONS. There are authorized to be appropriated to carry out this section \$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 research programs or other programs authorized in this division or division A, within the Foundation to expand the number of institutions of higher education (including institutions that are community colleges), and other eligible entities that the Director determines appropriate, that are able to compete for Foundation awards.

(b) COMPONENTS. Pilot programs under this section may include

- (1) a mentoring program;
- (2) award application training technical assistance;
- (3) targeted outreach, including to historically Black colleges or universities, 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 Hawaiian or Alaska Native);
- (4) programmatic support or consultation for institutions or entities that do not have an experienced award management office;
- (5) an increase in the number of award proposals received 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. An appropriation, each pilot program under this section shall work to reduce administrative burden for recipients and award personnel.

(d) AGENCY-WIDE PROGRAMS. No later than 5 years after the date of enactment of this Act, the Director shall

- (1) review the results of the pilot program under this section; and
- (2) develop agency-wide best practices from the pilot program for implementation across the Foundation, in order to fulfill the requirements 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, which no 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 policies across the Foundation, including

- (1) consulting and coordinating with the Foundation Office of Inspector General, within 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 policies and best practices, taking into account the policy guidelines established by the Director of the Office of Science and Technology Policy under section 10631 of this title;
- (2) reviewing and overseeing the Foundation for all issues related to the security and integrity of the conduct of Foundation-sponsored 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 control relevant to the grant or award;
- (4) educating Foundation program manager and other direct or indirect staff about a range of 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 awarding analytical tools to assess nondisclosure of required information;
- (7) establishing policies and procedures for identifying, communicating, and addressing security risks that threaten the integrity of Foundation-sponsored research and development, working in consultation, as appropriate, with other Federal agencies, to ensure compliance with National Security

Preidential Memorandum 33 (relating to strengthening protection of United States Government - sponsored research and development against foreign governments in reference and exploitation) or appropriate personnel; and

(8) in accordance with relevant policies of the agency, conducting or facilitating diligence with regard to application for research and development awards from the Foundation prior to making such award.

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 Appropriation of the House of Representatives, and the Committee on Appropriation of the Senate on the resources and the number of full-time employees needed to carry out the function 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 hereafter, 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 activities;

(B) such recommendations as the Director may have for legislative or administrative action relating to improving research efforts;

(C) identification and discussion of the gap in legal authority that needs to be improved to enhance the efforts of institutions of higher education performing research sponsored by the Foundation; and

(D) information on Foundation Inspector General cases, as appropriate, relating to undue influence and efforts to interfere with research and development activities funded by the Foundation, including effectiveness of proper or ineffective proper 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 forms, as appropriate.

SEC. 10334. ONLINE RESOURCE.

The Director shall develop an online resource hosted on the Foundation's website containing up-to-date information, tailored for institutions and individual researchers, including

(1) an explanation of Foundation research efforts; and

(2) unclassified guidance on potential efforts that have been or will be undertaken in the research and other efforts of the research enterprise;

(3) example of beneficial international collaboration and headquarters collaboration differ from foreign governments in reference effort has been research in effort;

(4) best practice for mitigating effort risk has been research in effort; and

(5) additional reference material, including tool has a organization seeking Foundation funding and a award in information disclosure of the Foundation.

SEC. 10335. RESEARCH AWARDS.

The Director shall continue to make award, on a competitive basis, in recognition of higher education or non-profit organization (or consortium of such institution or organization) of top research on the conduct of research and the researchers involved, including research on research misconduct or breaches of research in effort and detrimental research practice.

SEC. 10336. AUTHORITIES.

In addition to existing authorities for preventing, avoiding, and management of Federal funding, 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 tool, of research and development award application and disclosure of the Foundation.

SEC. 10337. RESPONSIBLE CONDUCT IN RESEARCH TRAINING.

Section 7009 of the America Creating Opportunity to Meaningful Promote Excellence in Technology, Education, and Science Act (42 U.S.C. 1862o-1) is amended by

(1) striking "and postdoctoral researcher" and inserting "postdoctoral researcher, faculty, and other personnel"; and

(2) by striking the period and inserting the following: ", including

"(1) mentoring and mentorship;

"(2) training opportunities of postdoctoral research effort has been research in effort; and

"(3) Federal reporting 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 effort and integrity information sharing analysis organization (referred to in this section as the "RSI-ISAO"), which shall include membership described in subsection (d) and carry out the duties described in subsection (b).

(b) DUTIES. The RSI-ISAO shall

(1) create a clearinghouse for information to help enable the member and other entities in the research community to understand and the control of their research and identify improper or illegal effort by foreign entities to obtain research results, knowledge, material, and intellectual property;

(2) develop a set of standard risk assessment framework and best practice, relevant to the research community, on a research effort risk in different context;

(3) share information concerning cybersecurity and lessons learned from protection and response efforts through forms and other forms of communication;

(4) provide timely reports on research cybersecurity risks to provide informational awareness tailored to the research and STEM education community;

(5) provide training and support, including through webinars, for relevant and affected individuals in the field of higher education on topics relevant to research cybersecurity 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 cybersecurity risks; and

(8) take other appropriate steps to enhance research cybersecurity.

(c) FUNDING. The Foundation may provide initial funding and the RSI-ISAO shall seek to have the fee authorized in subsection (d)(2) cover the cost of operation as the earliest practicable time.

(d) MEMBERSHIP.

(1) IN GENERAL. The RSI-ISAO shall enroll and include member representation in the field of higher education, nonprofit research in the field, and small and medium-sized businesses.

(2) FEES. A bona fide practicable, member 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, including 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 plan and strategy of the entity's operation. The board shall include a diverse group of stakeholder representation in the research community, including academia, industry, and experienced research cybersecurity 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 need of the research community, including

(1) consulting a series of workshops or other multi-stakeholder events; or

(2) publishing a description of the services the RSI-ISAO intend to provide and the requirements for membership in the Federal Register and provide an opportunity for submission of public comment for a period of not less than 60 days.

SEC. 10339. PLAN WITH RESPECT TO CONTROLLED INFORMATION AND BACKGROUND SCREENING.

(a) IN GENERAL. No 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 areas, having in place access to controlled and classified information, including in the key technology areas; and

(2) exercise due diligence in granting access, as appropriate, to the CUI or classified information identified under paragraph (1) of individuals working on such research, who are employees of the Foundation or covered individuals on research and development and funded by the Foundation.

(b) DEFINITIONS. In this section:

(1) CLASSIFIED INFORMATION. The term "classified information" means information that has been determined pursuant to Executive Order 13526, an predecessor or successor order, or section 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 has not been declassified.

(2) CONTROLLED UNCLASSIFIED INFORMATION. The term "controlled and classified information" or "CUI" means information described as "Controlled Unclassified Information" under Executive Order 13556 or an successor order, to require protection against unauthorized disclosure and has not been declassified.

SEC. 10339A. FOUNDATION FUNDING TO INSTITUTIONS HOSTING OR SUPPORTING CONFUCIUS INSTITUTES.

(a) CONFUCIUS INSTITUTE DEFINED. In this section the term "Confucius Institute" means a global initiative 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 that such action is appropriate in accordance with subsection (c).

(c) WAIVER. The Director, after consultation with the National Academies, may waive, either 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 an foreign law on an campus of the institution;
- (3) grant full managerial authority of the Confucius Institute to the institution, including full control over, having being sought, the activities carried out, the research and activities that are made, and, who is employed at the Confucius Institute; and
- (4) prohibit co-location with the institution's Chinese language, history, and global program and require separate promotional material.

(d) SPECIAL RULE.

(1) IN GENERAL. No, in hindering another 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. No, in hindering another provision of this section, the prohibition under subsection (b) shall not apply to an amount provided to a designated educational assistance.

(e) EFFECTIVE DATE. The limitation under subsection (b) shall apply, in respect to the fiscal year, beginning after the date that is 90 days after the date of the enactment of this Act and to an additional fiscal year subsequent 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 require, 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 each an educational, cultural, or language entity, of the foreign financial support, the amount of which is \$50,000 or more, including gifts and contracts, received directly or indirectly from a foreign source (as that term is defined in section 117 of the Higher Education Act of 1965 (20 U.S.C. 1011f(h)(2))) associated with a foreign 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 record subsequent to the disclosure requirements until the date 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 date of an applicable State public records law require a true copy of each agreement to be maintained.

(c) DOCUMENTATION. Upon receipt of the disclosure under this section, the Director may require that a recipient institution provide a true copy of any contract, agreement, or document of financial transaction associated with the disclosure made under this section.

(d) OFFICE OF THE INSPECTOR GENERAL. The Director, acting through the Office of Research Security and Policy Coordination within the Foundation's Office of Inspector General and in consultation with the recipient institution, may reduce the burden of reporting amounts or suspend or terminate the requirement if the Director determines

(1) each institution fails to comply with the record retention requirements in subsection (b) or fails to provide information requested under this section; or

(2) the Chief of Research Security determines the disclosure requirements under this section indicate a threat to research security.

SEC. 10339C. AUTHORIZATION OF APPROPRIATIONS.

From an amount appropriated for the Foundation for each fiscal year 2023 through 2027, the Director shall allocate \$6,000,000 to carry out the activities under this title.

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 advise the Director on the broader impact criteria applied across the Foundation and make recommendations for improving the effectiveness for meeting the goals established in section 526 of the America Creating Opportunities for Meaningful Promotion and Excellence in Technology, Education, and Science Research and Innovation Act of 2010 (42 U.S.C. 1862p-14).

(b) ACTIVITIES. The Director shall make a study on a competitive basis, on the basis of higher education or non-profit organization (or combination of combination of organization) to promote activities to increase the efficiency, effectiveness, and availability of research for implementing the broader impact criteria, including

(1) training and workshop for program officer, merit review panels, award office administrators, faculty, and students to improve understanding of the goal and the full range of potential broader impact available to researchers to satisfy the criteria;

(2) reporting and clearinghouse for having best practices and facilitating collaboration; and

(3) tools for evaluating and documenting societal impact 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 earlier in 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 harm before it happens;

(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. Drafting on stakeholder input, not later than 24 months after the date of enactment of this Act, the Director shall revise proposals to require ethical and societal considerations to be included as part of a proposal for funding prior to making the award, where such considerations are applicable. Such considerations shall be established by the Director in the review of proposals, taking into account any relevant input from the peer-reviewer for the proposal, and shall factor into award decisions, as deemed necessary.

the Director. When incorporating such consideration, propose to include, as appropriate

(1)(A) any readily foreseeable or identifiable risk to society, including the research could enable production, technology, or other activities could in any way result in any significant social harm; or

(B) any activity has no readily foreseeable potential ethical, social, safety, or other implications are apparent;

(2) any technical or social objection can mitigate such risk and, as appropriate, a plan of implementation mitigation measures; and

(3) any partnership and collaboration in the research can help mitigate potential harm and amplify potential societal benefits.

(c) GUIDANCE. The Director shall solicit stakeholder input to develop clear guidance on how to include a readily foreseeable or identifiable risk as described in subsection (b)(1), and to ensure practicable harmonization with other existing ethical policies or related requirements for human subjects.

(d) RESEARCH. The Director shall make a award, on a competitive basis, in addition of higher education or non-profit organization (or consortium of institutions or organizations) to support

(1) research to assess the potential ethical and societal implications of Federally supported research and production or technology 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 objections identified pursuant to subsection (b)(1).

(e) ANNUAL REPORT. The Director shall encourage recipient organizations to provide information on potential risks and benefits as appropriate as part of the annual report 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 other issues, the Director shall facilitate public access to research production, including data, software, and code, developed as part of Federally supported projects.

(b) DATA MANAGEMENT PLANS.

(1) IN GENERAL. The Director shall require the awardee to develop a 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 requirements in paragraph (1), the Director shall

(A) provide necessary resources, including training and workshop, to educate researchers and students on how to develop and require high quality data management plan;

(B) ensure program officer and merit review panel are equipped with the resources and training necessary to review the quality of data management plan; and

(C) enter program officer and meritorious panel read a management plan as essential element of award proposal, where appropriate.

(c) OPEN REPOSITORIES. The Director shall

(1) consult with the head of other Federal research agencies, as appropriate, and solicit input from the scientific community, to develop and identify the criteria for the establishment of Federal-funded research, according to discipline-specific need and necessary protection for sensitive information;

(2) work with stakeholder to identify significant gap in available repository meeting the criteria developed under paragraph (1) and option for supporting the development of additional or enhanced repository;

(3) make award on a competitive basis in support of higher education or non-profit organization (or consortium of institutions or organization) for the development, upgrade, and maintenance of open data repository having the criteria developed under paragraph (1);

(4) work with stakeholder and build on existing model, where appropriate, to establish a single, public, web-based point of access to help other local repository organizations, of, are, and code relating from or established in Federal-supported project;

(5) work with stakeholder to establish the necessary policies and procedures and allocate the necessary resources to enter, a practical, data handling public finding relating from Federal-supported project are deposited in repository meeting the criteria developed under paragraph (1) at the time of publication;

(6) incentivize the deposition of data, of, are, and code in repository having the criteria developed under paragraph (1); and

(7) coordinate with the scientific publishing community and the head of other relevant Federal departments and agencies to support the development of national content standards and data archiving and sharing.

(d) RESEARCH, DEVELOPMENT, AND EDUCATION. The Director shall make award, on a competitive basis in support of higher education or non-profit organization (or consortium of institutions or organization) to

(1) support research and development of open source, sustainable, available tool and infrastructure having support reproducible for a broad range of discipline differences;

(2) support research on computational reproducibility, including the limits of reproducibility and the consequences of computational results in the development of new computational hardware, tool, and method; and

(3) support the education and training of students, faculty, and researchers on computational method, tool, and technique 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 a award, on a competitive basis, to institutions of higher education or non-profit organization (or consortium of institutions or organization) to support research to improve understanding of the climate system and related human and environmental elements.

SEC. 10346. SOCIAL, BEHAVIORAL, AND ECONOMIC SCIENCES.

The Director shall

(1) facilitate communication and policy 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 advisory panels for such activities.

SEC. 10347. MEASURING IMPACTS OF FEDERALLY FUNDED RESEARCH AND DEVELOPMENT.

The Director shall make a award on a competitive, merit-reviewed basis to institutions of higher education or non-profit organization (or consortium of institutions or organization) to support research and development of data, models, indicators, and associated analytical tools to improve understanding of the impact of Federal funded research on society, the economy, and the workforce, including domestic job creation.

SEC. 10348. FOOD-ENERGY-WATER RESEARCH.

The Director shall make a award on a competitive basis to institutions of higher education or non-profit organization (or consortium of institutions or organization) to

(1) support research on significant advances understanding of the food-energy-water system through analysis and computational modeling, including support for relevant cyberinfrastructure;

(2) develop real-time, cyber-enabled interfaces to improve understanding of the behavior of food-energy-water system and increase decision support capabilities;

(3) support research that will lead to innovative solutions to critical food-energy-water system problems; and

(4) grow the scientific workforce capable of leading and managing the food-energy-water system, higher education and other professional development.

SEC. 10349. BIOLOGICAL FIELD STATIONS AND MARINE LABORATORIES.

The Director shall continue to support enhancing, repairing and maintaining research infrastructure, laboratories, electronic communication and hosting a biological field station and marine laboratory.

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 available, on a competitive basis, information of higher education or non-profit organization (or consortium of institutions or organizations) to support

(A) individual in engineering and team of in engineering, including the most practicable, early career in engineering for research and development;

(B) collaborative research and development partnership among universities, industry, and non-profit organization;

(C) integrating available chemical principles in elementary, secondary, undergraduate, and graduate chemistry and chemical engineering curriculum and research training, appropriate to the level of education and training; and

(2) incorporating available chemical information existing Federal research and development program.

SEC. 10351. RISK AND RESILIENCE RESEARCH.

The Director shall make available on a competitive basis information of higher education or non-profit organization (or consortium of institutions or organizations) to advance knowledge of risk assessment and predictability and to support the creation of tools and technologies, including advancing data analytic and utilization of artificial intelligence, for increased resilience through

(1) improvement in capabilities to understand, model, and predict extreme events and natural hazards;

(2) the creation of novel engineered systems for resilient complex infrastructure, particularly those having address critical interdependence among infrastructure and leverage the growing information of cyber-physical-social components in the infrastructure;

(3) development of equipment and instrumentation for innovation in resilient engineered infrastructure;

(4) multidisciplinary research on the behavior individual and community engaged in decision, perception, understanding, prediction, mitigation, and prevention risk and improvement and increase resilience; and

(5) advancement in multidisciplinary wildfire science, including how 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 National Aeronautics and Space Administration, the Director shall carry out a program of research and related activities related to unmanned aircraft technologies, which may include a priority competition pursuant to section 24 of the Section-Welder Technology Innovation Act of 1980 (15 U.S.C. 3719) and to support for undergraduate and graduate curriculum development.

SEC. 10353. ACCELERATING UNMANNED MARITIME SYSTEMS TECHNOLOGIES.

(a) IN GENERAL. In order to support advance in marine science, maritime domain awareness, and national security the Director, in consultation with the Under Secretary of Commerce

for Ocean and Atmosphere and the Commandant of the Coast Guard, shall investigate, on a competitive basis, organizations of higher education or nonprofit organizations (or consortiums of organizations or organizations) to support research that will accelerate innovation of advanced manned 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, energy, health, and well-being, including through binational research and development organizations and foundation and foundation ending team of Foundation scientific efforts in the area of scientific facilities and agencies in other countries. The Director shall establish and implement policies, including through an research energy training requirements, to mitigate the potential risk of technology transfer, including risk of the production 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 provide database, tool, method, and other activities that enhance and improve existing physical and digital biological research collection, improve the accessibility of collection and collection-related data for research and educational purposes, develop capacity for creation and collection management, and coordinate the development of collection that are significant to the biological research community, including community and initiatives.

(b) SPECIMEN MANAGEMENT PLAN. In consultation with other relevant Federal research agencies, and after the Director determines appropriate, the Director shall require a proposed timeline of the Foundation for funding for research that involves collecting or generating specimen included, as part of the data management plan under section 10344, a description of how the specimen and associated data will be accessioned in 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 a grant on a competitive basis to organizations of higher education or nonprofit organizations (or consortiums of organizations or organizations) to facilitate coordination and data sharing among community efforts for research, education, workforce training, evaluation, and best practice model development, including by establishing an Action Center for Biological Collection.

SEC. 10356. CLEAN WATER RESEARCH AND TECHNOLOGY ACCELERATION.

The Director shall make a award on a competitive, merit-based basis in support of higher education or non-profit organizations (or consortiums of institutions or organizations)

(1) support interdisciplinary research of significant advance regarding of water availability, quality, and demand and the impact of human activity and a changing climate on urban and rural water and wastewater, including in low-income, under-served, 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 equity, including through direct engagement with affected communities and partnership 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 leading and managing water and wastewater and of conducting water equity research, higher education, training, and other professional development.

SEC. 10357. TECHNOLOGY AND BEHAVIORAL SCIENCE RESEARCH.

(a) IN GENERAL. The Director shall make a award on a merit-based, competitive basis for research and development of

(1) increase understanding of social media and consumer technology use and patterns and related mental health, behavioral, and substance 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 disorder issues, including within communities experiencing long-term economic distress.

(b) COORDINATION TO AVOID DUPLICATION. In making a award under this section, the Director shall, for purpose 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 “industrial 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 next material design, complex material, rapid printing technique, and real-time process control.”.

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 a supply chain resilience, the Director shall make a grant, on a competitive basis, to institutions of higher education or nonprofit organization (or consortium of institutions or organization) to support basic research that will accelerate innovation to advance critical mineral mining strategies and technologies for the purpose of making better use of domestic resources and eliminating national reliance on mineral and mineral material that are subject to supply disruption.

(2) **USE OF FUNDS.** Activities funded by a grant 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 exploration and production, separation, alloying, or processing techniques and technologies that can decrease energy intensity to improve efficiency of development, supply chain of critical mineral, 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 cost of those activities;

(C) conducting long-term earth observation of reclaimed mine sites, including the use of the collection of microbial diversity data;

(D) examining the application of artificial intelligence for geological exploration of critical mineral, including data science and data mining of data sets, which should be required;

(E) examining the application of machine learning for detection and monitoring of critical mineral, including data science and data mining of data sets, which should be required;

(F) conducting detailed investigation of critical mineral and the development of more refined geologic model;

(G) improving understanding of the geological and geochemical processes through which critical mineral forms and are concentrated in economically viable deposits; or

(H) providing training and research opportunities to undergraduate and graduate students to prepare the next generation of mining engineer and researcher.

(3) **EXISTING PROGRAMS.** The Director shall enter a grant made under this section are complementary and not duplicative of existing programs across the Foundation and Federal Government.

(b) CRITICAL MATERIALS INTERAGENCY SUBCOMMITTEE.

(1) **IN GENERAL.** The Critical Mineral 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 purpose of the Subcommittee shall be

(A) to advise and assist the National Science and Technology Council, including the Commission on Homeland and National Security, on United States policies, procedures, and plans relating to critical materials, including

(i) Federal research, development, and commercial application efforts to minimize the environmental impact of methods for extraction, concentration, separation and purification of conventional, secondary, and unconventional sources of critical materials;

(ii) efficient use, distribution, and reuse of critical materials;

(iii) the critical materials workforce of the United States; and

(iv) United States private industry involvement in innovation and technology transfer from federally funded science and technology;

(B) to identify emerging opportunities, including international cooperation, and foster the development of secure and reliable supply chains of critical materials and establish scenario modeling teams 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 program 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 account 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 data, or the enhanced permitted use and release of appropriate information for purposes of private and security;

(B) advise the progress of 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, including critical materials need, 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 incentives and trade, industry alliances and partners and provide recommendations;

(E) evaluate and provide recommendations on incentives for development and use of advances in science and technology in the private industry;

(F) determine the need for and make recommendation to address the challenge the United States critical material supply chain, workforce, including aging and retiring personnel and facilities, and foreign competition for United States talent;

(G) develop, and provide a necessary, strategic plan to guide Federal program and activities to enhance scientific and technical capabilities across critical material supply chain, including a roadmap highlighting the research and development need and coordinate on-going activities for workforce diversification, more efficient use, recycling, and substitution for critical material; a well-advanced mining science, data science techniques, material science, manufacturing science and engineering, computational modeling, and environmental health and safety research and development;

(H) determine the need for, and make recommendation concerning, the availability and adequacy of the supply of technically trained personnel necessary for critical material research, development, extraction, and industrial production, with a particular focus on the problem of attracting and maintaining high-quality professional workforce for maintaining an adequate supply of energy critical material; and

(I) report on the appropriate Congressional commission on activities and findings under his section.

(c) DEFINITIONS OF CRITICAL MINERAL AND CRITICAL MINERAL OR METAL. In this section, the term "critical mineral" and "critical mineral or metal" include any mineral of a critical mineral (within the meaning of the term in section 7002 of title VII of division Z of the Consolidated Appropriation Act, 2021 (Public Law 116-260)).

SEC. 10360. STUDY OF AI RESEARCH CAPACITY.

(a) IN GENERAL. The Director shall conduct a study to report the development of a study by a qualified independent organization administered by the Director, on artificial intelligence research capacity in United States in addition of higher education.

(b) STUDY CONTENTS. The Director shall ensure that, at a minimum, the study under subsection (a) address the following topic:

(1) Which universities are producing significant peer-reviewed artificial intelligence research, including based on quantity and number of citations.

(2) For each of the universities described in paragraph (1), the specific factors enable their AI research, including computing power, data availability, specialized workforce, facilities and graduate students, source 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 program.

(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, and all categories of universities can look to as examples.

and pilot program shall be the Federal Government could develop or support to help further the production of AI research.

(c) WORKSHOPS. The Director may support workshops to help inform the field regarding the benefits.

(d) PUBLICATION. The Director shall ensure that the field carried out under this section is made publicly available no 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 Experience 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 a grant under the program and new or expanded program of the Foundation, the Director shall include in consideration of portfolio balance research and development on sensor connectivity in environments of interconnection and interconnection comparison

(1) improve the reliability of advanced sensing equipment in rural and agricultural areas; and

(2) have considered

(A) direct grant access for local roads;

(B) availability of signal transmission;

(C) loss of signal transmission; and

(D) availability 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) application that incorporates distance learning tool 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) application that incorporates distance learning tool and approaches.”.

(e) GAO REVIEW. No 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, including

(A) sensor, scanner, radio-frequency identification, and related technologies that can monitor soil properties, irrigation conditions, and plant health;

(B) sensor, scanner, radio-frequency identification, and related technologies that can monitor livestock and health;

(C) network connectivity and wireless communication that can be related to digital agriculture technologies in rural and remote areas;

(D) aerial imager generated by a satellite or unmanned aerial vehicle;

(E) ground-based robotic;

(F) control systems design and connectivity, such as smart irrigation control systems;

(G) Global Positioning System-based applications; and

(H) data management of, and advanced analytics that can assist in 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 accordance with the date of enactment of this section.

SEC. 10362. ASTRONOMY AND SATELLITE CONSTELLATIONS.

The Director shall support research in order and the design, development, and testing of mission measurement to address the potential impact of satellite constellation on Federal scientific program by

(1) making a study on a competitive basis to support funding of the potential impact of satellite constellation on ground-based optical, infrared, and radio astronomy, including through existing programs such as Spectrum and Wireless Innovation enabled by Future Technologies (SWIFT) and the Spectrum Innovation Initiative;

(2) supporting research on potential satellite impact and benefits and mission strategies to be carried out alone or more Federal supported Federal Funded Research and Development Center or major multi-agency research facilities as defined in section 110(g) of the American Innovation and Competitive Act (42 U.S.C. 1862-2(g)), as appropriate; and

(3) supporting workshop related to the potential impact of satellite constellation on scientific research and how the constellation could be used to improve scientific research.

SEC. 10363. RESEARCH ON THE IMPACT OF INFLATION.

(a) IN GENERAL. The Director may make a study, on a competitive merit-reviewed basis, on initiation of higher education or nonprofit organization (or consortium of such institution or organization) to support research on improve or understand 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 impact;

(2) considering the impact of inflation on American international competitiveness;

(3) evaluating the impact of inflation on rural and under-served communities through the center;

(4) affecting the inflation cost impact of the American generation; and

(5) evaluating the impact of policymaking on inflation, including the impact of Federal Government spending.

(c) COORDINATION TO AVOID DUPLICATION. In making a grant under this section, the Director shall, for purpose of avoiding duplication of activities and research, consult, collaborate, and coordinate with the program 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 competitive advantage in near-peer competition, including China.

(b) POLICY. To the extent appropriate during an appropriate period, the Foundation shall facilitate access to recipient of Foundation grants to the microgravity environment, including in particular for the development of science, engineering, and technology relevant to the grant.

(c) REPORT. No later than 180 days after the date of enactment of this Act, the Director shall provide to the appropriate committee of Congress a report on the Foundation's plan for facilitating appropriate 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 is characterized in part, a large radio telescope of 305 meters in diameter, 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 other partners.

(3) The Arecibo Observatory's 305-meter fixed spherical radio telescope, the world's largest single-dish radio telescope until the Five-Hundred-Meter Aperture Spherical Radio Telescope located in Guizhou, China, began operating in 2016.

(4) The 305-meter radio telescope made unparalleled contribution to the field of radio astronomy, planetary, and atmospheric science, and played a role in inspiring the and of students in Puerto Rico, the Nation, and the world to pursue career in STEM field through the Arecibo Observatory Education and Public Outreach Program.

(5) The radio telescope significantly advanced the field of radio astronomy, including the first indirect detection of gravitational waves, the first detection of exoplanets, invaluable contribution to the field of time domain astronomy and the study of 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 a national part of the agency's planetary defense program.

(7) The planetary radar at the Arecibo Observatory has contributed fundamental and significant 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 has provided the planetary radar, including meteorology, and other potential areas.

(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 quarter 4.

(b) SENSE OF CONGRESS. It is the sense of Congress that the Congress

(1) acknowledge the loss of the Arecibo Observatory's radio telescope due to its collapse and its implication for the loss of a unique, world-class multidisciplinary science facility which conducted research in the area of space and atmospheric science, planetary and planetary science, astronomy, and astrophysics;

(2) acknowledge 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) recognize 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) recognize the work and contribution made by the host and of dedicated staff who have supported the Arecibo Observatory for close to 6 decades;

(5) commend the National Science Foundation for continuing a vital work program in June 2021, to explore ideas for future scientific and educational activities at the Arecibo Observatory; and

(6) encourage 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 disaster preparedness program, and future research capabilities and technological achievements.

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 operation and maintenance costs for major research facilities that are, within the first five years of operation, where they have been determined based on

(1) the operation and maintenance costs of the major research facilities; and

(2) the capacity of the managing director or director of operations to absorb such costs.

(c) REPORT. After the fifth year of the pilot program, the Director shall transmit a report to Congress which shall include

(1) an analysis of the program, including feedback from the research community, of the effectiveness of the pilot program for

(A) supporting research directorate and division 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 development 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 directorate and division to assess the cost and benefits of extending the operation of research facilities that have exceeded their planned operational life span.

SEC. 10373. HELIUM CONSERVATION.

(a) MAJOR RESEARCH INSTRUMENTATION SUPPORT.

(1) IN GENERAL. The Director shall support, through the Major Research Instrumentation program, proposals that include the purchase, installation, operation, and maintenance of equipment and instrumentation of research centers of helium.

(2) COST SHARING. The Director may waive the cost-sharing requirements 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 determined by the National Center for Science and Engineering Statistics.

(b) ANNUAL REPORT. Not later than 1 year after the date of enactment of this Act and annually thereafter, 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 shall include

(1) the cost and price of helium purchased;

(2) change in pricing and availability of helium; and

(3) an updated helium conservation impact analysis and annual 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 evidence 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 determine and publish every year a summary of the amount and type of advanced computing capabilities that are needed to fulfill the Nation's projected needs identified under subsection (a).

(c) ROADMAP. To the priority and guidance of strategic decisions regarding investments in advanced computing capabilities, the Director shall develop, publish, and regularly update a 5-year advanced computing roadmap that

(1) describe the advanced computing research and capabilities that would fulfill the anticipated projected needs, including high performance computing in the Mid-Scale Research Infrastructure program and the Major Research Equipment and Facilities Construction account;

(2) draw on community input, information contained in research proposals, allocation requests, insights from Foundation-funded center-infrastructures operators, and Foundation-wide information gathering regarding community needs;

(3) consider community needs of planned major facilities;

(4) reflect anticipated technological trends;

(5) inform current and potential partners about future facilities and services;

(6) address the need of geographically underrepresented in STEM and geographic regions with high availability and high demand for advanced computing research;

(7) consider how Foundation-supported advanced computing capabilities can be leveraged for activities through the Directorate for Technology, Innovation, and Partnership; and

(8) provide an update to Congress about the level of funding necessary to fulfill community 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 margin of subsection (D) and each of subsection (J) through (O) to the left;

(B) by redesignating subsection (J) through (O) as subsection (K) through (P), respectively; and

(C) by inserting after subsection (I) the following:

“(J) provide for improving the security, reliability, and resilience of computing and networking systems used by institutions of higher education and other non-profit research institutions for the processing, storage and transmission of sensitive federal funded research and academic 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 head of other relevant Federal departments and agencies, shall establish a pilot program to make available to the security of federally supported research data and to a regional institution of higher education and their researchers in compliance with regulations regarding the

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agencie in a broader effort to expand efforts of Federal research.

(H) AUTHORIZATION OF APPROPRIATIONS. There is authorized to be appropriated to the Director, \$38,000,000 for fiscal year 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 inter-agency 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 evaluate models to inform the full implementation of the Commission on Evidence-Based Policymaking recommendation for a governmentwide data linkage and access infrastructure for artificial intelligence conducted for artificial purposes, as defined in chapter 35 of title 44, United States Code.

(b) ESTABLISHMENT. No 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 principle, best practice, and priority action recommended by the Advisory Commission on Data for Evidence Building, or its successor; and

(2) operated directly or via a contractor hired and 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 artificial data in the United States and otherwise to support governmentwide evidence-building activities consistent with the Foundation 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 optional.

(e) PRIVACY AND CONFIDENTIALITY PROTECTIONS. If the Director initiates a management contractor relationship (b), the recipient shall be designated as an "agent" under chapter 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 relationship, the Director shall

(1) consider application and use of emerging and technologies that incorporate protection measures to reasonably enhance confidential data and artificial products produced in accordance with obligations under chapter III of chapter 35 of title 44, United States Code, including emerging and technologies that enhance

(A) raw data and other sensitive information are not accessible to recipients of artificial products from the National Secure Data Service demonstration project;

(B) no individual entity's data or information is revealed by the National Security Data Service demonstration project plan form or any other part in an identifiable form;

(C) no information about the data added in the National Security Data Service demonstration project is revealed to any other party, except as incorporated in the final annual report;

(D) the National Security Data Service demonstration project permits authorized personnel to perform statistical queries necessary to analyze approved project operations, and prohibits any other queries; and

(E) the National Security Data Service demonstration project conducts privacy risk assessments to minimize the privacy risk of individual entities, whose data has been made available by reporting entities, including those privacy risks that result from data breaches of an unoperated by the reporting entities, as well as for determining approved project operations under paragraph (D) to minimize the privacy risk of individual affected by the annual report; and

(2) the National Security Data Service demonstration project shall implement reasonable measures to minimize the privacy risk of individual's privacy to achieve the combined paragraph (A) through (E) of paragraph (1), which make the appropriate application of privacy-enhancing technologies and appropriate measures to minimize or prevent identification risk consistent with any applicable guidance or regulation issued under chapter III of chapter 35 of title 44, United States Code.

(g) TRANSPARENCY. The National Security Data Service established under section (b) shall maintain a public website with posted information on proposed project.

(h) REPORT. Not later than 2 years after the date of enactment of this Act, the National Security Data Service demonstration project established under section (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 risk and removing barriers to sustained implementation of the National Security 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, hiring training personnel and privacy.

(i) AUTHORIZATION OF APPROPRIATIONS. There are authorized to be appropriated to the Director to carry out this section \$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 Executive Order the Directorate for Technology, Innovation, and Partnerships to advance research and development, technological development, and related activities to address United States societal, national, and global challenges, for the benefit of all Americans.

SEC. 10382. PURPOSES.

The purposes of the Directorate established under section 10381 are to

- (1) to provide coordinated and rational research and accelerate the development and use of federally funded research;
- (2) to strengthen United States competitiveness by accelerating the development of key technologies; and
- (3) to grow the domestic workforce in key technology areas, and expand the participation of United States students and researchers in areas of societal, national, and global importance, as well as of education.

SEC. 10383. ACTIVITIES.

Subject to the availability of appropriated funds, the Directorate shall achieve the purposes described in section 10382 by making available through the Directorate the

- (1) to provide rational advanced interdisciplinary and rational research and technological development, including high density funding mechanisms and modeling a differentiated, coordinated convergence accelerator and project designed to achieve specific technological metrics or objectives;

- (2) encourage the rationalization of research in innovation, process, and production, including
 - (A) engaging researchers on topics relevant to United States societal, national, and global challenges, including by educating researchers on engaging, high end career and public;
 - (B) advancing novel approaches and reducing barriers to technology transfer, including high intellectual property framework between academia and industry, nonprofit entities, entrepreneurial communities, and approaches to technology transfer for application, high public benefit, harmonization of rational commercialization pool; and
 - (C) establishing partnerships that connect researchers and research production to investment, acceleration, and incubation to enable research, private, public development and scaling, entrepreneurial education, and the formation and growth of new companies;

- (3) develop mutual-beneficial research and technological development partnerships and collaboration among institutions of higher education, including historically Black colleges and universities, Tribal Colleges or Universities, minority-serving institutions, emerging research institutions, EPSCoR institutions, and nonprofit organizations, labor organizations,

business and other for-profit entities, Federal or State agencies, local or Tribal governments, civil society organizations, other Foundation directorate, national laboratory, field station and marine laboratory, and, as appropriate, international entities and binational research and development foundation and fund, including foreign entities of concern;

(4) partner with other directorate and office of the Foundation for specific project or research area including

(A) explore basic question about natural, human, and physical phenomena that could enable advance in the challenge and key technology for area under section 10387;

(B) conduct question that could affect the design (including human interface), safety, security, operation, deployment, or the social and ethical consequences of technology and innovation in the challenge and key technology for area under section 10387, including the development of technology and innovation that complement or enhance the ability of workers and impact of specific innovation on domestic job and equitable opportunities; and

(C) explore further the creation of a domestic workforce capable of advancing, managing, and adapting to the key technology for area;

(5) build capacity and infrastructure for emerging and transnational research activities of higher education across the United States, including by making a broad portfolio of 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, both advanced emerging and transnational research and to address workforce challenge, high school scholarship, fellowship, and traineeship; and

(7) identify social, behavioral, and economic drivers and consequences of technological innovation that could enable advance in the challenge and key technology for area 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) utilize the full potential of the United States workforce by addressing national geographic concentration of research and development and education funding across the United States, and encourage broader participation in the key technology for area workforce by population historically underrepresented in STEM; and

(2) incorporate 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 and shall hold the position in the same manner as other Assistant Directors of the Foundation are appointed.

(b) QUALIFICATIONS. The Assistant Director shall be an individual, whose reputation of professional background and experience, is especially qualified to

(1) administer the Director on all matters pertaining to the supervised and extrajurisdictional research, development, and commercialization of the Foundation, including participation in the private sector and other activities of the Foundation funded research; and

(2) develop and implement the necessary policies and procedures to promote a climate of supervised and extrajurisdictional research, within the Director and across the Foundation and carry out the responsibilities under subsection (c).

(c) RESPONSIBILITIES. The responsibilities of the Assistant Director shall include

(1) administering the Director on all matters pertaining to the supervised and extrajurisdictional research and development activities of the Foundation, including effective practices for convergence research, and the potential impact of Foundation research on United States social, national and geographic challenge;

(2) identifying opportunities for and facilitating coordination and collaboration, where appropriate, on supervised and extrajurisdictional research, development, adoption, and commercialization

(A) among the office, directorate, and divisions within the Foundation; and

(B) between the Foundation and stakeholder 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 constitute 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 engineering derivative model and mechanism for selecting and providing a road for supervised and extrajurisdictional research and development at different scales, from individual investigator to large multi-institution collaboration;

(6) assessing the success of program;

(7) administering a road to achieve the purpose described in section 10382; and

(8) performing other activities pertaining to the purpose 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 or committees, and make recommendations regarding the activities carried out under this subtitle.

(b) MEMBERSHIP. The advisory committee member shall

(1) be individual, which relate an experience or expertise, including individual from industry and national laboratories, education, academic subject matter expertise, including individual, which knowledge of key technology focus areas and their impact on United States national security and geographic leadership, technical and social dimension of science and technology, technology transfer expertise, labor organization, representation of civil society, and other nongovernmental organization; and

(2) consist of a lead 10 member broadly represent a wide range of stakeholders, including no more than 3 members from the private sector, none of whom shall be an employee of the Federal Government, and no more than 1 member, which 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 title;

(2) proposing strategies for fulfilling the purpose in section 10382;

(3) proposing potential areas of research, particularly a relevant to United States societal, national, and geographic challenge; and

(4) other relevant activities 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 title VI, the Director shall identify, and announce and review and update as appropriate, a list of

(1) no more than 5 United States societal, national, and geographic challenge that may be addressed by technology guidance activities under this title; and

(2) no more than 10 key technology focus areas of guidance activities under this title.

(b) INITIAL LIST OF SOCIETAL, NATIONAL, AND GEOSTRATEGIC CHALLENGES. The initial list of societal, national, and geographic challenge are the following:

(1) United States national security.

(2) United States manufacturing and industrial productivity.

(3) United States workforce development and skill gap.

(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, automation, and related advances.

(2) High performance computing, semiconductor, 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 communication technology and immersive technology.

(7) Biotechnology, medical technology, genomic, and nanotechnology.

(8) Data storage, data management, distributed ledger technology, and cyber security, including biometrics.

(9) Advanced energy and industrial efficiency technologies, including advanced nuclear technology, including no limitation for the purpose of electric generation (conditioned by section 15 of the National Science Foundation Act of 1950 (42 U.S.C. 1874)).

(10) Advanced material science, including composite 2D material, nanogeneration material, and related manufacturing technology.

(d) RELATIONSHIP BETWEEN UNITED STATES SOCIETAL, NATIONAL, AND GEOSTRATEGIC CHALLENGES AND KEY TECHNOLOGY FOCUS AREAS.

(1) In pursuing the liability under subsection (a)(1), the Director shall evaluate national and global technology trends.

(2) In pursuing the liability under subsection (a)(2), the Director shall consider the impact of the selected technologies on United States societal, national, and geographic challenges.

(3) The liability under subsection (a)(2) may, but is not required to, align directly with the liability under subsection (a)(1).

(4) Nothing under this section shall prevent the Director from making limited investments in technology 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 title F of the 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 the purpose of this division. A part of the annual review, the Director

(1) shall consider input from relevant industry and stakeholder;

(2) may consider the challenge and recommendation identified in the reports required by section 206 and 206B of the National Science and Technology Policy, Organization, and Priorities Act of 1976, as amended by section 10611 and 10613 of this division and in other relevant reports, including technology and global trends reports from the defense and intelligence communities;

(3) shall consider the potential impact of the key technology focus areas on addressing societal, national, and geographic 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 social, national, and geographic challenge and rationale for their election;

(3) the role of the Foundation in advancing the key technology area;

(4) the impact, including on the academic research community, of an change of the key technology area; and

(5) the activities and partnership 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 a part of their annual budget request to Congress, a detailed description of the activities to be funded under this title, including an explanation of how the requested funding is complementary and nonredundant of program, effort, and infrastructure under taken or proposed by other relevant Federal agencies.

(h) NATIONAL ACADEMIES. No later than 5 years after the date of enactment of this Act, the Directorate shall contract with the National Academies to conduct a review of the key technology area and the social, national, and geographic challenge, including

(1) an assessment of their election process;

(2) an assessment of their relevance to the purpose of the Directorate, including ongoing challenges in social, economic, health, scientific, and national security implications;

(3) a review of whether Federal investments in the key technology area have resulted in new domestic manufacturing capacity and job creation;

(4) an assessment of an critical, new emerging area;

(5) an assessment of Federal investments in education and workforce development to support the key technology area; and

(6) an assessment of relative balance in leadership in addressing the key technology area 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 Directorate shall make awards eligible entities for the planning, establishment, and support of Regional Innovation Engines.

(b) PURPOSE. The purpose of the Regional Innovation Engine shall be to

(1) advance multidisciplinary, collaborative, team-oriented and transnational research, technology development, in key technology area;

(2) address regional, national, social, or geographic challenge;

(3) leverage the expertise of multidisciplinary and multi-sector partners, including partners from private industry, non-profit 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 through and sustain regional innovation.

(c) USES OF FUNDS. Funds awarded under this section may be used by a Regional Innovation Engine to

(1) conduct a coordinated and transnational research and technology development to advance innovation in a leading area of the key technology for the area and to help solve a compelling regional, national, societal, or geographic challenge;

(2) foster the development, adoption, and commercialization of innovation in the key technology for the area, including through support for proof-of-concept development, and through partnership with other Federal agencies and Federal laboratories, industry, including start-up companies, labor organizations, civil society organizations, and State, territorial, local, and Tribal governments;

(3) develop and manage, or facilitate access to, a bed and breakfast program, which may include fabrication facilities and cyberinfrastructure, to advance the development, integration, and demonstration of new, innovative technologies, including hardware or software;

(4) establish a traineeship program for graduate students who pursue a degree and research related to the key technology for the area leading to a master or doctoral degree by providing funding and other assistance, and opportunities for research experience in government or industry related to the graduate 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 innovation activities, technology transfer, and commercialization activities, including patenting and licensing, and for operation and staff, at the Director's discretion appropriate.

(d) SELECTION PROCESS. In making a grant under this title, the Director shall consider, in addition to the scientific and technical merits of the proposal, the extent to which the activities and location proposed

(1) have the potential to create an innovation ecosystem, or enhance existing ecosystem 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 direction and accreditation, societal, safety, and security implications relevant to the potential application of the research;

(3) demonstrate a capacity to broaden participation of population historically underrepresented in STEM in the activities of the Regional Innovation Engine; and

(4) demonstrate a plan and capability to prevent the inappropriate or dissemination of the research and technology, including research results, data, and intellectual property, as appropriate and consistent with the requirements of the relevant law.

(e) REQUIREMENTS.

(1) ELIGIBILITY. For the purpose of this section, an "eligible institution" means an institution of higher education, a nonprofit organization, a private research center, or a contractor of the hereof.

(2) PARTNERSHIPS. To be eligible for an award under this section an eligible entity

(A) shall include in its proposal partnership, which 1 or more institutions have

- (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) shall include partnership, which 1 or more

(i) additional entities described in paragraph (2)(A);

(ii) industry, including start-up, small business, and public-private partnership;

(iii) economic development organization or enterprise development organization, a term are defined in section 28(a) of the Small Business Technology Innovation Act of 1980 (15 U.S.C. 13701 et seq.), as added by section 10621 of the Act;

(iv) National Laboratory;

(v) Federal laboratory, as defined in section 4 of the Small Business Technology Innovation Act of 1980 (15 U.S.C. 3703);

(vi) Federal research facility;

(vii) labor organization;

(viii) entity described in paragraph (1) or (2) from allied or partner country;

(ix) other entity, as determined by the Director;

(x) binational research and development foundation and fund, including those affiliated with foreign entities of concern, as defined in section 10612; and

(xi) Engineer Research and Development Center laboratory of the Army Corp of Engineer; and

(C) shall include a part of its proposal a plan for

(i) establishing a joint partnership which jointly developed and managed, drawn from the capacity of each institution, and is mutually beneficial; and

(ii) develop governance and management plan, financial contribution from non-Federal source, and plan for partnership and use of an intellectual property.

(3) PROMOTING PARTNERSHIPS. In making an award under this section, the Director shall encourage application for a Regional Innovation Engine which include multiple regional partners as described in subsection (e)(2).

(4) GEOGRAPHIC DISTRIBUTION. In making an award under this section, the Director shall take into consideration the extent to which the proposal expand the geographic distribution of the Regional Innovation Engine, including bringing special consideration to rural-serving institutions of higher education.

(5) RESOURCE AVAILABILITY. The Director shall ensure that an eligible entity receiving an award under this section shall

(A) provide information on relevant research and development activities available to the proposing team from all internal and external sources, including all partner organizations; and

(B) include letter of collaboration from partner organizations that include information on research contributions committed to each partner.

(f) COLLABORATION WITH REGIONAL TECHNOLOGY HUBS. Each Regional Innovation Engine established under this section may collaborate and participate in, as appropriate, the activities of an regional technology hub designated under section 28 of the Section-Welder Technology Innovation Act of 1980 (15 U.S.C. 3701 et seq.), as added by section 10621.

(g) DURATION.

(1) INITIAL PERIOD. An applicant 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 period 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 include peer review by a diverse group of individuals, including relevant expertise from both the private and public sectors; and

(2) ensure the focus area of the Regional Innovation Engine does not substantially and unnecessarily duplicate the efforts of any other Regional Innovation Engine or any other similar effort at any other Federal agency.

(i) COLLABORATION. In making awards under this section, the Director may collaborate with Federal departments and agencies whose mission contributions or are affected by the technology focus area of the initiative.

SEC. 10389. TRANSLATION ACCELERATOR.

(a) IN GENERAL. The Director shall establish Translation Accelerator centers for the research, development, and commercialization of innovation in the key technology focus area.

(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) Any other entity, if the 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 each partnership consists of a institutional or organizational level, rather than solely at the principal investigator level.

(3) COST SHARE. No less than 25 percent of the funding for an initiative 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 Engine and Translation Accelerator.

(c) AUTHORIZATION OF APPROPRIATIONS. From the herein provided authorized for the Directorate for Technology, Innovation, and Partnership, there are authorized to carry out the activities under this section and section 10388 \$6,500,000,000 for fiscal year 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 available, on a competitive basis, to institutions of higher education, nonprofit organizations, or contractors hereof to establish and operate test beds, which may include fabrication facilities 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 goal of the work to be done at the test bed;
- (3) how the applicant will assemble a workforce, if the skill 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 coordinated research and development and funding, to ensure that work in the test bed will contribute to the commercial viability of an technology and will include collaboration from industry and labor organizations;
- (6) how the applicant will encourage the participation of industry and entrepreneurs and the development of new business;
- (7) how the applicant will increase participation by populations that are underrepresented in STEM;
- (8) how the applicant will demonstrate how the commercial viability of an new technology 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 information and other technical information to United States entities or allied or partner countries in the United States; and
- (11) how the applicant plans to make measurable progress in the inappropriate use of research results, data, and intellectual

proper, 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 purpose of this section, use the award for the purchase of equipment and for the support of travel, field and staff, and postdoctoral research.

(d) GEOGRAPHIC DIVERSITY. In selecting award recipients under this section, the Director shall consider the extent to which proposals will expand the geographic diversity of the award.

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 Director, 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 purpose of the Director's award 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 institutions);

(2) a nonprofit organization that either is affiliated with an institution of higher education or designed to support technological 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 individual 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 developing technology from both academic and a business perspective; or

(i) an individual or entity, which is an industry and startup expert, 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, which has the potential for technological transfer and commercialization, particularly a relevant to the purpose of the Director's award under section 10382;

(2) enhance the availability of staff, including technology transfer professional, entrepreneur in residence, and other mentors as required to accomplish the purpose of this section;

(3) help offset the cost of patenting and licensing research products, both domestically and internationally;

(4) reinvest in innovation policies, including policies related to intellectual property and field entrepreneurship, and making

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 business in institutions of higher education and private sector entities and other relevant organizations, including in the area of the preparation of building networks, expertise, and other capacity identification promising research has market potential market value and enable researchers to participate in the development and transfer of their ideas in a possible commercial or other use;

(6) develop seminars, courses, and other educational opportunities for students, postdoctoral researchers, faculty, and other relevant staff in institutions of higher education to increase awareness and understanding of entrepreneurship, patenting, business planning, research ethics, 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 entrepreneurship students and faculty to illustrate the commercialization potential of their ideas, including through entrepreneurship fairs of institutions of higher education.

(d) LIMITATIONS ON FUNDING.

(1) Award made under this section shall be a total of \$3 million or less and shall not exceed \$1,000,000 per fiscal year.

(2) Award 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 attachments as the Director may require. The application shall include, as a minimum, a description of

(1) how the eligible entity is submitting an application plan to obtain the proposed activity beyond the duration of the award;

(2) the steps the applicant will take to enable technology transfer and adoption and how such steps are likely to be effective;

(3) how the applicant will encourage the training and participation of students and postdoctoral researchers and the participation of research-related practices, including the development of networks;

(4) a relevant, potential step to drive economic growth in a particular region, by collaborating with industry, entrepreneurship, non-profit organizations, and State and local governments within the region; and

(5) background information that the Director determine is relevant to demonstrate the success of the innovation and entrepreneurship model proposed by the applicant or commercialized 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 to promote regional technology transfer and technology development activities available to more than

one in i+ ion of higher ed+ ca ion and o o her en i ie in a region.

(2) USE OF FUNDS. An eligible en i ha recei e an a ard+ nder hi + b ec ion hall+ e a ard f nd o carr o one or more of he follq ing ac i i ie , o he benefi of he region in, hich he cen eri loca ed:

(A) Pro iding ar + p and mall b+ ine concern (a defined in ec ion 3 of he Small B+ ine Ac (15 U.S.C. 632)) , i hin he region , i h acce o facili e , cien ific infra + c+ re, per onnel, and o her a e a req+ ired for echnolog ma+ ra ion.

(B) S+ ppor ing en repre+ rial raining for ar + p and mall b+ ine per onnel.

(3) Pro iding engineering and en repre+ rial ex+ perience and hand -on raining for + den enrolled in par icipa ing in i+ ion of higher ed+ ca ion.

(g) REPORTING ON COMMERCIALIZATION METRICS. The Direc or hall e abli h

(1) me ric rela ed o commerciali+ a ion for an a ard+ nder hi ec ion; and

(2) a repor ing check le for recipien of + ch a ard ha ake in o acco n bo h hor - and long- erm goal of he program + nder hi ec ion.

(h) GEOGRAPHIC DIVERSITY. The Direc or hall en+ re regional and geographic di eri in i+ ing a ard + nder hi ec ion.

(i) AUTHORIZATION OF APPROPRIATIONS. From , i hin f nd a+ hori ed for he Direc ora e for Technolog , Inno a ion, and Par ner hip , here are a+ hori ed o carr o he ac i i ie + nder hi ec ion \$3,100,000,000 for fi cal ear 2023 hr+ gh 2027.

SEC. 10392. ENTREPRENEURIAL FELLOWSHIPS.

(a) IN GENERAL. The Direc or, ac ing hr+ gh he Direc ora e for Technolog , Inno a ion, and Par ner hip , hall a ard fellq - hip o cien i and engineer o help de elop leader capable of ma+ ring promi ing idea and echnologie from lab o marke or o her+ e and forge connec ion be, een academic re earch and he go ernmen , ind r , financial ec or , and o her end+ er .

(b) APPLICATION. An applican for a fellq hip+ nder hi ec ion hall + bmi o he Direc or an applica ion a + ch ime, in + ch manner, and con aining + ch informa ion a he Direc or ma req+ ire. A a minim+ m, he Direc or hall req+ ire ha applican

(1) ha e comple ed a doc oral degree in a STEM field no more han 5 ear prior o he da e of he applica ion, or ha e o her i e demon ra ed ignifican po baccal+ rea e cien ific re earch ex+ perience and are con idered earl career, according o req+ iremen e abli hed b he Direc or; and

(2) ha e incl ded in he applica ion a propo al for hq he fellq , ill be embedded in a ho in i+ ion' re earch en ironmen .

(c) OUTREACH. The Direc or hall cond+ c program o reach o rec+ i fellq hip applican

(1) from di eri e re earch in i+ ion ;

(2) from all region of he co n r ; and

(3) from gr+ p hi oricall + nderrepre en ed in STEM field .

(d) ADMINISTRATION AGREEMENTS. The Director may enter into an agreement, in a qualified third-party administration, with 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 year 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 a community college), graduate fellowships and traineeships, and postdoctoral awards in the key technology area.

(b) IMPLEMENTATION. The Director may carry out the following:

- (1) direct operations; and
- (2) provision of higher education or consortium of institutions of higher education, including those in institution or consortium involved in operating Regional Innovation Engine 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 strengthening 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 a degree, undergraduate degree, or graduate level degree in STEM;
- (4) addressing current and expected gaps in the availability or skill of the STEM workforce, or addressing need of the STEM workforce, including by increasing educational capacity in institutions and by prioritizing awards to United States citizens, permanent residents, and individuals having skill gaps in the domestic workforce; and
- (5) addressing geographic disparities 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 student opportunities to gain experience in industry or Government as part of their graduate training, and through supporting further development in professional master's programs related to the key technology area or to the societal, national, and geographic challenge.

(e) AREAS OF FUNDING SUPPORT. Subject to the availability of funds to carry out this section, the Director shall:

- (1) invest in:
 - (A) postdoctoral awards,
 - (B) graduate fellowships and traineeships, including those of the NSF Research Traineeship and fellowship awarded under the Graduate Research Fellowship Program; and
 - (C) scholarships, including undergraduate scholarships, research experience, and internships, including:
 - (i) scholarships at community colleges; and
 - (ii) research experience 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 expended 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 program through program through the Advanced Technological Education program; and

(3) if funds remain after carrying out paragraph (1) and (2) make awards to institutions of higher education to enable the institution 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 a degree, undergraduate degree, or graduate level degree in STEM field.

(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 is in need of economic assistance under the scholarship enrollment or continuation enrollment program in institutions 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 field designated by the Director.

(B) ABILITY. Awards of scholarship 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 scholarship are deemed by the Director to be potentially substantially equal ability, and there are no sufficient scholarships available to award one to each of such applicants, the available scholarship or scholarships shall be awarded to the applicant in a manner that will end or result in a geographical redistribution through the United States recipient's place 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) to read

(A) reading “, except that the Director shall not award a scholarship in any amount exceeding \$10,000 per year”; and

(B) riking “4 ear ” and in er ing “5 ear ”.

(4) AUTHORIZATION. Of amø n æ hori ed for he Direc- ora e for Technolog , Inno a ion, and Par ner hip , \$100,000,000 hall be æ hori ed o carr ø hi + b ec ion.

(g) EXISTING PROGRAMS. The Direc or ma + e or æ gmen efi ing STEM ed ca ion program of he Fø nda ion and le erage ed ca ion or en repreø rial par ner o carr ø hi ec ion.

SEC. 10394. RESEARCH AND DEVELOPMENT AWARDS.

(a) IN GENERAL. From amø n made a ailable for he Direc- ora e, he Direc or hall make a ard , on a compe i i e ba i , for re earch and echnolog de elopmen , i hin he ke echnolog foø area , incl ding in e men ha ad ance o t ion o he challenge + nder ec ion 10387.

(b) PURPOSE. The p rpo e of he a ard + nder hi ec ion hall be o accelera e echnological ad ance and echnolog adop- ion in he ke echnolog foø area .

(c) RECIPIENTS. Recipien of f nd + nder hi ec ion ma incl de in i+ ion of higher ed ca ion, re earch in i+ ion , non- profi organi a ion , pri a e ec or en i ie , con or ia, or o her en i- ie a defined b he Direc or.

(d) METRICS. The Direc or ma e me ric , incl ding goal and deadline , for he de elopmen and demon ra ion of echnolog a de ermine in he erm of he a ard, and ma + e + ch me ric o de ermine he her an a ard recipien hall be eligible for con in- + ed or follø on f nding.

(e) SHORT TERM TECHNOLOGY DEPLOYMENT. The Direc or hall al o make a ard , incl ding hrø gh he SBIR and STTR program (a defined in ec ion 9(e) of he Small B ine Ac (15 U.S.C. 638(e)), o e p e hor - erm echnolog deplo men , i hin a period of no longer han 24 mon h .

(f) SELECTION CRITERIA. In elec ing recipien for an a ard + nder hi ec ion, he Direc or hall con ider, a a minim m

(1) he rele ance of he projec o he challenge and he ke echnolog foø area + nder ec ion 10387, and he po en- ial of he projec o re + l in ran forma ional ad ance for + ch challenge and he ke echnolog foø area ;

(2) he ø rren a + of imilar echnolog , he limi of ø rren prac ice, and he no el and rik of he propo ed projec ;

(3) he e hical, ocie al, afe , and eø ri implica ion rele an o he applica ion of he echnolog ;

(4) he appropria ene of ø an i a i e goal and me ric for e a + a ing he projec and a plan for e a + a ing ho e me ric ; and

(5) he pa h for de eloping and, a appropria e, commer- ciali ing he echnolog in o prod c and proce e in he Uni ed S a e .

(g) AUTHORIZATION OF APPROPRIATIONS. From , i hin f nd æ hori ed for he Direc ora e for Technolog , Inno a ion, and Par - ner hip , here are æ hori ed o carr ø he ac i i e + nder hi ec ion \$1,000,000,000 for fi cal ear 2023 hrø gh 2027.

SEC. 10395. SCALING INNOVATIONS IN PREK-12 STEM EDUCATION.

(a) IN GENERAL. Taking in o con idera ion he recommenda- ion + nder ec ion 10311(a)(4) of + b ile B, he Direc or hall make a ard , on a compe i i e, meri -re i e d ba i , o e abli h m l idi ciplinar Cen er for Tran forma i e Ed ca ion Re earch

and Transition (in this section referred to as "Center") of support research and development on wide spread and sustained implementation of STEM education innovation.

(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 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, as a minimum, a description of how the proposed Center will be

(1) established primarily among academic institutions, local or State educational agencies, and other relevant stakeholders in supporting program and activities of facilitating the wide spread and sustained implementation of promising, evidence-based STEM education practice, model, program, strategy, and technology;

(2) support enhanced STEM education infrastructure, including cyberlearning technology, facilitating the widespread adoption of promising, evidence-based practice;

(3) support research and development on scaling practice, partnership, and alternative model or proven approaches, including approaches in the area of the unique combination of capability, resource, and need of serving localities, educators, and learners;

(4) include a focus on the learning need of under-represented school and learner in low-represented or underachieving local educational agencies in urban and rural communities and the development of high-quality strategy and technology to engage the learner in the knowledge and practice of STEM field;

(5) include a focus on the learning need and unique challenge facing underserved populations;

(6) support research, development, or education on one or more of the key technology focus area;

(7) support research and development on scaling practice and model to support and sustain high-quality STEM education in urban and rural communities; and

(8) a description of the Director, and other requirements recommended in the attached commissioned under section 10311(a) of title 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 collaboration, pool, and strategy supported by the Foundation, including NSF INCLUDES and the Convergence Accelerator;

(2) support research on and the development and scaling of innovative approaches to distance learning and education for underserved populations;

(3) support education innovation that leverage new technology or deepen understanding of the impact of technology on educational ecosystem; and

(4) include a commitment from local or State educational administrators to making the proposed reform and activities a priori.

(e) PARTNERSHIP. In carrying out the program under this section, the Director shall explore opportunities to partner with the Department of Education, including through joint 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 Center, as appropriate, to foster collaboration among the Center and other Federal agencies relevant to the Center's proposed activities.

(h) EXISTING PROGRAMS. The Director may be carrying out NSF program activities and activities under this section.

(i) REPORT. No later than 5 years after the date of enactment of this Act, the Director shall submit to Congress and make available to the public a report that includes

- (1) a description of the focus and proposed goal of each Center;
- (2) an assessment, based on a common set of benchmark and tools, of the Center's success in helping to promote quality education in PreK-12 STEM education; and
- (3) an recommendation for administrative and legislative action that would optimize the effectiveness of the Center's activities under this section.

SEC. 10396. AUTHORITIES.

In addition to carrying out the activities available to the Foundation, the Director may exercise the following authorities in carrying out the activities under this title:

- (1) AWARDS. In carrying out this title, 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 program established in this section. The Director shall ensure that the program director

(i) has expertise in one or more of the challenge areas under section 10387; and

(ii) comes 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 experts, taking into account relevant expert reports, and publicizing the goal of the program to the public and private sector;

(ii) attracting a wide range of institutions of higher education, nonprofit organizations, and private entities to identify emerging trends in the challenge areas under section 10387, and, as appropriate, soliciting proposals from these entities to

conduct research in areas of particular promise having the greatest potential for independent development.

(iii) facilitating research collaboration in the challenge and key technology areas under section 10387, including connecting academic researchers, high potential leaders of technology, including industry, labor organizations, nonprofit organizations, civil service organizations, and other relevant organizations;

(i) 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

(ii) monitoring the progress of projects supported under the program and making recommendations from relevant experts and stakeholders, recommending program modifications as needed.

(C) SELECTION CRITERIA. Program directors may use the direct merit review model for selection of award recipients under section 10394, including internal review and different models having peer review.

(D) TERMS. Program directors of the Director 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 paragraph (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 paragraph (A), the Foundation may

(i) with regard to an provision of title 5, United States Code, governing the appointment of employees in the competitive service, appoint individuals on a basis of no more than 70 positions in the Foundation, of which no more than 5 such positions may be positions of administration or management of the Foundation;

(ii) prescribe the rate of basic pay for positions of which employees are appointed under clause (i)

(I) in the case of employees appointed pursuant to clause (i) of an of 5 positions designated by the Foundation for purpose of this clause, a rate no 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 employees appointed pursuant to clause (i), a rate no 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) par an emplo ee appoin ed + nder + bpara- graph (A), o her han an emplo ee appoin ed o a po i- ion de igna ed a de cribed in cla e (ii)(I), pa men in addi ion o ba ic pa , i hin he limi applica ble o he emplo ee+ nder + bparagraph (D).

(C) LIMITATION ON TERM OF APPOINTMENT.

(i) IN GENERAL. Except a pro ided in cla e (ii), he er ice of an emplo ee+ nder an appoin men + nder + bparagraph (B)(i) ma no ex ceed 4 ear .

(ii) EXTENSION. The Direc or ma , in he ca e of a par ig lar emplo ee + nder he program + nder + bparagraph (A), ex end he period o , hich er ice i limi ed + nder cla e (i) b + p o 2 ear if he Direc or de ermine ha + ch ac ion i nece ar o promo e he efficienc of he Fõ nda ion.

(D) MAXIMUM AMOUNT OF ADDITIONAL PAYMENTS PAY- ABLE. No , i h anding an o her pro i ion of hi + b- ec ion or ec ion 5307 of ile 5, Uni ed S a e Code, no addi onal pa men ma be paid o an emplo ee+ nder + bparagraph (B)(iii) in an calendar ear if, or o he ex en ha , he emplo ee' o al ann al compen a ion in + ch calendar ear , ill ex ceed he ma im m amõ n of o al ann al compen a ion pa able a he alar e in accordance, i h ec ion 104 of ile 3, Uni ed S a e Code.

(4) HIGHLY QUALIFIED EXPERTS IN NEEDED OCCUPATIONS.

(A) IN GENERAL. The Fõ nda ion ma carr õ a program+ ing he a hori pro ided in + bparagraph (B) in order o a rac highl õ alified ex per in needed occ pa ion , a de ermine b he Fõ nda ion. Indi id al hired b he Direc or hõ gh + ch a hori ma incl de indi id al , i h ex per i e in b ine crea i i , inno a ion managemen , de ign hinking, en repreõ r hip, en+ re capi al, and rela ed field .

(B) AUTHORITY. Under he program, he Fõ nda ion ma

(i) appoin per onnel from õ ide he ci il er ice and + niformed er ice (a + ch erm are defined in ec ion 2101 of ile 5, Uni ed S a e Code) o po i- ion in he Fõ nda ion, i hõ regard o an pro i ion of ile 5, Uni ed S a e Code, go erning he appoin - men of emplo ee in he compen i i e er ice;

(ii) pre cribe he ra e of ba ic pa for po i ion o , hich emplo ee are appoin ed+ nder cla e (i) a ra e no in ex ce of he ma im m ra e of ba ic pa a hori ed for enior-le el po i ion + nder ec ion 5376 of ile 5, Uni ed S a e Code; and

(iii) pa an emplo ee appoin ed+ nder cla e (i) pa men in addi ion o ba ic pa , i hin he limi applica ble o he emplo ee + nder + bparagraph (D).

(C) LIMITATION ON TERM OF APPOINTMENT.

(i) IN GENERAL. Except a pro ided in cla e (ii), he er ice of an emplo ee+ nder an appoin men made pr + an o hi + b ec ion ma no ex ceed 5 ear .

(ii) EXTENSION. The Fõ nda ion ma , in he ca e of a par ig lar emplo ee, ex end he period o , hich er ice i limi ed+ nder cla e (i) b + p o 1 addi onal ear if he Fõ nda ion de ermine ha + ch ac ion

is necessary to promote the Federal Government's national economic recovery program.

(D) LIMITATIONS ON ADDITIONAL PAYMENTS.

(i) TOTAL AMOUNT. The total amount of the additional payments paid to an employee under this subsection for an 12-month period may not exceed the maximum amount of total compensation payable to the employee in accordance with section 104 of title 5, United States Code.

(ii) ELIGIBILITY FOR PAYMENTS. An employee appointed under this subsection is not eligible for an 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 Federal Government under subsection (B)(i) shall not exceed 70 at any time.

(F) SAVINGS PROVISIONS. In the event that the Federal Government terminates the program under this paragraph, in the case of an employee who, on the date 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 of which the employee's service is limited under paragraph (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 perform an acceptable level of performance in the position, in the absence of 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 Federal Government with employees from other Federal agencies, State and local governments, Indian Tribes and Tribal organizations, in addition to higher education, and other organizations, as described in this section, in the same manner and subject to the same conditions, has applied to each individual authorized to accomplish other missions of the Federal Government.

(6) NATIONAL ACADEMY OF PUBLIC ADMINISTRATION.

(A) STUDY. Not later than 30 days after the date of enactment of this Act, the Director shall conduct a study of the National Academy of Public Administration's conduct and operations on the organization and management structure of the Federal Government, to

(i) evaluate and make recommendations on efficiency and effectiveness of implementation of the Director's office for Technology, Innovation, and Partnership; and

(ii) evaluate and make recommendations on the coordination of the Directorate for Technology, Innovation, and Partnership, in other directorate and office of the Foundation and other Federal agencies.

(B) REVIEW. Upon completion of the study under paragraph (A), the Foundation shall receive the recommendation from the National Academy of Public Administration and provide a briefing to Congress on the plan of the Foundation to implement each recommendation.

(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 dissemination of information in 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 head of other Federal research agencies, as appropriate, to further the goal of high quality.

(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 title VI and head of other Federal research agencies to ensure the activities enhance and complement, but do not constitute unnecessary duplication of effort and ensure the responsible leadership.

(c) EMERGING TECHNOLOGIES. After completion of the study regarding emerging technologies conducted by the Secretary of Commerce under title XV of division FF of the Consolidated Appropriation Act, 2021 (Public Law 116-260), the Director shall consider the results of that study 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 dimension of science and technology and develop formal agreements 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 challenge and key technology focus area 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 preceding 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 of the Directorate, including the guidance in the decision 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 ensure federal funding of 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 title D of 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 methodology 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 challenge and key technology focus areas under section 10387;

(3) an assessment of efforts to enhance 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 Veteran in STEM Career Act (42 U.S.C. 1862) 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) to have paragraph (3) read as follows:

“(3) COMPLIANCE REVIEW. The Inspector General of the Foundation shall conduct a review of the compliance by the Board, in the requirements described in paragraph (2) a necessary based on a biennial risk assessment. An review deemed necessary shall examine the proposed and actual content of closed meeting and determine whether the closure of the meeting is consistent with section 552b of title 5, United States Code.”; and

(2) by striking paragraph (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 section, and an appropriate 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 an closed meeting, for a least 3 years after its 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 “omic” refers to the collection of technologies used to explore the role, relationship, and action of the various parts of molecules that make up the cell and stem of an organism and the elements of their function.

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 social well-being, national security, sustainability, and economic productivity and competitiveness through the following:

(1) Advancing area of research and development of the biological, physical, chemical, data, and computational and information science and engineering to accelerate scientific advancement and technological innovation in engineering biology.

(2) Advancing area of biomaterials research to optimize, standardize, scale, and deliver new products and solutions.

(3) Supporting social and behavioral science and economic research in the field of engineering biology and contribute to the development and public advancement of new products, processes, and technologies.

(4) Improving the advancement of engineering biology of scientific and laboratory and supporting greater evidence-based public decision-making and benefits and risks.

(5) Supporting research relating to the risks and benefits of engineering biology, including advancement.

(6) Supporting the development of novel tools and technologies to accelerate scientific advancement and technological innovation in engineering biology.

(7) Expanding the number of researchers, educators, and students and a skilled workforce in engineering biology training, including from traditionally underrepresented and underserved populations.

(8) Accelerating the translation and commercialization of engineering biology and biomaterials 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) Supported by the following research and development through the following:

(A) Grant funding the work of individual investigators and teams of investigators, including interdisciplinary teams.

(B) Projects funded under joint solicitation by a collaboration of non-Federal agencies participating in the Initiative.

(C) Interdisciplinary research centers that are organized to investigate basic research questions, carry out technological development and demonstration activities, and increase advancement of high-potential engineering biology processes, including biomaterials.

(2) Supported by the following and related tools, including the following:

(A) Support for the establishment, operation, and maintenance of shared genomic, epigenomic, and other relevant 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, including databases.

(B) Development of standard for technology, including for operation, interoperability, and protection of privacy and security.

(C) Support for the development of computational tools, including artificial intelligence tools, which can accelerate research and innovation in technology.

(D) An inventory and assessment of all Federal government activities to identify opportunities to improve the quality of technology, as appropriate and in a manner that does not compromise national security or the privacy and security of information, including technology, and inform the men in technology a critical infrastructure for the engineering biological research enterprise.

(3) Support for the development, optimization, and validation of novel tools and technologies to enable the dynamic and molecular processes in life, including through the following:

(A) Research conducted at Federal laboratories.

(B) Grants to fund the work of independent institutions of higher education and other nonprofit research institutions.

(C) Incentivized development of retooled industrial infrastructure that fosters a pipeline of modernized engineering biological initiatives.

(D) Award 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, biomaterials, nanofabrication, 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 embedded open standards, interfaces, and processes, including by reporting existing facilities which are specified in paragraph (3)(C), which would enable scale-up of laboratory engineering biological research.

(6) Activities to develop robust mechanisms for demonstration and quantification of the societal 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 biological research and development, including to address barriers to scaling-up innovation 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 start-up companies including through programmatic support under the Small Business Innovation Research Program and the Small Business Technology Transfer Program.

(c) EXPANDING PARTICIPATION. The Initiative shall include, to the maximum extent practicable, outreach primarily to undergraduate and historically Black college and universities, Tribal College or Universities, and minority engineering institutions about Initiative opportunities, and shall encourage the development of research collaboration between research-institutions and primarily undergraduate and historically Black college and universities, Tribal College or Universities, and minority engineering 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 factors concerning 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 engineering research on topics, including research and development in engineering biology, and encouraging the dissemination of the results of such research, including through interdisciplinary engineering 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 and institutions of higher education about potential safety and security implications of engineering biology research, as appropriate.

(3) Encouraging input from Federal and non-Federal experts on the ethical, legal, environmental, safety, security, and other appropriate societal issues related to engineering biology in engineering education of the Initiative.

(4) Encouraging, through the agencies and departments that participate in the Initiative, high-profile and outreach are incorporated into the Initiative by the convening of regular and ongoing public dialogues through mechanisms such as workshops, 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 elect 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, no later than 12 months after the date of the enactment of this Act, and transmit heretofore hereafter, 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 Agriculture, Nutrition, and Forestry, the Committee on Small Business and Entrepreneurship, and the Committee on Health, Education, Labor, and Pension of the Senate has

(A) guide the activities of the Initiative for purposes of meeting the goal and priorities established under (and transmitted pursuant to) paragraph (2); and

(B) describe

(i) the Initiative's proposal for long-term funding for interdisciplinary engineering biological research and development;

(ii) the Initiative's proposal for education and public outreach activities;

(iii) the Initiative's proposal for research and other activities on ethical, legal, environmental, safety, equity, and other appropriate societal issues related to engineering biology, including

(I) an applied biological management research plan;

(II) recommendation for integrating equity in biological data access and international reciprocity agreements;

(III) recommendation for manufacturing research, development, and scaling initiatives; and

(IV) an evaluation of existing biological governance policies, guidance, and directives for the purpose of creating an adaptable, evidence-based framework to respond to emerging biological challenges created by advances in engineering biology;

(i) help the Initiative, in collaboration with the relevant stakeholders of the laborator and in application for the benefit of society and United States competitiveness; and

(ii) help the Initiative, in collaboration with the relevant stakeholders of engineering biology to United States economic growth and other societal indicators.

(4) Develop a national genomic engineering strategic plan on engineering biological research full length plan, animal, and microbe biodiversity, an appropriate and in a manner that does not compromise economic competitiveness, national equity, or the privacy or equity of human genetic information, to enhance long-term innovation and competitiveness in engineering biology in the United States.

(5) Develop a plan to utilize Federal program, 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 his election, take into consideration the recommendation of the advisory committee established under section 10404, the report of the work shop conducted 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 each year, 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 Pension, the Committee on Small Business and Entrepreneurship, and the Committee on Agriculture, Nutrition, and Forestry of the Senate a report which includes the following:

(1) A summarized agency budget in support of the Initiative for the current fiscal year, including a breakdown of pending for each agency participating in the Program, and for the development and acquisition of new research facilities and infrastructure.

(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 solicitation by a collaboration of not fewer than two agencies participating in the Initiative.

(C) A description of the effect of newly funded projects by the Initiative.

(c) INITIATIVE COORDINATION OFFICE.

(1) IN GENERAL. The President shall establish an Initiative Coordination Office, which shall have 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 for Federal engineering, biological, and other government organizations, academia, industry, professional societies, State governments, interested citizens groups, and other organizations to exchange technical and programmatic information;

(C) coordinate interagency coordination of the Initiative, including budgeting and supporting joint agency solicitation and election of applications for funding of activities under the Initiative, as appropriate;

(D) conduct public outreach, including dissemination of findings and recommendation of the advisory committee, as appropriate;

(E) serve as the coordinator of ethical, legal, environmental, safety, security, and other appropriate activities; and

(F) promote access, and early application of, the technologies, innovation, and expertise derived from initiatives of agencies, institutions, and the Federal Government, and the United States industry, including start-up companies.

(2) FUNDING. The Director of the Office of Science and Technology Policy, in coordination with each participating Federal department and agency, shall develop and submit a budget and estimate of the funds necessary to carry out the activities of the Initiative Coordination Office and submit a budget estimate with an agreed program of contribution from each agency to Congress as part of the President's annual budget request to Congress.

(3) TERMINATION. The Initiative Coordination Office 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, procedures, or practice of individual Federal agencies in effect on the date before the date of the enactment of this Act relating to the conduct of biomedical research and advanced development, 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 no fewer than 12 members, including representatives of research and academic institutions, industry, and non-governmental entities, who are qualified to provide advice on the Initiative.

(b) ASSESSMENT. The advisory committee shall advise 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, procedures, 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 adopted by the interagency committee established under section 10403 is helping to maintain United States leadership in engineering biology.

(7) Whether ethical, legal, environmental, safety, equity, and other appropriate societal issues are adequately addressed by the Initiative.

(c) REPORTS. Beginning no later than one year after the date of the enactment of this Act and no less frequently than once every five years hereafter, the advisory committee shall

to be made by 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 Pension, and the Committee on Agriculture, Nutrition, and Forestry of the Senate, a report on the following:

(1) The findings of the advisory committee's activities under subsection (b).

(2) The advisory committee's recommendations for a program 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. No later than 12 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 Science, Engineering, and Medicine to conduct a review, and make recommendations with respect to, the ethical, legal, environmental, safety, security, and other appropriate activities related to engineering biological research and development. The review shall include the following:

(1) An assessment of the current research on activities.

(2) A description of the research needs relating to activities.

(3) Recommendations on how the Initiative can address the research needs identified pursuant to paragraph (2).

(4) Recommendations on how researchers engaged in engineering biological can be incorporated in consideration of activities in 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 Science, Engineering, and Medicine to, no later than 1 year after the date of the enactment of this Act

(1) to be made by 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. A part of the Initiative, the National Science Foundation shall carry out the following:

(1) Support research in engineering biological and biomaterials through individual grants, collaborative grants, and interdisciplinary research centers.

(2) Support research on the environmental, legal, ethical, and social implications of engineering biology.

(3) Provide support for research in stem cell biology, nanotechnology, and cyberinfrastructure for engineering biology disciplines, including support for research, development, operations, and validation of novel technologies to enable the development of molecular processes in vitro.

(4) Support research in development and research experience for undergraduates, graduate students, and graduate students in engineering biology and biomanufacturing, including research 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 interdisciplinary manner.

(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 measurement, including the promotion of interoperability between component technologies and processes for engineering biology and biomanufacturing disciplines, innovation, and production processes.

(B) Establish a national database, techniques, and processes necessary to advance engineering biology and biomanufacturing.

(C) Provide access to user facilities, high-advanced or next-generation equipment, services, materials, and other resources to industry, in institutions of higher education, nonprofit organizations, and government agencies to perform research and development.

(D) Provide technical expertise to inform the potential development of guidelines or standards 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 oceanic and atmospheric bioinformatics science and development and production of improved environmental data, monitoring, management, assessment, and forecasting, consistent with the mission of the agency.

(B) Collaborate with other agencies to understand and potentially environmental health and development 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 area of synthetic biology, advanced biofuels and bioproduction development, bio-based 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 vivo.

(3) Provide access to user facilities, including advanced instrumentation, services, materials, and other resources, including access to high-performance computing, as appropriate, to industry, in support of higher education, nonprofit organizations, and governmental agencies to perform research and teaching.

(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 application.

(d) DEPARTMENT OF DEFENSE. A 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 science.

(2) Support critical development and research experience in engineering biology and associated data and information science across the military education system, including the service academies, professional military education, and military graduate education.

(3) Assess the risk of potential national security and economic security threats relating to engineering biology.

(e) NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. A 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 genetic biology, and related to Earth and space science, aeronautics, space technology, and space exploration and experimentation, consistent with the priority established in the National Academies' decadal study.

(2) Award grants, on a competitive basis, to enable in support of support graduate students and postdoctoral fellows who perform some of their engineering biology research in an industry setting.

(f) DEPARTMENT OF AGRICULTURE. A 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 program and grants, and the Office of the Chief Scientist.

(g) ENVIRONMENTAL PROTECTION AGENCY. A part of the Initiative, the Environmental Protection Agency shall support research on hazardous products, processes, and uses of engineering biology that will affect or can protect the environment.

(h) DEPARTMENT OF HEALTH AND HUMAN SERVICES. A part of the Initiative, the Secretary of Health and Human Services, as appropriate and consistent with the activities of the Department of Health and Human Services in effect on the date 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 the development 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 head of relevant agencies, shall provide guidance to each Federal research agency on the following policies:

(1) apply to all

(A) research and grant budget agencies; and

(B) principal investigators of 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 and grant budget agencies;

(B) non-competition of research and;

(C) award supplements, as appropriate, to research and grant awards to maintain research activities conducted under the award; and

(D) any other appropriate accommodation at the discretion of the director of each 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 this subsection; and

(2) broadly disseminate in easily accessible form such policies to grant and potential award recipients.

(d) DATA ON USAGE. Federal research agencies shall consider

(1) collecting data, including demographic data that can be aggregated by sex, geographic location, and socioeconomic indicator, which may include employment status, occupation, educational attainment, parental education, and income, on the usage of the policies under subsection (c), as a basis for the initiation of higher education and Federal labor force; 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, information on all applications for meritorious research and development awards made by such agency, standardized record-level annual information on demographic, primary field, award type, institution type, research budget, funding source, and awarded budget.

(2) UNIFORMITY AND STANDARDIZATION. The Director, in consultation with the head 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 no later than one year after the issuance of the policy under paragraph (2) of Federal research agencies, and on an annual basis hereafter, 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. A part of the first submission under paragraph (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 such data cannot be provided.

(b) REPORTING OF DATA. The Director of the National Science Foundation shall publish a technical manual, as practicable, collected under this section, disseminated and cross-labeled by race, ethnicity, socioeconomic indicator, which may include employment status, occupation, educational attainment, parental education, and income, geographic location, and year of completion of doctoral degree, including in consultation with the National Science Foundation reporting required by section 37 of the Science and Engineering Equal Opportunity 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 structural and institutional barrier limiting the recruitment, retention, and success of groups historically underrepresented in STEM research career, including policies and practices relevant to the advancement of Federal research application.

(b) CONSIDERATIONS AND ACTIVITIES. In carrying out the requirements under subsection (a), Federal research agencies shall

(1) require or encourage 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 finding rate of proposal from all groups, including historically underrepresented in STEM;

(3) collect and disseminate best practices to remove or reduce structural and institutional barrier limiting the recruitment, retention, and success of groups historically underrepresented in STEM research career; and

(4) implement evidence-based policies and practices to achieve the goal of his 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 a later date hereafter, the Director of the National Science Foundation shall carry out a study to collect data from award recipients on the demographic of STEM faculty, broad field of STEM, a different type of institution of higher education has received Federal research funding.

(2) SURVEY CONSIDERATIONS. To the extent practicable, the Director of the National Science Foundation shall study, by sex, race, socioeconomic indicator, which may include employment status, occupation, educational attainment, parental education, and income, geographic location, ethnicity, citizenship status, and year 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 non-entrepreneurial position, including teaching and research;
- (D) the number and percentage of faculty who are recruited for promotion, including tenure, and the percentage of that number who are promoted, including being awarded tenure;
- (E) faculty year in rank;
- (F) the number and percentage of faculty who leave entrepreneurial position;
- (G) the number and percentage of faculty hired, by rank; and
- (H) the number and percentage of faculty in leadership position.

(b) EXISTING SURVEYS. The Director of the National Science Foundation, may, in modifying or expanding existing Federal research of higher education (as necessary)

(1) take into account the consideration under subsection (a)(2) by collaborating with a research center at other Federal agencies; or

(2) make an award to an institution of higher education or nonprofit organization (or contractor hereof) to make such consideration in accordance.

(c) REPORTING DATA. The Director of the National Science Foundation shall publish a statistical summary of data collected under this section, including a part of the National Science Foundation's report required by section 37 of the Science and Engineering Equal Opportunity 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 requirements 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 information that receives Federal research funding best practices for

(A) conducting periodic climate review of STEM departments and divisions, with a particular focus on identifying and addressing any cultural or institutional barrier to the recruitment, retention, or advancement of group historically underrepresented in STEM fields and career; and

(B) providing educational opportunities, including workshoppes, for STEM professionals to learn about current research on effective practices for talented 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, as a minimum, doctoral degree granting institutions that receive Federal research funding; and

(ii) require each 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 each 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 each 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 scope and frequency of activities and policies developed and carried out under subsection (a) based on the report submitted under paragraph (2) of this 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.

No later than for each year after the date of the enactment of this Act, the Director shall transmit to Congress a report that includes the following:

(1) A description and evaluation of the status and progress of policies implemented pursuant to section 10505 at all Federal research agencies, including an recommendation for reining in or expanding such policies.

(2) With respect to efforts to remove or reduce structural and institutional barriers limiting the recruitment, retention, and success of groups historically underrepresented in academic and government STEM research career under section 10505

(A) a report on all Federal research agencies that have taken or implemented policies and practices to further such efforts;

(B) a description of any significant progress on the policies for reining in or expanding Federal research and related funding; and

(C) any evidence of the impact of such policies on the reining in or expanding of Federal research and funding; and

(3) A description and evaluation of the status of funding of higher education and Federal labor or policies and practices related under section 10505, including an recommendation for reining in or expanding such policies.

SEC. 10508. MERIT REVIEW.

Nothing in this title may be construed as altering any institutional or broader impact criteria at a Federal research agency for evaluating any application.

SEC. 10509. DETERMINATION OF BUDGETARY EFFECTS.

The budgetary effect of this title, for the purpose of complying with the Statutory Pay-As-You-Go Act of 2010, shall be determined by reference to the latest available published "Budgetary Effect of PAYGO Legislation" for this title, transmitted for printing in the Congressional Record by the Chairman of the House Budget Committee, provided that such a statement has been transmitted prior to the date of publication.

SEC. 10510. DEFINITION.

In this title, 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 title, 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 a grant on a merit-reviewed, competitive basis in support of higher education or nonprofit organization (or a contractor hereof) 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. Amount made available under this section 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 children 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 metrics and master-based grading practices to assess student performance, when employing the interdisciplinary teaching approach for STEM discipline;

(iii) designing and developing pre-service and in-service training courses for rural educators, principals, and other school leaders in adopting interdisciplinary teaching practices across STEM courses;

(iv) coordinating with local partners to adapt STEM teaching practices to the unique local, national, and community areas 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) a Federal laboratorian or in institution 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 determine will accomplish the goal 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 experience for rural STEM educators, principals, and other school leaders of children 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 a grant on a merit-reviewed, competitive basis to institution of higher education or nonprofit organization (or a contractor hereof) for

(A) research and development of programming to identify the barriers rural children face in accessing high-quality STEM education; and

(B) development of innovation of improve the participation and advancement of rural children in pre-kindergarten through grade 12 in STEM field.

(2) USE OF FUNDS.

(A) IN GENERAL. Amount 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 courses, including computer science, or rural high school children;

(ii) supporting research on effective STEM practices in rural settings;

(iii) implementing a schoolwide STEM approach, including preparation and support for principal and other school leader;

(iv) improving the Foundation's Advanced Technology Education program coordination and engagement with rural communities;

(v) collaborating with existing community partners and networks, such as the Cooperative Extension System, 4-H, and other rural research programs of the Department of Agriculture and other existing organizations like 4-H, after school STEM program, and summer STEM program, 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 laboratory resources for children 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 children;

(ix) building capacity to support extracurricular STEM programs in rural schools, including mentored engagement programs, STEM programs held during non-school hours, STEM networks, maker space, coding activities, and competitions;

(x) creating partnerships with local industry and local educational agencies to tailor STEM curricula and educational experiences to the need of a particular local or regional economy; and

(xi) and other activities the Director determine will accomplish the goal of this paragraph.

(c) APPLICATION. An applicant seeking an amount under subsection (a) or (b) shall submit an application at such time, in such manner, and containing such information as the Director may require. The application may include the following:

(1) A description of the target population to be served by the research activities or activities for which such amount is sought.

(2) A description of the process for recruitment and election of children, educators, principal, and other school leader, or school from rural area to participate in such activities or activities.

(3) A description of how each activity or activity may inform efforts to promote the engagement and achievement of rural children in prekindergarten through grade 12 in STEM fields.

(4) In the case of a proposal involving a partnership or partnership, with one or more rural schools and one or more researchers, a plan for establishing a sustained partnership that is jointly developed and managed, drawn from the capacities of each partner, and is mutually beneficial.

(d) PARTNERSHIPS. In making a grant under subsection (a) or (b), the Director shall

(1) encourage applications, which, for the purpose of the activity or activity funded through the grant, include or partner with a nonprofit organization or an institution of higher education (or a contractor hereof) that has extensive experience and expertise in increasing the participation of rural children in prekindergarten through grade 12 in STEM;

(2) encourage applications, which, for the purpose of the activity or activity funded through the grant, include or partner with a contractor of rural schools or rural school districts; and

(3) encourage applications, which, for the purpose of the activity or activity funded through the grant, include commitments from school principals, other school leaders, and administrators or making reform and activity proposed by the applicant a priori.

(e) EVALUATIONS. All proposals for a grant under subsection (a) and (b) shall include an evaluation plan that includes the use of outcome-oriented measures to assess the impact and effectiveness of the grant. Each recipient of a grant under this subsection shall include reports from the evaluation activity in annual and final reports.

(f) ACCOUNTABILITY AND DISSEMINATION.

(1) EVALUATION REQUIRED. The Director shall evaluate the portfolio of grants made under subsection (a) and (b). Such evaluation shall

(A) use a common set of benchmark and tools to assess the relative of research conducted under each grant and identify best practices; and

(B) determine whether practicable, integrate the findings of research resulting from the activity or activity funded through each grant with the findings of other research on rural children's pursuit of degree or career in STEM.

(2) REPORT ON EVALUATIONS. No later than 180 days after the completion of the evaluation under paragraph (1), the Director shall submit to Congress and make available to the public a report that includes

(A) the results of the evaluation; and

(B) an recommendation for administrative and legislative action that could optimize the effectiveness of the grant made under this subsection.

(g) REPORT BY COMMITTEE ON EQUAL OPPORTUNITIES IN SCIENCE AND ENGINEERING. A part of the first report required by subsection 36(e) of the Science and Engineering Equal Opportunity Act (42 U.S.C. 1885c(e)) transmitted to Congress after the date of enactment of this Act, the Committee on Equal Opportunity

in Science and Engineering, in consultation, with the Chief Director 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 natural community 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 for broadening existing strategies toward 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 program 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 this section

(a) for each of fiscal years 2023 through 2027; and

(2) \$12,000,000 to carry out the activities under this section

(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 hereof, 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 mentorship experiences can be integrated to meet the need 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 having special needs and academic accommodations; and

(5) any other activities the Director determines will accomplish the goal of this subsection.

(c) EVALUATIONS. All proposals for award under this section shall include an evaluation plan that includes the use of common-oriented measures to assess the impact and efficacy of the award. Each recipient of an award under this subsection shall include a report from the evaluator activities in annual and final projects.

(d) ACCOUNTABILITY AND DISSEMINATION.

(1) EVALUATION REQUIRED. The Director shall evaluate the portfolio of awards made under his jurisdiction. Such evaluation shall

(A) set a common set of benchmark and tool to assess the relative of research conducted under the award and identify best practice; and

(B) to the extent practicable, integrate findings from activities carried out prior to research conducted under his jurisdiction, in his report on the priority of career and degree in STEM, in his report on activities carried out prior to other research on emerging national trends and communication.

(2) REPORT ON EVALUATIONS. No later than 180 days after the completion of the evaluation under paragraph (1), the Director shall submit to Congress and make available to the public a report that includes

(A) the relative of the evaluation; and

(B) an recommendation for administrative and legislative action that would optimize the effectiveness of the award made under his jurisdiction.

(e) COORDINATION. In carrying out his jurisdiction, the Director shall, for the purpose of enhancing program effectiveness and avoiding duplication of activities, consult, cooperate, and coordinate with the program and policies of other relevant Federal agencies.

SEC. 10514. NATIONAL ACADEMIES EVALUATION.

(a) STUDY. No 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) evaluate the quality and quantity of current Federal programming and research directed at examining STEM education for children in prekindergarten through grade 12 and workforce development in rural areas;

(2) in coordination with the Federal Communication Commission, assess the impact of broadband connectivity in rural communities, and the affordability of broadband connectivity, in relation to STEM and technical literacy for children in prekindergarten through grade 12 in rural areas;

(3) assess the core research and data needed to understand the challenges rural areas are facing in providing quality STEM education and workforce development;

(4) make recommendation for action at the Federal, State, and local level for improving STEM education, including online STEM education, for children in prekindergarten through grade 12 and workforce development in rural areas; and

(5) make recommendation to inform the implementation of program in sections 10512 and 10513 (_____-LOG262) and (_____-LOG263).

(b) REPORT TO DIRECTOR. The agreement entered into under subsection (a) shall require the National Academies, no later than 24 months after the date of enactment of this division, to submit to the Director a report on the study conducted under each paragraph, including the National Academies' findings and recommendation.

(c) AUTHORIZATION OF APPROPRIATIONS. There are authorized to be appropriated to the Director to carry out his section \$1,000,000 for fiscal year 2023.

SEC. 10515. GAO REVIEW.

No later than 3 years after the date of enactment of this Act, the Comptroller General of the United States shall conduct a study on the engagement of rural population in Federal STEM education program and transmit to Congress a report that include

- (1) an assessment of how Federal STEM education programs are serving rural population;
- (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 Small Business Technology Innovation Act of 1980 (15 U.S.C. 3719), the Secretary of Commerce shall carry out a program to award prize competition to stimulate research and development of creative technologies to support the deployment of affordable and reliable broadband connectivity in rural communities, including underserved 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 no more than a total of \$5,000,000 to one or more winners of the prize competition.

(d) REPORT. No later than 60 days after the date on which a prize is awarded under the prize competition, the Secretary shall transmit to the relevant committee of Congress a report that describe the winning proposal of the prize competition.

(e) CONSULTATION. In carrying out the program under this section, the Secretary shall consult with the Federal Communication Commission and the head of relevant departments and agencies of the Federal Government.

Subtitle C—MSI STEM Achievement

SEC. 10521. GAO REVIEW.

No 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 competition funding programs and initiatives carried out by Federal research agencies that are targeted to HBCU, TCU, and MSI or partner with HBCU, TCU, and MSI;
- (2) an assessment of Federal research agencies that reach activities to increase the participation and effectiveness of

HBCU, TCU, and MSI in the funding program and initiative identified in paragraph (1); and

(3) recommendation of the Comptroller General to increase the participation of and the rate of success of HBCU, TCU, and MSI in competitive funding programs offered by Federal research agencies.

SEC. 10522. AGENCY RESPONSIBILITIES.

(a) IN GENERAL. In consultation with the stakeholder and the head 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 policy guideline for Federal research agencies to carry out a sustained program of outreach activities to increase clarity, transparency, and accountability for Federal research agencies in STEM education and research activities at HBCU, TCU, and MSI, including transition in rural areas.

(b) OUTREACH ACTIVITIES. In developing policy guideline under subsection (a) the Director of the Office of Science and Technology Policy shall include guideline that require each Federal research agency

(1) to designate a liaison for HBCU, TCU, and MSI responsible for

(A) enhancing direct communication with HBCU, TCU, and MSI to increase the Federal research agency's understanding of the capacity and need of transition and outreach activities of available Federal funding opportunities and transition;

(B) coordinating program, activities, and initiatives while accounting for the capacity and need of HBCU, TCU, and MSI;

(C) tracking Federal research agencies in education and engagement with HBCU, TCU, and MSI; and

(D) reporting progress and increasing participation of HBCU, TCU, and MSI in award programs;

(2) to develop a practicable, to produce an annual summary of funding opportunities and proposal deadline targeted at HBCU, TCU, and MSI, including for grants, contracts, subcontracts, and cooperative agreements;

(3) to develop a practicable, identifying in annual budget request potential areas for collaboration with HBCU, TCU, and MSI in the relevant fiscal year, including relating to potential meeting and workshop;

(4) to initiate proposal that have a broader participation by emerging research institutions, including HBCU, TCU, and MSI;

(5) to conduct on-site review of research facilities at HBCU, TCU, and MSI, a practicable, and make recommendations regarding strategies for becoming more competitive in research;

(6) to hold geographically accessible or virtual workshop on research priorities of the Federal research agencies and on headquarters, remote competitive award proposal and headquarters, award management capacity for the entire award lifecycle, from application to completion;

(7) to ensure opportunities for HBCU, TCU, and MSI to direct communication with Federal research agency officials

responsible for managing competitive award program in order to receive feedback on research ideas and proposals, including guidance on the Federal research agencies' merit review process; and

(8) to formulate all beneficial public-private collaboration among Federal research agencies, including Federal laboratories, academia, and nonprofit organizations.

(A) identify alternative sources of funding for STEM education and research at HBCU, TCU, and MSI;

(B) provide access to high-quality, relevant research experience for students and faculty of HBCU, TCU, and MSI;

(C) expand the professional network of students and faculty of HBCU, TCU, and MSI;

(D) broaden STEM educational opportunities for students and faculty of HBCU, TCU, and MSI; and

(E) support the retention of students of HBCU, TCU, and MSI in the STEM workforce;

(c) STRATEGIC PLAN.

(1) IN GENERAL. No 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 plan of each Federal research agency to increase the capacity of HBCU, TCU, and MSI to compete effectively for grants, contracts, or cooperative agreements and to encourage HBCU, TCU, and MSI 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) Investing new or expanding existing funding opportunities targeted to HBCU, TCU, and MSI.

(B) Modifying existing research and development programs solicitation incentives to effectively partner with HBCU, TCU, and MSI.

(C) Offering planning grants for HBCU, TCU, and MSI 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 personalized guidance of grant officers, faculty, and postdoctoral researchers at HBCU, TCU, and MSI to enhance their understanding of the requirements for an effective grant proposal.

(E) Other approaches for making current competitive funding models more accessible for underrepresented HBCU, TCU, and MSI.

(d) REPORT ON POLICY GUIDELINES. No later than one year after the date of the enactment of this Act and 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. Section (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 agencies in existence in HBCU, TCU, and MSI, including, to the degree practicable, data on the level of participation of HBCU, TCU, and MSI as prime recipients, contractors, subrecipients, or subcontractors of an award, or reasonable estimate hereof; 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 a award, on a competitive basis, on invitation of higher education or nonprofit organization (or consortium hereof) of

- (1) conduct research described in subsection (b), in respect of HBCU, TCU, and MSI; and
- (2) identify and broadly disseminate effective model for program and practice at HBCU, TCU, and MSI that promote the education and workforce preparation of minority students pursuing STEM studies and career in high-tech industries and underrepresented.

(b) RESEARCH. Research described in this subsection is research on the contribution of HBCU, TCU, and MSI to the education and training of underrepresented minority students in STEM field and on the meeting of national STEM workforce need, including relating to the following:

- (1) The disparity in respect of local context, cultural difference, and institutional success among HBCU, TCU, and MSI and an associated impact on education and research endeavor.
- (2) Effective practice at HBCU, TCU, and MSI and associated outcomes on student recruitment, retention, and advancement in STEM field, including the ability for student to compete for fellowship, employment, and advancement in the workforce.
- (3) Contribution made by HBCU, TCU, and MSI to local, regional, and national workforce.
- (4) The challenge and opportunity for HBCU, TCU, and MSI in addressing the resource needed for increasing effective practice in STEM education, including providing research experience for underrepresented minority students.
- (5) The access of student at HBCU, TCU, and MSI to STEM infrastructure and an associated outcome for STEM competence.
- (6) Model of STEM curriculum, learning, and teaching practice at HBCU, TCU, and MSI for increasing participation, retention, and success of underrepresented minority students.
- (7) Successful promising partnership between HBCU, TCU, and MSI and other institution of higher education, private sector and nonprofit organization, Federal laboratory, and international research institution.

(c) RESEARCH EXPERIENCES. Award under this section may fund the development or expansion of opportunity for the exchange

of + den and fael o cond c re earch, facili ae profe ional de elopmen , and pro ide men or hip, incl ding hrø gh par ner hip , i h in i+ ion of higher ed ca ion ha are no HBCU , TCU , or MSI , pri ae ec or and nonprofi organi a ion , Federal labora orie , and in erna ional re earch in i+ ion .

SEC. 10524. CAPACITY-BUILDING PROGRAM FOR DEVELOPING UNIVERSITIES.

(a) AWARDS.

(1) IN GENERAL. The Direc or hall make a ard , on a compe i ie bai , o eligible in i+ ion de cribed in + b ec ion (b) o + ppor he mi ion of he Fø nda ion and o bld in i+ ional re earch capaci ae eligible in i+ ion .

(2) ADMINISTRATION. The Direc or ma admini er epara e compe i ion for each ca egor of eligible in i+ ion de cribed in + b paragraph (A) hrø gh (C) of + b ec ion (b)(1) in order o en+ re fair compe i ion for in i+ ion , i h ignifi can l differen re earch capaci e .

(b) ELIGIBLE INSTITUTIONS. To be eligible o recei e an a ard + nder hi + b ec ion, an en i

(1) hall be

(A) a hi oricall Black college or+ ni er i ;

(B) a Tribal College or Uni er i ;

(C) a minori - er ing in i+ ion;

(D) an in i+ ion of higher ed ca ion , i h an e abli hed STEM capaci -blding program foed on Na i e Ha aian and Ala ka Na i e ; or

(E) con or ia hereof;

(2) hall

(A) ha e no more han \$50,000,000 in ann al federal financed re earch and de elopmen expendi+ re for cience and engineering a repor ed hrø gh he Na ional Science Fø nda ion Higher Ed ca ion Re earch and De elopmen S r e ; or

(B) no be an in i+ ion cla ified a ha ing er high re earch ac i i b he Carnegie Cla ifica ion of In i+ ion of Higher Ed ca ion.

(c) PARTNERSHIPS. In making a ard + nder hi ec ion, he Direc or hall

(1) encø rage en i ie ha are con or ia of eligible in i+ ion o + bmi propo al and req ire + ch propo al o incl de a plan for e abli hing a + ained par ner hip ha i join l de eloped and managed, dra from he capaci e of each in i+ ion, and i m+ + all beneficial;

(2) encø rage propo al + bmi ed in par ner hip , i h he pri ae ec or, nonprofi organi a ion , Federal labora orie , and in erna ional re earch in i+ ion , a appropria e;

(3) req ire propo al de cribed in paragraph (1) and (2) o incl de a plan o reng hen he admini ra i e and re earch capaci of he par nering HBCU , TCU , or MSI o lead + re propo al .

(d) VERY HIGH RESEARCH ACTIVITY STATUS HISTORICALLY BLACK COLLEGES AND UNIVERSITIES PROGRAM. A ard + nder hi ec ion ma be+ ed o enable HBCU , hich ha e high re earch ac i i a+ o achie e er high re earch ac i i a+ , a cla ified+ nder he Carnegie Cla ifica ion of In i+ ion of Higher Ed ca ion, b enabling

- (1) faculty professional development;
- (2) stipend for graduate and undergraduate students, and postdoctoral scholars;
- (3) acquisition of labor and equipment and infrastructure; and

(4) other activities as necessary to build research capacity.

(e) PROPOSALS. To receive an award under this section, an eligible institution shall submit an application to the Director at such time, in such manner, and containing such information as the Director may require, including

(1) a plan that describes how the eligible institution will establish or expand research office capacity and how such award funds will be used to

(A) conduct an assessment of capacity-building and research infrastructure needs of an eligible institution;

(B) enhance institutional research capacity to provide administrative research development support to faculty at an eligible institution;

(C) bolster the institutional research competitive efforts of an eligible institution to support awards made by the Foundation;

(D) support the acquisition of infrastructure capacity at an eligible institution in research areas directly addressed by the Foundation;

(E) increase capability of an eligible institution to meet technology in the marketplace;

(F) increase engagement with industry to enhance research through the SBIR and STTR program (as such terms are defined in section 9(e) of the Small Business Act (15 U.S.C. 638(e)) and direct contracts at an eligible institution;

(G) enhance STEM workforce and research training opportunities at the undergraduate, graduate, and postdoctoral level at an eligible institution;

(H) further faculty development initiatives and strengthen institutional research training infrastructure, capacity, and competitive efforts of an eligible institution;

(I) address plan and prospect for long-term sustainability of institutional enhancement 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 institution of higher education partners, including HBCU, TCU, and MSI on STEM education, including the facilitation of student exchange, core and research sharing, collaboration, and materialization of student-oriented graduate program, mentoring program for student and junior faculty, joint research projects, and student access to graduate education; and

(2) a relevant plan, which shall be updated every three years, that describes the institution's strategy to achieve or enhance research activities, including making investments in institutional and non-Federal funds, to achieve the activities within a decade of the grant award, to the extent practicable.

(f) MSI CENTERS OF INNOVATION. Award under this section may fund the establishment of no more than five MSI Centers

of Innovation Challenge + center of HBCU, TCU, and MSI in STEM education and research training of underrepresented minority + develop a model for other institutions, including both HBCU, TCU, and MSI and institutions of higher education that are not HBCU, TCU, or MSI. Such centers will be located on campus of selected HBCU, TCU, or MSI, and serve as incubator + pilot in institutions of higher education of experiments, pilot + scale, and scale + promising practice.

(g) AWARDS. Award made under this subsection shall be for period of three years and may be extended for period of no 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. No 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) identify challenge and barrier to Federal research and development + award for high research activities at HBCU; and

(B) identify recommendation for Federal research agencies to + available boost the research capacity of high research activities at HBCU through award-making activities.

(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 Defense, the Secretary of Energy, the Secretary of Health and Human Services, and the head of other + each agency as determined relevant to the National Science and Technology Council.

(3) INFORMATION FROM FEDERAL AGENCIES. The National Science and Technology Council may receive directly from a Federal department or agency + each information that the National Science and Technology Council consider 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 + each information as 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 award on a competitive, merit-based basis to eligible entities to increase the participation of Tribal populations in computer science and computational thinking education program to enable + develop

o develop skill and competence in coding, problem-solving, critical thinking, creativity and collaboration.

“(2) PURPOSE. A grant made under this subsection shall support

“(A) research and development needed to bring computer science and computational thinking core and degree Tribal College or University;

“(B) research and development of instructional material needed to integrate computer science and computational thinking in a program that are of high quality and of high quality Tribal College or University;

“(C) research, development and evaluation of distance education for computer science and computational thinking core and degree program for Tribal College and University; and

“(D) other activities consistent with the activities described in paragraph (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 hereof, may partner with an institution of higher education or nonprofit organization, which demonstrated expertise in academic program development.

“(4) COORDINATION. In carrying out this subsection, the Director shall consult and cooperate with the program and policies of other relevant Federal agencies to avoid duplication, which 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. No later than one year after the date of the enactment of this Act, the Director shall evaluate the award program authorized under section 525 of the America COMPETES Reauthorization 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 benchmark and assessment tools to identify best practices and material developed or demonstrated by the research conducted pursuant to the award program 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 the award program in expanding access to high quality STEM education, research, and outreach at Tribal College or University, as applicable;

(C) assess the number of students who participated in the award program; and

(D) assess the percentage of students participating in the award program who successfully completed their education program.

(3) REPORT. No later than 180 days after the date on which the evaluation under paragraph (1) is completed, the

Director shall submit to Congress and make available to the public, a report on the results of the evaluation, including an recommendation for legislative action that would 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 title:

(1) DIRECTOR. The term “Director” means the Director of the National Science Foundation.

(2) HBCU. The term “HBCU” has the meaning given the term “public 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 Institution as defined in section 502 of the Higher Education Act of 1965 (20 U.S.C. 1101a); Alaska Native Serving Institution and Native Hawaiian-Serving Institution as defined in section 317 of the Higher Education Act of 1965 (20 U.S.C. 1059d); and Predominant Black Institution, Asian American and Native American Pacific Islander-Serving Institution, and Native American-Serving Nontribal Institution 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 make the following finding:

(1) According to the report issued by the National Academies of Science, Engineering, and Medicine in 2018 entitled “Sexual Harassment of Women: Climate, Culture, and Consequences in Academic Science, 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 each group;

(E) the average for each individual who has a Doctor of Philosophy in the sciences, technology, engineering, and mathematics field is estimated to cost approximately \$500,000; and

(F) a portion of an individual's lost reputation in a field of science and medicine.

(2) According to a 2017 University of Illinois study, among astronomer 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, which respect sexual harassment, are inconsistent among Federal research agencies and have varying degrees of accessibility.

(4) There is no adequate communication among Federal research agencies and between agencies and recipients regarding reporting of sexual harassment, which has resulted in harassment receiving Federal funding after moving to a different institution.

SEC. 10532. PURPOSE.

The purpose of this title is to increase understanding of the cause and consequence of sexual harassment and sexual harassment, as detailed in the report issued by the National Academies in 2018 entitled "Sexual Harassment of Women: Climate, Culture, and Consequence in Academic Science, Engineering, and Medicine", and to advance evidence-based approaches to reduce the prevalence and negative impact of sexual harassment.

SEC. 10533. DEFINITION.

In this title, 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, in support of higher education or nonprofit organization (or consortium of such institution or organization)

(1) to expand research efforts to be undertaken and the factors contributing to, and consequence of, sexual harassment and sexual harassment affecting individuals in the STEM workforce, including students and trainees; and

(2) to examine approaches to reduce the incidence and negative consequence of sexual harassment.

(b) USE OF FUNDS. Activities funded by an award under this section may include

(1) research on the sexual harassment and sexual harassment experience of individuals, including in racial and ethnic minority groups, disabled individuals, foreign national, sexual minority individuals, and other;

(2) development and assessment of policies, procedures, training, and intervention, which respect sexual harassment and sexual harassment, conflict management, and a safe reporting system and include climate;

(3) research on approaches for remedying the negative impact and experience of sexual harassment on individuals experiencing sexual harassment;

(4) support for institution of higher education or nonprofit organization to develop, adapt, implement, and assess the impact of innovative, evidence-based strategies, policies, and approaches to policy implementation to prevent and address sexual harassment and sexual harassment;

(5) research on alternative to the predominant, hierarchical, and dependent relationship, including but not limited to the mentor-mentee relationship, in academia that have been

higher level of risk for and lower level of reporting of sex-biased and sexual harassment; and

(6) establishing a center for the ongoing compilation, management, and analysis of organizational climate research.

SEC. 10535. RESPONSIBLE CONDUCT GUIDE.

(a) IN GENERAL. No later than 180 days after the date of enactment of this Act, the Director shall enter into an agreement with the National Academies to produce the report entitled "On Being a Scientist: A Guide to Responsible Conduct in Research" issued by the National Academies. The report, as produced, shall include

(1) produced professional standard of conduct in research;

(2) promising practices for preventing, addressing, and mitigating the negative impact of sex-biased and sexual harassment, including

(A) standard of research individual can expect to receive under produced standard of conduct;

(B) evidence-based practices for fostering a climate in tolerance of sex-biased, sexual, and other forms of harassment;

(C) methodology, including benchmarking, for identifying and addressing incidents of sexual harassment; and

(D) professional standard for mentorship and teaching, with an emphasis on proper diffusion mechanism and preventing sexual harassment; and

(3) promising practices for mitigating potential ethical risks inherent in research.

(b) REPORT. No 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 produced 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-biased and sexual harassment in the workplace. In coordination with the working group on inclusion in STEM field established under section 308 of the American Innovation and Competitiveness Act (42 U.S.C. 6626) and the Safe Inclusion Research Environment Subcommittee of the National Science and Technology Council, and in consultation with the 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) no 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 Pension of the Senate an in en or of Federal re earch agencie policie , procedre , and re ece dedica ed o pre en ing and re ponding o repor of e-ba ed and e al hara men ;

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(3) consistent 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 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 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 in error 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 the following guidelines that require or incite

(1) recipients of periodicals and their organizational climate, which may include the health of climate change, foreign groups, or minorities;

(2) recipients of publications available in electronic or print form of a document pursuant to paragraph (1), disseminated by and, if practicable, race, ethnicity, disability, 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 sexual abuse and sexual harassment within their organization;

(4) recipients to regulate and improve policies, procedures, and information to reduce the prevalence of and improve the reporting of sexual abuse and sexual harassment;

(5) each entity applying for a research and development award shall have a code of conduct in place for maintaining a healthy and welcoming workplace for award personnel and posted on their public website;

(6) each recipient and Federal research agency shall have in place mechanisms for addressing the needs of individuals who have experienced sexual abuse and sexual harassment, including those individuals seeking to reintegrate into the recipient entity; and

(7) recipients to work to create a climate in violation of sexual abuse and sexual harassment and harassment and promote diversity and inclusion.

(d) FEDERAL RESEARCH AGENCY IMPLEMENTATION. No 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 sexual abuse and sexual harassment that are consistent with the policy guidelines under subsection (a)(2) and have protected the privacy of all parties involved in an report and in the investigation of sexual abuse 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 agencies.

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 of Sciences, Engineering, and Medicine to conduct a study and issue a report on the influence of early-career and early-career women in the field of higher education on the career advancement of individuals in the STEM workforce. The study shall also—

(1) determine the extent of research on early-career and early-career women in the STEM workforce;

(2) determine the research demonstrating a decrease in the prevalence of early-career and early-career women in the STEM workforce;

(3) highlight progress made in the National Academies of Sciences, Engineering, and Medicine report entitled “Sexual Harassment of Women: Climate, Culture, and Consequence in Academic Science, Engineering, and Medicine”;

(4) determine the effectiveness of efforts to decrease the prevalence of early-career and early-career women in the STEM workforce, including specific recommendations; and

(5) offer recommendations and advice, as the National Academies of Sciences, Engineering, and Medicine determine appropriate.

SEC. 10538. GAO STUDY.

Not later than 3 years after the date of enactment of this Act, 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 such 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 practice and policies to improve the guidelines and implementation.

SEC. 10539. AUTHORIZATION OF APPROPRIATIONS.

There is authorized to be appropriated to the Director to carry out this title, \$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 facilities chosen by the Secretary, not later than a period not greater than one year.

(b) SELECTION PROCESS. The Director of the National Science Foundation shall select recipients under subsection (a) from among citizens, nationals, and lawful permanent residents alien 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 field 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 describe 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 include the following:

- (1) A summary of the use of award funds under this section and the impact of the pilot program under this section.
- (2) Statistical summary data on fellowship awardees that aggregated by race, ethnicity, sex, geography, age, year of 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 title.

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. No later than December 31 of the year immediately after the calendar year in which a reauthorization of 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 recommendation and priorities developed by the reauthorization of section 206B;

“(B) the most recent 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 plan, report, and strategy; and

“(D) the strategic plan 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 social and national challenges, including a transition to a circular economy;

“(B) program, 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) plan to promote sustainable 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 technology and opportunities for international collaboration in science and technology; and

“(E) plan to foster the development of international partnerships to reinforce domestic policy action, build new markets, engage in collaborative research, and create an

international engineers shall reflect United States
 and protect United States interests.

“(c) CONSULTATION. The Director of the Office of Science and
 Technology Policy shall consult a necessary with the Office of
 Management and Budget and other appropriate elements of the
 Executive Office of the President to ensure that the recommenda-
 tion 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 tech-
 nology strategy, a briefing to the relevant congressional committee,
 which may include a report on the following:

“(1) The status and development of the national science
 and technology strategy, including any significant change.

“(2) The implementation of the national science and tech-
 nology 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, in the production of national
 strategy and other information to the maximum extent prac-
 ticable, 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 it is appropriate.

“(f) TERMINATION. This section terminates on the date that
 it is enacted 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 terms “foreign
 country of concern” mean the People's Republic of China,
 the Democratic People's Republic of Korea, the Russian Federa-
 tion, the Islamic Republic of Iran, or any other country deter-
 mined 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 Immigra-
 tion and Nationality Act (8 U.S.C. 1189(a));

(B) included on the list of specially designated national
 and blocked persons maintained by the Office of Foreign
 Assets Control of the Department of the Treasury (com-
 monly known as the SDN list);

(C) owned by, controlled by, or subject to the jurisdic-
 tion or direction of a government of a foreign country
 that is a covered nation (as that 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, as obtained
 under

(i) chapter 37 of title 18, United States Code (com-
 monly 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);

(i) the Arms Export Control Act (22 U.S.C. 2751 et seq.);

(ii) section 224, 225, 226, 227, or 236 of the Atomic Energy Act of 1954 (42 U.S.C. 2274, 2275, 2276, 2277, and 2284);

(i) the Arms Export Control Reform Act of 2018 (50 U.S.C. 4801 et seq.); or

(ii) 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 transnational 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 termination 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 head of each other relevant Federal agency and the Director of the Office of Science and Technology Policy consider appropriate and in consultation with the transnational partners of the Director of the Office of Science and Technology Policy consider appropriate

(A) relevant transnational security, including the national defense strategy and 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), program, and resource of the Director of the Office of Science and Technology Policy determine pertinent to United States' national competitive in science, technology, research, innovation, and technology transfer activities, including patenting and licensing, has proposed the national security strategy;

(B) develop relevant international strategy to improve the national competitive 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, in which report the relevant conducted pursuant to subparagraph (A); and

(ii) the strategy developed or revised pursuant to paragraph (B).

(2) TERMINATION. This section 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 this section (b)(1)(C)(i) shall include the following:

(A) An assessment of the effort of the United States Government to prepare United States leadership in key emerging technologies and prepare United States strategic competition from leading advanced technologies to gain strategic military or economic advantage over the United States.

(B) An assessment of public and private investments in science and technology relevant to national security posture, 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 high regional innovation capacity efforts in STEM fields are contributing and could contribute to the national security of the United States, including programs within States and local governments.

(G) An assessment of the following:

(i) Workforce need for competition in technology areas identified in the national security strategy.

(ii) An effort needed to expand participation in technology fields to achieve the goal of the national security strategy.

(H) An assessment of barriers to the development, export, or competition of startups, small and medium-sized businesses, 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 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 nature of certain defense technology research and commercialization arrangements, with regard to public-private partnerships; and

(ii) the extent to which intellectual property developed in the 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 entities that have majority owned or controlled (as that term is defined in section 800.208 of title 31, Code of Federal Regulations, or applicable regulation), or minority owned greater than 25 percent by

(aa) an governmental organization of a foreign country of concern; or

(bb) an other entity that

(AA) knowingly owned or controlled by an governmental organization of a foreign country of concern; or

(BB) organized under, or otherwise controlled, the laws of a foreign country of concern.

(M) Recommendation to enhance the ability of the Federal Government to recruit in the Federal service and retain in that service individuals with critical skill relevant to national security.

(N) Recommendation for policies to protect United States leadership and the alliance of the United States in critical areas relevant to national security through export control, information 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 clarified, describing an integrated and ending approach to the identification, prioritization, development, and fielding of emerging technologies relevant to national security.

(2) STRATEGY. Each strategy submitted to be included in (b)(1)(C)(ii) shall, to the extent practicable, include the following:

(A) A plan outlining available tools to address or minimize the leading threat and challenge and to take advantage of the leading opportunity, particularly in regard to technology central to international competition in science and technology relevant to national security portfolio, 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 portfolio, including near-term, medium-term, and long-term research priorities.

(iii) Specific plan to fund research and technology funded, appropriate, in whole or in part, by the Federal Government, including in technology critical to national security, from the portfolio of foreign entities of concern.

(i) Specific plan of support for public and private economic development in research, technological development, education and workforce development, and domestic manufacturing support of the national energy of the United States and of other public-private partnership.

() A description of the following:

(I) Headquarters of the research and development and education (b)(1)(C)(ii) support of the national energy research.

(II) Headquarters of the research and development and education in integrated and coordinated, in the most recent

(aa) national defense research and development (g) of section 113 of title 10, United States Code; and

(bb) national science and technology research and development section 206 of the National Science and Technology Policy, Organization, and Priority Act of 1976 (42 U.S.C. 6615).

(i) A plan to encourage the government of countries that are allies or partners of the United States to cooperate, in the execution of such research, where appropriate.

(ii) A plan for strengthening the industrial base of the United States.

(iii) A plan to remove or reduce the burden of or outdated Federal regulation, as appropriate.

(iv) A plan

(I) of further incentives and participation in public-private partnership for the purpose of accelerating technology research and commercialization in support of national energy, including alternative sources of accounting for in-kind contribution and allowing partial manufacturing production;

(II) to ensure that in the proper developed, in the Federal funding in commercialized in the United States; and

(III) to ensure, to the maximum appropriate extent, that in the proper developed, in the Federal funding in no being held by foreign business entities that are majority owned or controlled (as that term is defined in section 800.208 of title 31, Code of Federal Regulation, or as that term is defined in regulation), or minority owned greater than 25 percent

(aa) an governmental organization of a foreign concern; or

(bb) an otherwise that is

(AA) known to be owned or controlled by an governmental organization of a foreign concern; or

(BB) organized and, or otherwise that is subject to the laws of a foreign concern of concern.

(f) An identification of additional resources, administrative action, or legislative action recommended to assist in the implementation of such program.

(d) RESEARCH AND DEVELOPMENT FUNDING. The Director of the Office of Science and Technology Policy shall, at the direction of the Office of Science and Technology Policy consider necessary, in consultation with the Director of the Office of Management and Budget and with the head of each other element of the Executive Office of the President at the direction of the Office of Science and Technology Policy consider appropriate to enter the recommendation and priorities in the report on research and development funding relevant to national security, as expressed in the most recent report and program budget under subsection (b)(1)(C) are incorporated in the development of annual budget requests for Federal research agencies.

(e) PUBLICATION. The Director of the Office of Science and Technology Policy shall, in consultation with the production of national security and other intelligence matters and other 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 section:

“SEC. 206B. QUADRENNIAL SCIENCE AND TECHNOLOGY REVIEW.

“(a) REQUIREMENTS.

“(1) QUADRENNIAL REVIEWS REQUIRED. Not later than December 31, 2023, and thereafter hereafter, 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 program of the United States, including recommendation 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 program, areas, capabilities, budget, policies, and activities across all Federal research and development program.

“(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 head of other relevant Federal agencies.

“(F) Other relevant governmental and nongovernmental entities, including representatives from industry,

in addition of higher education, nonprofit organization, Member of Congress, and other public employees.

“(4) COORDINATION. The Director of the Office of Science and Technology Policy shall ensure that each quadrennial science and technology report is coordinated with other relevant activities required by law, and to the maximum extent practicable incorporate information and recommendations from existing reports to avoid duplication.

“(b) CONTENTS. In each quadrennial science and technology report, the Director of the Office of Science and Technology Policy shall

“(1) provide an integrated report of, and recommendation for, science and technology policy across the Federal Government, while considering economic and national security and other social and national challenges;

“(2) assess and recommend priorities for research, development, and demonstration program 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 program to address social 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 recommendation on the science, technology, engineering, mathematics, and computer science workforce of the United States;

“(6) assess and make recommendation 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 chain, and markets;

“(8) assess and make recommendation to improve translation of basic and applied research and the enhancement of technology transfer of federally funded research;

“(9) identify, assess, and make recommendation to address science and technology gaps that should not be met by the Federal investment;

“(10) report administrative and legislative policies and funding opportunities that affect private sector science and technology activities, and identify and make recommendation 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 social and national challenges; and

“(12) report administrative or legislative policies that affect the science and technology enterprise and identify and make recommendation regarding policies that hinder research and development in the United States.

“(c) REPORTING.

“(1) IN GENERAL. No later than December 31 of the year in which a quadrennial science and technology report is conducted, the Director of the Office of Science and Technology Policy shall transmit to Congress a report relating to such report.”

“(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 transmitted 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 occurs after the date of the enactment of this section.”

Subtitle C—Regional Innovation

SEC. 10621. REGIONAL INNOVATION CAPACITY.

(a) IN GENERAL. The Section on-Welder 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 committee of Congress’ mean

“(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 service’ 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’ mean localized drinking water and access roads to facilitate wellhead protection facilities for drinking water, sewer, broadband, and other basic infrastructure already present in the area.

“(4) VENTURE DEVELOPMENT ORGANIZATION. The term ‘venture development organization’ has the meaning given such term in section 27(a) of the Section on-Welder Act of 1980 (15 U.S.C. 3722(a)).

“(5) COMMUNITY DEVELOPMENT FINANCIAL INSTITUTION. The term ‘community development financial institution’ has the meaning given in section 103 of the Community Development Banking and Financial Institution Act of 1994 (12 U.S.C. 4702).

“(6) MINORITY DEPOSITORY INSTITUTION. The term ‘minority depository institution’ mean an entity that

“(A) a minority depositor 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 depositor institution

“(i) the appropriate Federal banking agency; or

“(ii) the National Credit Union Administration, in the case of an insured credit union.

“(7) LOW POPULATION STATE. The term ‘low population State’ means a State, whether an urbanized area, which has a population greater than 250,000 as reported in the decennial census.

“(8) SMALL AND RURAL COMMUNITIES. The term ‘small and rural communities’ means a noncore area, a micropolitan area, or a small micropolitan statistical area, which has a population of no more than 250,000.

“(b) REGIONAL TECHNOLOGY AND INNOVATION HUB PROGRAM.

“(1) IN GENERAL. Subject to the availability of appropriation, the Secretary shall carry out a program

“(A) encourage and conduct collaborative efforts among local, State, Tribal, and Federal governmental entities, institutions of higher education, the private sector, economic development organizations, labor organizations, nonprofit organizations, and community organizations to promote broad-based regional innovation initiatives;

“(B) support eligible consortia in the development and implementation of regional innovation strategies;

“(C) designate eligible consortia as regional technology and innovation hubs and facilitate activities and 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 growth;

“(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;

“(i) to support the modernization and expansion of United States manufacturing based on advances in technology and innovation;

“() to support domestic job creation and broad-based economic growth; and

“(i) to improve the pace of market readiness, industrialization, and overall commercialization and domestic production of innovative research;

“(D) to enhance the regional technology and innovation hubs address the interconnection of emerging technologies and their regional challenge or national challenge; 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) Strategic development grant or cooperative agreement of eligible contractor + b e c i o n (e).

“(B) Strategic implementation grant or cooperative agreement of regional technology and innovation + b e c i o n (f).

“(3) ADMINISTRATION. The Secretary shall carry out his section through the Assistant Secretary of Commerce for Economic Development in coordination with the Under Secretary of Commerce for Standard and Technology.

“(c) ELIGIBLE CONSORTIA. For purpose of this section, an eligible contractor + b e c i o n shall

“(1) include 1 or more of each of the following

“(A) institution of higher education, which may include Historically Black College and Universities, Tribal College or University, and minority-serving institution;

“(B) State, territorial, local, or Tribal government or other political subdivision of a State, including State and local agency, or contractor hereof;

“(C) industry or firm in relevant technology, innovation, or manufacturing sector;

“(D) economic development organization or similar entity that are focused primarily on improving science, technology, innovation, entrepreneurship, or access to capital; and

“(E) labor organization or workforce training organization, which may include State and local workforce development board established under section 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 entity in relevant sector, including a district organization (as defined in section 300.3 of title 13, Code of Federal Regulations, or successor regulation);

“(B) organization that contributes to increasing the participation of underrepresented population in science, technology, innovation, and entrepreneurship;

“(C) enterprise development organization;

“(D) organization that promotes local economic mobility, high-wage domestic job, and broad-based economic opportunity, through a worker-employer member organization and State or local worker-employer and cooperative development center, financial institution and investment fund, including community development financial institution and minority depository institution;

“(E) elementary school and secondary school, including area career and technical education school (as defined in section 3 of the Carl D. Perkins Career and Technical Education Act of 2006 (29 U.S.C. 2302));

“(F) National Labor Organization (as defined in section 2 of the Energy Policy Act of 2005 (42 U.S.C. 15801));

“(G) Federal labor organization;

“(H) Manufacturing extension center;

“(I) Manufacturing USA initiative;

“(J) transportation planning organization;

“(K) cooperative enterprise;

“(L) organization has represented the perspective of underrepresented communities in economic development initiatives; and

“(M) institution 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 evaluate a competitive, merit-based process to designate eligible countries a regional technology and innovation hub.

“(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, subject to available appropriation, designating at least 20 technology hubs, and

“(A) seeking to designate at least three technology hubs in each region coordinated by a regional office of the Economic Development Administration, while

“(i) entity has no fewer than one-third of eligible countries designated a regional technology hub significant benefit a small and rural community, which may include a State or territory described in clause (ii) and (iii);

“(ii) entity has no fewer than one-third of eligible countries designated a regional technology hub include a member of the eligible countries at least 1 member has a State or territory that is eligible to receive funding from the Established Program of Stimulating Competitive Research of the National Science Foundation; and

“(iii) entity has at least one eligible country designated a regional technology hub headquartered in a low population State that is eligible to receive funding from the Established Program of Stimulating Competitive Research of the National Science Foundation;

“(B) seeking to designate an additional regional technology hub based on election factors which shall include likelihood of success and include regional factors such as the extent to which the regional technology and innovation hub significant engage and benefit underrepresented communities in and near metropolitan area;

“(C) encouraging eligible countries to leverage in addition of higher education serving population historically underrepresented in STEM, including historically Black College and Universities, Tribal College or Universities, and minority-serving institutions to significant benefit an area or region; and

“(D) encouraging proposal from eligible countries that would significant benefit an area or region, whose economic significant reliance 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 country to receive a grant or cooperative agreement under subsection (e) in order to be

designated a regional technology and innovation hub under paragraph (1) of this section.

(e) STRATEGY DEVELOPMENT GRANTS AND COOPERATIVE AGREEMENTS.

(1) IN GENERAL. The Secretary shall evaluate a competitive, merit-based process of awarding cooperative agreements to eligible consortia for the development of regional innovation regions.

(2) NUMBER OF RECIPIENTS. Subject to availability of appropriations, the Secretary shall seek to award a grant or cooperative agreement under paragraph (1) to no 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 no fewer than one-third of the grant and cooperative agreements under each paragraph of eligible consortia that have significant benefits to small and rural communities, which may include a State described in clause (ii); and

(ii) award no fewer than one-third of the grant and cooperative agreements under each paragraph of eligible consortia that include at least one member of the eligible consortia at least one member that is a State or territory that is eligible to receive funding from the Established Program of Stimulating 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 process, across jurisdiction and agencies, relating to developing a comprehensive regional technology region;

(ii) identification of regional partnerships for developing and implementing a comprehensive regional technology region;

(iii) implementation or updating of a regional assessment of regional needs and capabilities;

(iv) development or updating of goals and strategies for implementing a comprehensive regional plan;

(v) identification or implementation of planning and local zoning and other code change necessary to implement a comprehensive regional technology region; 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 region, according to the need for a skilled and technical workforce at all skill and degree levels in the region proposed to be established by the eligible consortia. A workforce development

eligible and admitted pursuant to paragraph (1) hold included

(i) help the eligible contractor, will develop, offer, or improve educational or career training program and contribute to the skilled and technical workforce;

(ii) the extent to which such program developed and offered by the eligible contractor will meet the educational or career training need of a skilled and technical workforce in the region to be served;

(iii) help the eligible contractor, will provide facilities for the development of training and technical program developed and offered by the eligible contractor; and

(iv) help the eligible contractor, will enhance outreach and recruitment for such program developed and offered by the eligible contractor to population underrepresented in STEM.

(5) FEDERAL SHARE. The Federal share of the cost of an effort carried out under a grant or cooperative agreement awarded under this section may not exceed 80 percent

(A) where in-kind contribution may be added for all or part of the non-Federal share, but Federal funding from other government sources may not exceed the non-Federal share;

(B) except in the case of an eligible contractor that represents all or part of a small and rural or other underrepresented community, the Federal share may be up to 90 percent of the total cost, subject to paragraph (A); and

(C) except in the case of an eligible contractor 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 evaluate the competitive merit review process of award grant or cooperative agreement of regional technology and innovation hub for the implementation of regional innovation strategy, including regional strategy for infrastructure and development, in support of the regional innovation and technology and innovation hub plan and program. The Secretary shall determine the size and number of award based on appropriate available to ensure the success of regional technology and innovation hub as outlined in section (h).

(2) USE OF FUNDS. Grant or cooperative agreement awarded under paragraph (1) of a regional technology and innovation hub may be added by the regional technology and innovation hub to support any of the following activities, consistent with the most relevant regional innovation strategy of the regional technology and innovation hub, which may have been developed, in whole or in part, financial assistance received under section (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 college, or create and

align technical training and educational program, including for a skilled technical workforce.

“(ii) The design, development, and production of educational and training curriculum and program, including training of trainer, teacher, or instructor or demonstrated regional skilled and technical workforce need.

“(iii) The procurement of facilities and equipment, as required to train a skilled and technical workforce.

“(i) The development and execution of program, including trainee and apprentice, to rapidly provide training and accreditation or credential recognized by regional industry or other organization.

“() The matching of regional employer with a potential new entrant, underemployed, underrepresented, reentering, or incumbent workforce, as well as the offering of commitment from employer to hire worker, who complete training program, or who are awarded accreditation or credential.

“(i) The expansion of certificate training program as a career required by the region or by the regional technology and innovation hub, including through the use of online education and mentoring.

“(ii) The development and expansion of program with the goal of increasing the participation of person historically underrepresented in STEM and manufacturing in the workforce development plan of the regional technology and innovation hub.

“(iii) The provision of support services for a provider of training program developed, produced, or expanded program to enhance retention, including career counseling.

“(iv) The implementation of outreach and recruitment for training program developed, produced, or expanded program to enhance retention, particularly a local educational institution, including high school and community college.

“(B) BUSINESS AND ENTREPRENEUR DEVELOPMENT ACTIVITIES. Define and entrepreneur development activities, including activities relating to the following:

“(i) The development and growth of local and regional business and the training of entrepreneur, which may include support for the expansion of employment needed business and cooperation.

“(ii) The support of technology commercialization, including funding for activities relevant to the provision of intellectual property and for advancing potential entrepreneur to achieve acceleration, incubation, early-stage production and other relevant programming.

“(iii) The development of local and regional capital networks and consortia to address entrepreneurial funding of business and entrepreneur in the region.

“(i) The development of local and regional networks for business and entrepreneur mentoring.

“(C) TECHNOLOGY DEVELOPMENT AND MATURATION ACTIVITIES. Technology maturation activities, including activities relating to the following:

“(i) The development and deployment of technologies in economic critical of the region exercised by the regional technology and innovation hub or national and economic entity, including industry research cooperation, proof of concept, prototype development, testing, and scale-up for manufacturing.

“(ii) The development of programming support for the creation and transfer of intellectual property in open platforms, through open creation.

“(iii) The provision of facilities for technology maturation, including incubator and production beds for collaborative development of technologies by private, academic, nonprofit, and other entities.

“(iv) Activities to provide or enhance access to capital for new business and business expansion, including financing through private, public, and philanthropic investments and enabling local and regional entrepreneurship and loan funds, community development financial institutions, and minority depository institutions.

“(D) INFRASTRUCTURE-RELATED ACTIVITIES. The building of facilities and interconnectivity infrastructure necessary to carry out activities described in subparagraph (A), (B), and (C), including activities relating to the following:

“(i) Enabling a center, which required tools and infrastructure for workforce development.

“(ii) Enabling a facility for technology development, demonstration, and testing.

“(iii) Enabling collaborative incubator support for technology commercialization and entrepreneurship 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 a further period at the Secretary's discretion, if the Secretary determines that the regional technology and innovation hub has made a significant progress toward the metrics agreed to under this subsection (j).

“(C) FLEXIBLE APPROACH. In renewing a grant or cooperative agreement under subparagraph (B), the Secretary and the eligible contractor may agree on one or additional uses of funds in order to meet change in the need of the region.

“(4) LIMITATION ON AMOUNT OF AWARDS.

“(A) INITIAL PERFORMANCE PERIOD. The amount of an initial grant or cooperative agreement awarded to a

regional echnolog and inno a ion h b + nder paragraph (3)(A) hall be no more han \$150,000,000.

“(B) SUBSEQUENT PERFORMANCE PERIOD. Upon rene al of a gran or coopera i e agreemen + nder paragraph (3)(B), he Secre ar ma a ard f nding in he amon ha he Secre ar con ider appropria e, en + ring ha no ngle regional echnolog and inno a ion h b recei e more han 10 persen of he aggrega e amon of he gran and coopera i e agreemen a arded + nder hi + b ec ion.

“(5) MATCHING REQUIRED.

“(A) INITIAL PERFORMANCE PERIOD. E cep in he ca e of a regional echnolog and inno a ion h b de cribed in + bparagraph (C), he o al amon of all gran a arded o a regional echnolog and inno a ion h b + nder hi + b ec ion in pha e one hall no e ceed 90 persen of he o al opera ing co of he regional echnolog and inno a ion h b + ring he ini ial performance period.

“(B) SUBSEQUENT PERFORMANCE PERIOD. E cep in he ca e of a regional echnolog and inno a ion h b de cribed in + bparagraph (C), he o al amon of all gran a arded o a regional echnolog and inno a ion h b in + b eq en performance period hall no e ceed 75 persen of he o al opera ing co of he regional echnolog and inno a ion h b in each ear of he gran or coopera i e agreemen .

“(C) SMALL AND RURAL COMMUNITIES, UNDERSERVED COMMUNITIES, AND INDIAN TRIBES.

“(i) IN GENERAL. The o al Federal financial a i ance a arded in a gi en ear o a regional echnolog and inno a ion h b + nder hi + b ec ion hall no e ceed amon a follo :

“(I) In he ca e of a regional echnolog and inno a ion h b ha primaril er e a mall and r ral comm ni or o her + nder er ed comm ni , in a fi cal ear, 90 persen of he o al f nding of he regional echnolog and inno a ion h b in ha fi cal ear.

“(II) In he ca e of a regional echnolog and inno a ion h b ha i led b a Tribal go ernmen , in a fi cal ear, 100 persen of he o al f nding of he regional echnolog and inno a ion h b in ha fi cal ear.

“(ii) MINIMUM THRESHOLD OF RURAL REPRESENTATION. For p rpo e of cla e (i)(I), he Secre ar hall e abli h a minim m hre hold of r ral repre en a ion in he regional echnolog and inno a ion h b.

“(D) IN-KIND CONTRIBUTIONS. For p rpo e of hi paragraph, in-kind con rib ion ma be + ed for par of he non-Federal hare of he o al f nding of a regional echnolog and inno a ion h b in a fi cal ear.

“(6) GRANTS FOR INFRASTRUCTURE. An gran or coopera i e agreemen a arded + nder hi + b ec ion o + ppor he con r c ion of facili e and i e connec i i infra r c + re hall be a arded p r + an o ec ion 201 of he P blic Work and Economic De elopmen Ac of 1965 (42 U.S.C. 3141) and + bjec o he pro i ion of + ch Ac , e cep ha + b ec ion

(b) of this section and section 204 and 301 of this 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 this section (e) in order to receive a grant or cooperative agreement under this section.

“(g) APPLICATIONS. An eligible contractor seeking designation as a regional technology and innovation hub under this section (d) or a grant or cooperative agreement under this section (e) or (f) shall submit to the Secretary an application hereof as follows, in this manner, and containing this information as the Secretary may specify.

“(h) CONSIDERATIONS FOR DESIGNATION AND AWARD OF STRATEGY IMPLEMENTATION GRANTS AND COOPERATIVE AGREEMENTS. In selecting an eligible contractor to be designated as a regional technology and innovation hub under this section (d) or for a grant or cooperative agreement under this section (f), the Secretary shall consider the following:

“(1) The potential of the eligible contractor 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 contractor plans to integrate, in-house and leverage the resources of one or more federally funded research and development centers, National Laboratories, Federal laboratories, Manufacturing USA initiatives, Holling Manufacturing Extension Partnership centers, regional innovation engines or regional accelerators established under section 10388 and 10389 of the Research and Development, Competition, and Innovation Act, established and operated under section 10390 of this Act, or other Federal entities.

“(4) How the eligible contractor will engage, in-house privately or, including small- and medium-sized businesses and cooperatives, and employed businesses and cooperatives, to commercialize new technologies and improve the resilience and sustainability of domestic supply chain in a key technology focus area, or other technology or innovation sector critical to national security and economic competitiveness.

“(5) How the eligible contractor will carry out workforce development and skill acquisition programming, including through partnership initiatives with State and local workforce development boards, in addition to higher education, including community college, historically Black college and universities, Tribal College or Universities, and minority-serving institutions, labor organizations, nonprofit organizations, workforce development programs, and other related activities authorized by the Secretary, to support the development of a skilled technical workforce for the regional technology

and innovation hubs, including key technology focus areas or other technology or innovation sector critical national security and economic competitiveness.

“(6) Headquarters eligible consortium will improve or expand science, technology, engineering, and mathematics education program and opportunities in the identified region in elementary and secondary school and higher education institution located in the identified region to support the development of a key technology focus area or other technology or innovation sector critical national security and economic competitiveness.

“(7) Headquarters eligible consortium plan to develop partnership with entrepreneur organizations, community development financial institution and minority depository institution, and source 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 national security and economic competitiveness.

“(8) Headquarters eligible consortium plan to organize the activity of regional partner across or in support of a regional technology and innovation hub.

“(9) Headquarters eligible consortium consider opportunities to support local and regional business through procurement, including from minority-owned and women-owned business.

“(10) Headquarters eligible consortium will enhance high technology, innovation, and advanced manufacturing sector production opportunities across the identified region and for economic development, minority, underrepresented and rural population, including, as appropriate, consideration of headquarters eligible consortium make in connection the relevant impact of existing regional assets and plan or make affect regional goal for affordable housing availability, local and regional transportation, high-speed internet access, and primary and secondary education.

“(11) Headquarters eligible region's education institution align their activity, including research, educational program, training, with the proposed area of focus.

“(12) The likelihood effort entered by the consortium will be sustained once Federal support ends.

“(13) Headquarters eligible consortium will, as appropriate

“(A) enhance the economic, environmental, and energy security of the United States by promoting domestic development, manufacturing, and deployment of innovative clean technologies and advanced manufacturing practice; and

“(B) support regional research, technology development, manufacturing innovation, and commercialization activity relating to clean technology.

“(i) COORDINATION AND COLLABORATION.

“(1) COORDINATION WITH REGIONAL INNOVATION PROGRAM.

The Secretary shall ensure the activity undertaken hereunder do not duplicate activity or effort undertaken section 27.

“(2) COORDINATION AMONG HUBS. The Secretary shall ensure eligible consortium have received a grant or cooperative agreement undertaken hereunder coordination and have best practice for regional economic development.

“(3) COORDINATION WITH PROGRAMS OF THE NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY. The Secretary shall coordinate the activities of regional technology and innovation hubs designated under his section, the Manufacturing Extension Partnership, and the Manufacturing USA Program, as the Secretary considers appropriate, to maximize the effectiveness of a manufacturing extension center or a Manufacturing USA initiative.

“(4) COORDINATION WITH DEPARTMENT OF ENERGY PROGRAMS. The Secretary shall, in collaboration with the Secretary of Energy, coordinate the activities and election of regional technology and innovation hubs designated under his section, as the Secretary considers appropriate, to maximize 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 mission contributes to the goal of the regional technology and innovation hubs;

“(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 his 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, increase 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 purpose set forth under subsection (b)(1);

“(B) establish a standard for the performance of the regional technology and innovation hubs that are based on the metrics developed under subparagraph (A); and

“(C) prior to an award made under a subsection (f) performance period in subsection (f) and every 2 years thereafter until Federal financial assistance under his 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 standard 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 contractor to have received 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, or within 60 days of the Secretary, no later than 120 days after the lapse 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 contractor under paragraph (A) shall include the following:

“(i) A detailed description of the activities carried out by the regional technology and innovation hub during the grant or cooperative agreement described in paragraph (A), including the following:

“(I) A description of each project the regional technology and innovation hub completed during the grant or cooperative agreement.

“(II) An explanation of how each project described in clause (I) achieves a specific goal under this section in the region of the regional technology and innovation hub, including the following:

“(aa) the reliance 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 description of an objective 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 the objective.

“(iii) An evaluation of the success of the project of the regional technology and innovation hub during the performance period 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.

“(i) 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 produce broad-based opportunities across the region, including for economic development and underrepresented populations and rural areas.

“() Information regarding such other matters as the Secretary may require.

“(3) INTERIM REPORTS BY RECIPIENTS OF GRANTS AND COOPERATIVE AGREEMENTS. In addition to requiring technical of final reports under paragraph (2)(A), the Secretary may require a regional technology and innovation hub described in each paragraph of technical of the Secretary technical interim reports the Secretary consider appropriate.

“(4) ANNUAL REPORTS TO CONGRESS. Not less frequently than once each year, the Secretary shall submit to the appropriate committee of Congress an annual report on the results of the activities 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 of award grants and cooperative agreements under subsection (e) for the period of fiscal year 2023 through 2027;

“(2) \$2,950,000,000 of award grants and cooperative agreements under subsection (f) for the period of fiscal year 2023 and 2024; and

“(3) \$7,000,000,000 of award grants and cooperative agreements under subsection (f) for the period of fiscal year 2025 through 2027.

“(l) ADMINISTRATION. The Secretary may expend made available to carry out his or her duties for administrative costs under his or her duties.

“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 address their 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 appropriation, 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 development activities.

“(c) STRATEGY IMPLEMENTATION GRANTS AND COOPERATIVE AGREEMENTS. Subject to available appropriation and subsection (f), the Secretary shall award, on the application of an eligible recipient, a leadership implementation grant, in accordance with a recompete plan request and approved by the Secretary, to carry out coordinated and comprehensive economic development program 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 program oriented to local employer need, such as

“(A) community job training program carried out by local community college and other training or educational organizations in partnership with local business;

“(B) workforce outreach program located in, and targeted to, low-income and underemployed neighborhood; and

“(C) program to embed job placement and training services in neighborhood initiative, technical assistance, housing projects, and community development programs; and

“(D) job retraining program and initiative, technical assistance, and provision of career coaching;

“(2) business and enterprise development initiative of the kind described in section 28(f), technology development and manufacturing initiative of the kind described in technical assistance, or the provision of business advice and assistance to small and medium-sized local business and enterprise. Such advice and assistance may include

“(A) manufacturing enterprise;

“(B) small business development center;

“(C) center to help business bid for Federal procurement contracts;

“(D) enterprise financial assistance program has link enterprise with available public and private resources;

“(E) legal advice and resources; and

“(F) assistance in accessing capital;

“(3) infrastructure related initiative of the kind described in section 28(f) or other land and development program, technical assistance, research and technology park, business incubator, business corridor development, and other infrastructure initiative related to providing job creation and employment for retraining, subject to the requirements of section 28(f)(6); and

“(4) additional planning, development, technical assistance, and other administrative initiative as may be necessary for the ongoing implementation, administration, and operation of the program and initiative 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 initiative but not less than 2 years.

“(2) SUBSEQUENT PERFORMANCE PERIOD. The Secretary may renew a grant or cooperative agreement awarded under subsection (c) for each period, term, and term at the Secretary's discretion, if the Secretary determines that the recipient of an award under subsection (c) has made satisfactory progress toward meeting or benchmarking requirements established by the Secretary at the time of award.

“(3) FLEXIBLE APPROACH. In renewing a grant or cooperative agreement under subsection (c), the Secretary may approve new or additional use of funds, consistent with the use described in subsection (c), to meet change in the need 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 purpose 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 to 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 recommendation; and

“(B) award no more than the production obtained by multiple

“(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 market; or

“(II) \$53,600 for local community.

“(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 recommendation 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 year 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 or no 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 or no less than 5 percent;

“(ii) is not located within an eligible local labor market that meets the criteria described in paragraph (A);

“(iii) has a median annual household income of no more than \$75,000; and

“(i) meet additional criteria as the Secretary may determine.”

“(2) ELIGIBLE RECIPIENT. The term ‘eligible recipient’ means as specified in (i) has been authorized in a manner determined by the Secretary or representative and acting on behalf of an eligible area for the purpose of this section.

“(3) LOCAL LABOR MARKET. The term ‘local labor market’ means any of the following areas which contain 1 or more as specified in (i) described in (A) through (D) of paragraph (6):

“(A) A metropolitan statistical area or micropolitan statistical area, including an area described in (B) paragraph (C).

“(B) A commuting zone, including an area described in (A) and (C).

“(C) The Tribal land, which is 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 which is located, in whole or in part, in the area of a local labor market which 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 purpose of (A) paragraph (A), an individual is prime-age if such individual is between the age of 25 years and 54 years.

“(6) RECOMPETE PLAN. The term ‘recompete plan’ means a comprehensive multi-year economic development plan which

“(A) includes

“(i) proposed program and activities to be carried out which are authorized under (c) to address the economic challenge of the eligible area in a comprehensive manner which promote long-term, sustained economic growth, lasting job creation, per capita income increase, and reduction in the prime-age employment gap of the eligible area;

“(ii) projected costs and annual expenditures and proposed distribution schedule;

“(iii) the role and responsibilities of participants in the plan which are authorized under (c); and

“(i) other information as the Secretary may determine appropriate;

“(B) is submitted to the Secretary for approval for an eligible recipient to be considered for a grant described in (b) section (c); and

“(C) may be modified over the term of the grant by the eligible recipient, subject to the approval of the Secretary or as the direction of the Secretary, if the Secretary

to determine benchmarking requirements are repealed, no measure or other circumstance necessitates a modification.

“(7) SPECIFIED ENTITY. The term ‘specified entity’ means

“(A) any local government;

“(B) the District of Columbia;

“(C) any State or of the United States;

“(D) any Tribal government;

“(E) any political subdivision of a State or other entity, including any special-purpose entity engaged in economic development activities;

“(F) any public entity or nonprofit organization, acting in cooperation with the official of a political subdivision of a State or other entity described in paragraph (E);

“(G) an economic development district (as defined in section 3 of the Public Work and Economic Development Act of 1965 (42 U.S.C. 3122)); and

“(H) any contractor of any of the specified entities described in this paragraph, which entity or entities are contained within the same eligible area.

“(8) TRIBAL LAND. The term ‘Tribal land’ means any land

“(A) located within the boundaries of an Indian reservation, pueblo, or rancharia; or

“(B) not located within the boundaries of an Indian reservation, pueblo, or rancharia, 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 reversion against alienation and transfer of the United States; or

“(iii) by a dependent Indian community.

“(9) TRIBAL PRIME-AGE POPULATION.

“(A) IN GENERAL. The term ‘Tribal prime-age population’ shall be equal to the number obtained by adding

“(i) the number obtained by multiplying

“(I) the total number of individuals age 25 through 54 residing on the Tribal land of the Tribal government; and

“(II) 0.65; and

“(ii) the number obtained by multiplying

“(I) the total number of individuals age 25 through 54 included on the membership roll of the Tribal government; and

“(II) 0.35

“(B) USE OF DATA. A calculation under paragraph (A) shall be determined based on data provided by the applicable Tribal government to the Department of the Treasury under the Corona Initiative State and Local Financial Record Fund program under title VI of the Social Security Act (42 U.S.C. 801 et seq.).”

(b) INITIAL DESIGNATIONS AND AWARDS.

(1) COMPETITION REQUIRED. No 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 Section on-Welder 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 a lead application under subsection (g) of section 28 of the Section on-Welder Technology Innovation Act of 1980 (as added by this section) from an eligible contractor in which the Secretary considers it to be eligible for designation under subsection (d)(1) of section 28, the Secretary shall

(A) designate a lead regional technology and innovation hub under subsection (d)(1) of section 28; and

(B) award a grant or cooperative agreement under subsection (f)(1) of section 28 to each regional technology and innovation hub designated pursuant to paragraph (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 appropriation, if the Secretary has received an application under section 29 of the Section on-Welder Technology Innovation Act of 1980 (as added by this section) from an eligible recipient in which the Secretary considers it to be eligible for award under section 29, the Secretary shall award grant or cooperative agreement under subsection (b) and (c) of 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 innovation partnership’ means a group of one or more persons, including a covered contractor, who perform a collection of activities that are coordinated by a covered contractor 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 governmental entity, including a State, territorial, local, or tribal government or unit of local government, and a lead or more of the following additional entities:

“(A) an institution of higher education or a contractor of institution of higher education, including community college;

“(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 Laborer;

“(H) a entrepreneurship organization;

“(I) a community development financial institution or minority depository institution;

“(J) a worker cooperative memberhip association or a State or local employer 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) an otherwise identified Secretary determine 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 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 in section 2 of the Energy Policy Act of 2005 (42 U.S.C. 15801).

“(6) CLEAN ENERGY TECHNOLOGY. The term ‘clean energy technology’ means a technology having significant reduction in energy use, increase in energy efficiency, reduction in greenhouse gas emissions, reduction in emissions of other pollutants, or mitigation of other negative environmental consequences of energy production, transmission, or use.

“(7) COMMUNITY-BASED ORGANIZATION. The term ‘community-based organization’ has the meaning given 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 location, at which the highest degree, or the predominant awarded degree, is an associate degree; or

“(B) an Tribal college or territory (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 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) to support the development of cool and echnologie be
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“(d) REGIONAL CLEAN ENERGY INNOVATION PARTNERSHIPS.

“(1) IN GENERAL. The Secre ar hall compe i i el a, ard
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 of he Program in + b ec ion (c).

“(2) PERMISSIBLE ACTIVITIES. Gran a arded+ nder hi
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“(A) faciliting he commercial applica ion of clean
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 ran fer;

“(B) planning among par icipan of a regional clean
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“(C) impro ing akeholder in ol emen in he de elop-
 men of goal and ac i i ie of a regional clean energ
 inno a ion par ner hip;

“(D) a e ing differen incen i e mechani m for clean
 energ de elopmen and commercial applica ion in he
 region;

“(E) ho ing e en and conference ; and

“(F) e abli hing and + pda ing roadmap o mea+ re
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“(3) APPLICATIONS. Each applica ion + bmi ed o he Sec-
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“(A) a li of member and role of member of he
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 ion par ner hip;

“(B) an a e men of he rele an clean energ inno a-
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“(C) a de cription of propo ed ac i i ie ha he
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 he p rpo e de cribed in + b ec ion (c);

“(D) a plan for a rac ing addi ional f nd and iden i-
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 inno a ion par ner hip;

“(E) a plan for par nering and collabora ing , i h
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energy sector, and advance model of local economic development has been developed and retained in the region;

“(F) a plan for training activities of the regional clean energy innovation partnership after funds received under this program have been expended; and

“(G) a proposed budget, including financial contribution from non-Federal source.

“(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 under this Program shall be in an amount no greater than \$10,000,000, with the total grant awarded in any year less than that in the preceding year.

“(6) COST SHARE. For grants awarded 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 no longer than 5 years.

“(8) RENEWAL. A grant awarded under this section may be renewed for a period of no more than 5 years, subject to a rigorous merit review based on the progress of a regional clean energy innovation partnership toward achieving the purpose 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 on 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 to receive 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 no longer than 2 years to an entity consisting of a governmental entity, including a State, territorial, local, or tribal government or tribal or tribal government or an entity established under subsection (a)(2) to plan a regional clean energy innovation partnership or establish a covered consortium for the purpose of applying for funds under subsection (b).

“(f) INFORMATION SHARING. A 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 e al a ing a gran rene al + nder + b ec ion (d)(8), he Secre ar hall ork i h program e al a ion e per o de elop and make p blicl a ailable me ric o a e he progre of a regional clean energ inno a ion par ner hip q ard achie ing he p rpo e of he program in + b ec ion (c).

“(h) COORDINATION. In carr ing o he program, he Secre ar hall coordina e i h, and a oid + nnece ar d plica ion of, he ac i i ie carried o + nder hi ec ion i h he ac i i ie of o her re earch en i ie of he Depar men or rele an program a o her Federal agencie .

“(i) CONFLICTS OF INTEREST. In carr ing o he program, he Secre ar hall main ain conflic of in ere proced re , con i en i h he conflic of in ere proced re of he Depar men .

“(j) EVALUATION BY COMPTROLLER GENERAL. No la er han 3 ear af er he da e of he enac men of he Re earch and De elopmen , Compe i ion, and Inno a ion Ac , and again 3 ear la er, he Comp roller General hall + bmi o he Commi ee on Science, Space, and Technolog of he Ho e of Repre en a i e and he Commi ee on Energ and Na + ral Re o rce of he Sena e an e al a ion on he opera ion of he program d ring he mo recen 3- ear period, incl ding

“(1) an a e men of he progre made q ard achie ing he p rpo e pecified in + b ec ion (c) ba ed on he me ric de eloped + nder + b ec ion (g);

“(2) he hor - erm and long- erm me ric + ed o de ermine he + cce of he program + nder + b ec ion (g), and an change recommended o he me ric + ed;

“(3) he regional clean energ inno a ion par ner hip e abli hed or + ppor ed b co ered con or ia ha ha e recei ed gran + nder + b ec ion (d); and

“(4) an recommenda ion on hq he program ma be impro ed.

“(k) NATIONAL LABORATORIES. In + ppor ing echnolog ran fer ac i i ie a he Na ional Labora rie , he Secre ar hall enc o rage par ner hip i h en i ie ha are loca ed in he ame region or Sa e a he Na ional Labora or .

“(l) SECURITY. In carr ing o he ac i i ie + nder hi ec ion, he Secre ar hall en + re proper e o ri con rol are in place o pro ec en i i e informa ion, a appropria e.

“(m) NO FUNDS FOR CONSTRUCTION. No f nd pro ided o he Depar men of Energ + nder hi ec ion hall be + ed for con r c ion.

“(n) AUTHORIZATION OF APPROPRIATIONS. There are a hori ed o be appropria ed o he Secre ar o carr o hi ec ion \$50,000,000 for each of fi cal ear 2023 hr o gh 2027.”.

Subtitle D—Research Security

SEC. 10631. REQUIREMENTS FOR FOREIGN TALENT RECRUITMENT PROGRAMS.

(a) PURPOSE. The p rpo e of hi + b i le i o direc ac ion o prohibi par icipa ion in an foreign alen recr i men program b per onnel of Federal re earch agencie and o prohibi par icipa ion in a malign foreign alen recr i men program b co ered indi id al in ol ed i h re earch and de elopmen a ard from ho e agencie .

(b) GUIDANCE. No 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 disseminate a uniform set of guidelines for Federal research agencies regarding foreign talent recruitment program. 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 Scientists, Engineering, and Education appointments, and special government employees otherwise than peer reviewer, from participating in a foreign talent recruitment program;

(2) a 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), requirements related to disclosure if such individuals are a part of a foreign talent recruitment program contract, agreement, or other arrangement;

(3) prohibit research and development awards from being made for an proposal in which a covered individual is participating in a malign foreign talent recruitment program; and

(4) to the extent practicable, requirements related to prohibition of covered individuals participating in malign foreign talent recruitment program from working on projects supported by research and development awards.

(c) DEFINITION OF FOREIGN TALENT RECRUITMENT PROGRAMS.

A part of the guidance under subsection (b), the Director of the Office of Science and Technology Policy shall define and describe the characteristic of a foreign talent recruitment program.

(d) IMPLEMENTATION. No later than one year after the date of the enactment of this Act, each Federal research agency shall issue a policy outlining 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. No later than 24 months after the date of enactment of this Act, each Federal research agency shall establish a policy that, as a part of a proposal for a research and development award from the agency

(1) each covered individual listed in such proposal certifies that each such individual is not a part of a malign foreign talent recruitment program in the proposal submission of each such individual and announce hereafter for the duration of the award; and

(2) each institution of higher education or other organization applying for such an award certifies 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 requirements 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 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 alien recruitment program on the list developed under paragraph (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 preparation and publishing, or material regarding scientific information not otherwise controlled under copyright;

(2) participation in international conference or other international exchange, research project or program that involves open and reciprocal exchange of scientific information, and which are aimed at advancing international scientific understanding and not otherwise controlled under copyright;

(3) admitting a foreign student enrolled as an institution of higher education or, making a recommendation for such student, a student request; and

(4) other international activities determined appropriate by the Federal research agency head or designee.

(e) **LIMITATION.** The certification 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 institution provide training on the risk of malign foreign alien recruitment program coordinated individually employed as such institution, including how to identify individuals who are participating in activities described in subsection (d).

SEC. 10633. REVIEW OF CONTRACTS AND AGREEMENTS.

(a) **IN GENERAL.** In addition to entering a contract for preparation, a contract, award, and management of Federal funds, each Federal research agency shall have the authority to

(1) require, upon request, the submission of 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 other agreements specific to foreign appointments, employment, with a foreign institution, participation in a foreign alien recruitment program and other information reported as current and pending support for all coordinated individuals in a research and development award application;

(2) require such institution of higher education or other organization to identify any documents required under paragraph (1) for compliance with the Federal research agency

award term and condition, including guidance on conflict of interest and conflict 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 termination 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 contract, grant, or agreement includes obligations that

(A) interfere with the capacity for agency-sponsored activities to be carried out; or

(B) create duplication with agency-sponsored activities.

(b) LIMITATIONS. In exercising the authority 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 this subsection;

(2) endeavor to provide justification for request for suspension of documentation made under this paragraph;

(3) request has allegation be preponderance of evidence; and

(4) as practicable, afford subject an opportunity to provide comment 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 or training that meets the guideline 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 institution of higher education and other organization receiving Federal research and development funding in developing their continuing program to address the unique need,

challenge, and risk profile of activities and other organizations, including adoption of emerging models developed under subsection (c), to ensure compliance with National Security Presidential Memorandum 33 (relating to strengthening protection of the United States Government - supported research and development against foreign governments in reference and exploitation) or any other document.

(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 Institute of Health, the Secretary of Energy, and the Secretary of Defense, and in consultation with the head of relevant Federal research agencies, shall enter into an agreement or contract with a qualified entity for the development of online research 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 other documents, including modules

(A) focused on cyber security, international collaboration and international travel, foreign intelligence, and threats for protection of funds, disclosure, conflict of commitment, and conflict of interest; and

(B) tailored to the unique need of

(i) covered individuals;

(ii) undergraduate students, graduate students, and postdoctoral researchers; and

(iii) applicants for awards under the SBIR and STTR program (awards 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 emerging modules, including the diversity of need across institutions of higher education and other recipients of different size and type, 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 entities referred to in paragraph (1)

(A) develop emerging modules that can be adapted and utilized across Federal research agencies; and

(B) develop and implement a plan for regular updating of 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 + d cond c ed + nder + b ec ion (b) hall incl de, o he ex en prac icable, i h re pec o he + d period, an a e men of:

(1) he o al amon of Federal f nding made a ailable o foreign en i ie of concern for re earch;

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(3) he req iremen rela ing o he a arding, racking, and moni ring of + ch f nding;

(4) an o her da a a ailable, i h re pec o Federal f nding made a ailable o foreign en i ie of concern for re earch; and

(5) + ch o her ma er a he Comp roller General of he Uni ed S a e de ermine appropria e.

(d) BRIEFING ON AVAILABLE DATA. No la er han 120 da af er he da e of he enac men of hi Ac, he Comp roller General of he Uni ed S a e hall brief he Commi ee on Commerce, Science, and Tran por a ion, he Commi ee on Heal h, Ed ca ion, Labor, and Pen ion, and he Commi ee on Foreign Rela ion of he Sena e and he Commi ee on Science, Space, and Technolog, he Commi ee on Energ and Commerce, and he Commi ee on Foreign Affair of he Ho e of Repre en a i e on he + d cond c ed + nder + b ec ion (b) and he da a ha i a ailable, i h re pec o Federal f nding made a ailable o foreign en i ie of concern for re earch.

(e) REPORT. The Comp roller General of he Uni ed S a e hall + bmi o he congre ional commi ee pecified in + b ec ion (d), b a da e agreed + pon b he Comp roller General and he commi ee on he da e of he briefing + nder + ch + b ec ion, a repor on he finding of he + d cond c ed + nder + b ec ion (b).

SEC. 10636. PERSON OR ENTITY OF CONCERN PROHIBITION.

No per on p bli hed on he li + nder ec ion 1237(b) of he S rom Th rmond Na ional Defen e A hori a ion Ac for Fi cal Year 1999 (P blic La 105 261; 50 U.S.C. 1701 no e) or en i iden ified + nder ec ion 1260h of he William M. (Mac) Thornberr Na ional Defen e A hori a ion Ac for Fi cal Year 2021 (10 U.S.C. 113 no e; P blic La 116 283) ma recei e or par icipa e in an gran, a ard, program, + ppor, or o her ac i i + nder

(1) he Direc ora e e abli hed in + b ile G of ile III of hi di i ion;

(2) ec ion 28(b)(1) of he Se en on-W dler Technolog Inno a ion Ac of 1980 (15 U.S.C. 3701 e eq.), a added b ec ion 10621; or

(3) he Man fac + ring USA Program, a impro ed and ex panded + nder + b ile E of ile II of hi di i ion.

SEC. 10637. NONDISCRIMINATION.

In carr ing ex req iremen + nder hi + b ile, each Federal re earch agenc hall en + re ha policie and ac i i e de eloped and implemen ed p r + an o hi + b ile are carried ex in a manner ha doe no arge, igma i e, or di crimina e again indi idal on he ba i of race, e hnic i, or na ional origin, con i en, i h ile VI of he Ci il Righ Ac of 1964 (42 U.S.C. 2000d e eq.).

SEC. 10638. DEFINITIONS.

In hi + b ile:

(1) COVERED INDIVIDUAL. The term “covered individual” means an individual who

(A) contributed in a substantial manner, meaningfully, a scientific development or execution of a research and development project proposed to be carried out in a research and development activity funded from a Federal research agency; and

(B) is designated 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

(A) is designated 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) is included on the list of specially designated national and blocked persons maintained by the Office of Foreign Assets Control of the Department of the Treasury (commonly known as the SDN list);

(C) is owned, controlled, or operated by the jurisdiction or direction of a government of a foreign country that is a covered nation (as that term is defined in section 4872 of title 10, United States Code);

(D) is alleged by the Attorney General to have been involved in activities for which a conviction, as 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);

(i) the Arms Export Control Act (22 U.S.C. 2751 et seq.);

(ii) section 224, 225, 226, 227, or 236 of the Atomic Energy Act of 1954 (42 U.S.C. 2274, 2275, 2276, 2277, and 2284);

(i) the Export Control Reform Act of 2018 (50 U.S.C. 4801 et seq.); or

(ii) the International Emergency Economic Powers Act (50 U.S.C. 1701 et seq.); or

(E) is determined by the Secretary of Commerce, in consultation with the Secretary of Defense and the Director of National Intelligence, to be engaged in transnational 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) a program, position, or activity that includes compensation in the form of cash, in-kind compensation, including research funding, promised future compensation, complimentary foreign travel, hiring of non-de minimis

able, honorific title, career advancement opportunity, or other type of remuneration or consideration directly provided by a foreign country as an employee (national, provincial, or local) or heir designate, or an employee, funded by, or affiliated with a foreign country, whether or not directly sponsored by the foreign country, or otherwise arranged indirectly, whether directly or indirectly, in the arrangement, contract, or other documentation, in exchange for the individual

(i) engaging in the transfer of intellectual property, material, data product, or other nonpublic information needed by a United States entity or developed by a Federal research and development agency or the government of a foreign country or an employee, funded by, or affiliated with a foreign country regardless of whether the government or entity provided support for the development of the intellectual property, material, or data product;

(ii) being required to receive or research or enroll in a program, position, or activity;

(iii) establishing a labor or company, accepting a full position, or undertaking another employment or appointment in a foreign country or with an employee, funded by, or affiliated with a foreign country if such activities are in violation of the standard term and condition of a Federal research and development agency;

(i) being unable to terminate the foreign alien recruitment program contract or agreement except in extraordinary circumstances;

() through funding or effort related to the foreign alien recruitment program, being limited in the capacity to carry out a research and development agency or required to engage in, or have a relationship in a bilateral or overlapping duplication with a Federal research and development agency;

(i) being required to apply for and accept full receive funding from the sponsoring foreign government's funding agency with the sponsoring foreign organization as the recipient;

(ii) being required to acknowledge the recipient in its name, which the individual is affiliated, or the Federal research agency sponsoring the research and development agency, contract or the institutional policies or standard term and condition of the Federal research and development agency;

(iii) being required to disclose to the Federal research agency or employing institution the participation of such individual in such program, position, or activity; or

(iv) having a conflict of interest or conflict of commitment contract or the standard term and condition of the Federal research and development agency; and

(B) a program has been sponsored by

- (i) a foreign concern of concern or an entity established in a foreign concern of concern, whether or not directly sponsored by the foreign concern 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 alien 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 title 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 follow through the semicolon and inserting “maintain and advance 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 “technique for” and all that follow through the period and inserting “mitigating the impact of ocean and coastal acidification and related core or on marine ecosystem”.

(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 ocean” and all that follow before the period at the end and inserting “and change in the average chemistry of the Earth’s ocean, coastal estuarine, marine, and Great Lakes waters”;

b 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 paragraph (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 change in the chemical character of coastal ocean, estuarine, and Great Lakes from atmospheric pollution, freshwater input, and excess nutrient runoff 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.”.

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 estuarine” and inserting “Subcommittee shall coordinate Federal activities on ocean and coastal acidification and estuarine and marine”;

(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 a appropriate,” after “designate”;

(ii) by striking “de eloped” and inserting “and coastal acidification de eloped”; 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 “in 2032” after “effective 2 years

hereafter”;

(ii) by inserting “, and of the Office of Management and Budget,” after “House of Representatives”; and

(iii) in paragraph (B), by striking “the inter-

agency research” and inserting “interagency research”;

(B) in paragraph (3), by inserting “in 2031” after “effective 5 years”; and

(C) in paragraph (4), by inserting “in 2032” after “effective 6 years

hereafter”;

(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 of the Subcommittee on

“(i) the biennial report specified in subsection

(d)(2); and

“(ii) the research plan in subsection (d)(3);

“(B) provide ongoing advice of the Subcommittee and the interagency working group on matters related to Federal activities on ocean and coastal acidification, including impact 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 standard 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 fishing industry.

“(C) One representative of seafood processor.

“(D) Three representatives from academia, including both natural and social science.

“(E) One representative of recreational fishing.

“(F) One representative of a relevant nongovernmental organization.

“(G) Six representatives from relevant State and local governments, including those with policies or regulations related to ocean acidification and coastal acidification.

“(H) One representative from the Alaska Ocean Acidification Network or a comparable entity that represents the same geographical region and has a similar purpose.

“(I) One representative from the California Great Central Acidification Network or a + b equivalent in the same geographical region and has a similar purpose.

“(J) One representative from the Northeast Coastal Acidification Network or a + b equivalent in the same geographical region and has a similar purpose.

“(K) One representative from the Southeast Coastal Acidification Network or a + b equivalent in the same geographical region and has a similar purpose.

“(L) One representative from the Gulf of Mexico Coastal Acidification Network or a + b equivalent in the same geographical region and has a similar purpose.

“(M) One representative from the Mid-Atlantic Coastal Acidification Network or a + b equivalent in the same geographical region and has a similar purpose.

“(N) One representative from the Pacific Island Ocean Observing System or a + b equivalent in the representative island territory and possession 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 + b equivalent in the representative Puerto Rico and the United States Virgin Islands and has a similar purpose.

“(P) One representative from the National Oceanic and Atmospheric Administration Olympic Coastal Ocean Acidification Sentinel Site or a + b equivalent in the representative same geographical representative area.

“(Q) One representative from the National Oceanic and Atmospheric Administration shall serve as an ex-officio member of the Advisory Board, hereby.

“(4) APPOINTMENT OF MEMBERS. The Chair of the Subcommittee shall

“(A) appoint member of the Advisory Board (taking into account the geographical interest of each individual to be appointed as a member of the Advisory Board) ensure that an appropriate balance of geographical interest are represented by the member of the Advisory Board, who

“(i) represent the interest groups for which each is designated;

“(ii) demonstrate expertise on ocean acidification or coastal acidification and its scientific, economic, industrial, global, and community impact; and

“(iii) have a record of demonstrated expertise in the respective ocean acidification or coastal acidification, and its impact;

“(B) give consideration to nomination and recommendation from the member of the interagency working group and the public for each appointment; and

“(C) ensure that an appropriate balance of scientific, industrial, State and local resource manager, and geographical interests are represented by the member 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 for no more than 1 term.

“(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 a time and place 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 activities and the requirements 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 this paragraph

(A) may be construed as affecting any requirements of consultation 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. An Federal agency with a representative interest in the interagency working group established under this section may, either individually or in cooperation with one or more agencies, carry out a program of award prize competition under section 24 of the Science and 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 the interagency working group.

“(2) PURPOSES. An prize competition carried out under this subsection shall be for the purpose of stimulating innovation or advance in National capabilities and, research, or monitoring ocean acidification or its impacts, or development 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 climate change, environmental, or industrial areas in direct relation 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 no later than 5 years following the publication of each subsection (a) 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” after “mitigation strategies”;

(iii) by striking “marine ecosystem” each place it appears and inserting “ecosystem”;

(C) in the second sentence, by striking “National Academy of Science in the report 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 science” after “among the ocean science”;

(B) in paragraph (2)

(i) in subparagraph (B)

(I) by striking “improve the ability to address the” and inserting “address the short- and long-term”;

(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”;

(iii) by adding at the end the following new subparagraph:

“(D) improve research on

“(i) ocean acidification and coastal acidification;

“(ii) the interaction between and effects of ocean and coastal acidification and multiple combined or interacting changes in water chemistry, change in sediment delivery, hypoxia, and harmful algal bloom, on ocean acidification and coastal acidification; and

“(iii) the effects or effectiveness of climate (i) and (ii) on marine resources and ecosystems”;

(C) in paragraph (3)

(i) in subparagraph (F), by striking “development” and inserting “adaptation”;

(ii) in subparagraph (H) by striking “and” at the end; and

- (iii) by adding at the end the following new paragraph:
- “(J) a committee of adaptation and mitigation strategies; and
- “(K) education and outreach activities;”
- (D) in paragraph (4), by striking “efforts” and inserting “ensuring 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 “in” 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 for potential affected industry member, coastal stakeholder, fisheries management council and commission, Tribal governments, non-Federal resource manager, and scientific expert 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 “input”;
- (ii) by inserting “, marine food web,” after “marine ecosystem”; and
- (iii) by inserting “, and modeling has supported 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 on and related and complementary research and other biogeochemical processes occurring in conjunction with ocean acidification and coastal acidification.”;
- and
- (4) by striking subsection (d) and (e) and inserting the following:
- “(d) PUBLICATION. Congress, in the testimony of the plan of 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, as appropriate, the Integrated Ocean Observing System and the ocean observing system of other Federal, State, and Tribal agencies,” after “ocean observing system”;

(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 subparagraph:

“(C) priority actions of the location of monitoring instruments, assets, and projects to maximize the efficiency of research and agency and departmental mission;

“(D) an optimization of understanding of socioeconomic impacts and ecosystem health”.

(i) in subparagraph (E), as redesignated, by striking “adaptation” and inserting “adaptation and mitigation”;

(ii) by inserting after subparagraph (E), as 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”.

(i) in subparagraph (H), as redesignated

(I) by striking “impacts” and inserting “health-related impacts”;

(II) by striking “and” at the end;

(ii) in subparagraph (I), as redesignated

(I) by striking “monitoring and impact research” and inserting “research, monitoring, and adaptation and mitigation strategies”; and

(II) by striking the period at the end and inserting a semicolon; and

(iii) by adding at the end the following new subparagraph:

“(J) research to improve understanding of

“(i) the impact of ocean acidification and coastal acidification; and

“(ii) how multiple environmental stressors may combine to 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 project has explored" and inserting "critical research, education, and outreach project has explored and communicate"; and

(D) in paragraph (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 section:

"(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 with

"(1) coordinate monitoring and research efforts among Federal agencies in cooperation with State, local, and Tribal governments and international partners; hire and include analysis and synthesis of the results of monitoring and research;

"(2) maintain an Ocean Acidification Information Exchange created under section 12404(b)(5) of all information to be electronically accessible, including information

"(A) on ocean acidification developed through or under the ocean acidification program created under section (a); or

"(B) has, or will be, staffed by State government, local government, Tribal government, resource manager, policymaker, researcher, and other stakeholder in mitigation or adaptation of the impacts of ocean acidification and coastal acidification; and

"(3) establishing and maintaining the data archive under section (d).

"(d) DATA ARCHIVE SYSTEM.

"(1) IN GENERAL. The Secretary, in coordination with the member of the interagency working group, shall support the long-term development, and access, of a repository of ocean and coastal acidification through providing the data on a public accessible data archive. To the extent possible, the data archive shall collect and provide access to ocean and coastal acidification data

"(A) from relevant federal funded research;

"(B) provided by a Federal, State, or local government, academic institution, citizen scientist, or industry organization;

"(C) of national and tribal or Tribal government; and

"(D) from existing global or national data sets that are currently maintained within Federal agencies.

"(2) DATA STANDARDS. The Secretary shall, to the extent possible, shall encourage all such data to adhere 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 section (a)

(A) in the matter preceding paragraph (1), by striking “i mpac ” and inserting “heir re pec i e impac ”;

(B) in paragraph (3), by striking “and i mpac ” and inserting “and heir re pec i e impac ”;

(C) in paragraph (4), by striking the period at the end and inserting “; and”; and

(D) by adding at the end the following paragraph:
“(5) adaptation and mitigation strategies to address socio-economic 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 title shall collect data described under section 12406(d) shall

“(1) collect data in accordance with the standard, protocol, or procedure established pursuant to section 12406(d); and

“(2) submit such data to the Director and the Secretary after publication, in accordance with any rule 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 “i mpac ” and inserting “heir re pec i e impac ”; and

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

“(d) REQUIREMENT. Researchers from the National Aeronautics and Space Administration under this title shall collect data described under section 12406(d) shall

“(1) collect such data in accordance with the standard, protocol, or procedure established pursuant to section 12406(d); and

“(2) submit such data to the Administrator and the Secretary, in accordance with any rule 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 “+ b i l e ” and all that follow through paragraph (4) and inserting the following: “+ b i l e

“(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 “+ b i l e ” and all that follow through paragraph (4) and inserting the following: “+ b i l e, \$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 member (or their designee), who may be organized into a committee, 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 official as the Director of the Office of Science and Technology Policy considers appropriate, including member of the National Science and Technology Council Committee on Technology.

(c) COORDINATION. The interagency working group shall seek to enhance the activities of different Federal agencies 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 Partnership Directorate in the key technology focus area, with a view to the Regional Innovation Engine under section 10388 and related under section 10390.

(2) The activities of the Department of Commerce under his direction, including regional technology hub under section 28 of the Small Business Technology 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. 278 (b)(1)), and the Holling Manufacturing Extension Partnership (15 U.S.C. 278k).

(3) The activities of the Department of Energy in the key technology focus area, including a national laboratory, and a Federal laboratory, as defined in section 4 of the Small Business Technology Innovation Act of 1980 (15 U.S.C. 3703), and facilities and other facilities operated in partnership with a national laboratory of the Department of Energy.

(4) Any other program of the Director of the Office of Science and Technology Policy determine in order research and development with respect to the key technology focus area.

(d) REPORT. The interagency working group shall

- (1) by no later than 180 days after the date of enactment of this Act

- (A) conduct an initial review of Federal program and research activities in the field of quantum computing technology for areas identified pursuant to section 10387(a)(2), in order to
- (i) determine the level of effort and characterize existing research infrastructure, as of the date of the review;
 - (ii) identify potential areas of overlap or duplication in the field of quantum computing technology; and
 - (iii) identify potential cross-agency collaboration and joint funding opportunities; and
- (B) submit a report regarding the review described in paragraph (A) to Congress; and
- (C) seek stakeholder input and recommendations in the course of the review; and
- (2) shall carry out the annual review and update required under section 10387(e).
- (e) CONFLICTS. If a conflict between Federal agencies arises 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 committee of Congress” has the meaning given that 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 proposed 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 of the following 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 committee of Congress a report detailing a plan for the advancement of quantum networking and communication 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* for ongoing

on a framework for interagency collaboration regarding the advancement of quantum networking and communications research.

“(B) A plan for Federal Government partnership in the private sector and interagency collaboration regarding engagement in international standard for quantum networking and communications technology, including a list of Federal priorities for standard relating to quantum networking and technology.

“(C) A proposal for the provision of national expertise relating to the advancement of quantum networking and communications technology.

“(D) An assessment of the relative position of the United States in the race to develop, demonstrate, and utilize quantum networking and communications technology.

“(E) Recommendation to Congress for legislation action relating to the matter considered under subparagraph (A), (B), (C), and (D).

“(F) Such other matter as the Quantum Networking Working Group consider necessary to advance the expertise of communications and network infrastructure, remain at the forefront of scientific discovery in the quantum information science domain, and transition of 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 paragraph (3) and (4) as paragraphs (6) and (7), respectively; and

(B) inserting after paragraph (2) the following new paragraph:

“(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 emerging technologies and applications;

“(5) for quantum technologies determined by the Director of the National Institute of Standards and Technology to be a readine level sufficient for standardization, shall provide technical review and assistance to other Federal agencies as the Director consider appropriate for the development of quantum networking infrastructure standard;”.

(2) AUTHORIZATION OF APPROPRIATIONS. There is authorized to be appropriated to the Scientific and Technical Research and Service account of the National Institute of Standards and Technology to carry out paragraph (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 year 2023 through 2027.

(d) QUANTUM INFORMATION SCIENCE WORKFORCE EVALUATION AND ACCELERATION.

(1) IN GENERAL. No 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 Science, 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

(i) describing, having conducted a quantum information science workforce study, working 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 government, academia, and industry sectors, including identifying the cross-disciplinary academic degree or academic core requirements

(i) prepare a plan for multiple career paths in quantum information science and related fields;

(ii) enter the United States in competition in the field of quantum information science, while preparing national efforts; and

(iii) support the development of quantum applications;

(C) assess the state of quantum information science education and skill training at all education levels and identify gaps in meeting current and future workforce needs, including

(i) elementary, middle, and high- school preparation of foundational core, 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, models, and curricula;

(iii) career pipeline and skill training opportunities, including professional certification and internship; and

(iv) higher education curricula, labor force experience in academia, the Federal Government, and industry sectors, 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. No later than 90 days 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 Information Science 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 program 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 in all education levels, including community college, and considered appropriate by the Director.

“(2) CURRICULUM INTEGRATION. The curriculum in integration under paragraph (1) may include the following:

“(A) Methodology to incorporate QISE for elementary, middle, and high school curricula.

“(B) Methodology for strengthening foundational mathematics and science curricula.

“(C) Methodology for integrating and identifying areas underrepresented or historically underrepresented groups in STEM.

“(D) Age-appropriate materials that apply the principles of quantum information science in STEM fields.

“(E) Recommendation 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 partnership and education (d) of section 10661 of the Research and Development, Competition, and Innovation Act and strategies to account for the skill and workforce needs identified through the study.

“(3) COORDINATION. In carrying out this subsection, the Director shall coordinate with relevant Federal agencies, and consortia, industry organizations, and other participants in the Established Program of Stimulated Competitive Research (EPSCoR).

“(4) DEFINITION. In this subsection, the term ‘STEM’ means the academic and professional disciplines 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, in building on the National Science Foundation’s role in the National Quantum Education Partnership and program through the Q2Work Program, shall make a study of the integration of higher education, nonprofit organizations, or consortia hereof to carry out a pilot program, to be known as the “Next Generation Quantum Leader 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 a study to coordinate with the educational research agencies (as that term “educational research agency” is defined in section 602(5) of the Individuals with Disabilities Education Improvement

Act of 2004 (20 U.S.C. 1401(5)), a local educational agency, and partnership through the Q12 Educational Partnership, elementary school, middle school, and secondary school, and State educational agency participating in the Program;

(ii) require the appropriate partnership, elementary school, middle school, or secondary school, or consortia hereof, and State educational agency, to carry out activities under the Program;

(B) USE OF FUNDS. In carrying out the Program, the Director shall make competitive, merit-reviewed awards

(i) to support the development, dissemination, and implementation of age-appropriate quantum information science curricula and research, including the integration of quantum information science and engineering into the STEM curriculum portfolio + section (d) of section 301 of the National Quantum Initiative Act (15 U.S.C. 8841), as added by + section (e);

(ii) to support opportunities for informal education on quantum concepts, including informal hands-on learning opportunities;

(iii) to support opportunities for students to further explore quantum information science education and related careers;

(i) 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

() carry out other activities as the Director determines appropriate.

(C) DISTRIBUTION. In carrying out the Program and to the extent practicable, the Director shall ensure that a wide, equitable distribution of Program participants across diverse geographic areas and that the Program include 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 Quantum Information Science of the National Science and Technology Council and the Advancing Informal STEM Learning Program.

(4) REPORTING. Not later than 180 days after the date of the enactment of this Act, 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 and implementing effective quantum education and training innovations.

(B) If determined to be effective, a plan for increasing the Program in ongoing program, including the feasibility and adaptability of expanding the scope of the Program to include additional technology areas, grade levels, and educational institutions beyond those originally elected to participate in the Program.

(5) AUTHORIZATION OF APPROPRIATIONS. There are authorized to be appropriated to the Director \$8,000,000 for each fiscal year 2023 through 2026 to carry out this section.

(6) TERMINATION. This subsection shall terminate on the date that is 1 year 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 cryptocurrency advisor special position within the Office to coordinate Federal activities and advise the President on matters of research and development relating to blockchain, cryptocurrency, 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 “public 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 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 non-tribal institution as defined in

ec ion 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. No 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, in addition 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 non-voting member described in clause (ii) and the appointed voting member described in clause (iii).

(ii) EX OFFICIO MEMBERS. The ex officio member 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 member of the Board shall

(aa) seek to enter into an agreement with the National Academies of Science, Engineering, and Medicine to develop a list of individuals to serve as members of the Board, who are well-qualified and well-meaning.

the requirements of clause (II) and (III); and

(bb) appoint the initial member of the Board from the list, if applicable, in consultation with the National Academies of Science, Engineering, and Medicine.

(II) REPRESENTATION. The appointed member of the Board shall reflect a broad cross-section of stakeholder from academia, National Laboratories, industry, nonprofit organization, State or local government, the international community, and the philanthropic community.

(III) EXPERIENCE. The Secretary shall ensure that a majority of the appointed member 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 operation; and

(bb) of the energy practicable, represent diverse region, sector, and community.

(C) CHAIR AND VICE CHAIR.

(i) IN GENERAL. The Board shall designate from among the member 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 expiration of the term of service of the member, as determined under paragraph (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 representative of the same area of subject matter expertise, or energy, as applicable, under paragraph (B)(iii)(II); and

(II) shall not be representative of an area of subject matter expertise, or energy, 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 no more than 5 years.

(II) INITIAL APPOINTED MEMBERS. Of the initial member of the Board appointed under paragraph (B)(iii)(I), half of the member shall

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er e for 5 ear , a de ermined b he Chair
of he Board.

(ii) VACANCIES. An acanc in he member hip
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(III) hall be filled b an indi id al elec ed
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(E) MEETINGS; QUORUM.

(i) INITIAL MEETING. No la er han 60 da af er
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(ii) QUORUM. A majori of he appoin ed mem-
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(F) DUTIES. The Board hall

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(G) BYLAWS.

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lq , raine e , and o her agen of he Fø nda ion
(incl ding e officio and appoin ed member of
he Board) o conflic of in ere andard ; and

(IV) he pecific d ie of he E e e i e
Direc or.

(ii) REQUIREMENTS. The Board shall ensure that the ability of the Foundation and the activities carried out under the authority 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 an governmental agency or program, or an officer or employee employed by, or in connection with, 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 authority of the Foundation, member of the Board may be reimbursed for reasonable 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 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 efficient and proper use of the United States' abundant energy and environmental challenge through environmental science and technology education; and

(B) to increase private and philanthropic contributions to support efforts to create, characterize, develop, evaluate, and deploy commercial energy technologies that address cross-national energy challenges, including those affecting minorities, rural, and other underserved communities, by methods that include

(i) fostering collaboration and partnerships with researchers from the Federal Government, State governments, in institutions of higher education, including historically Black colleges or universities, Tribal Colleges or Universities, and minority-serving institutions, federal funded research and development centers, industry, and nonprofit organizations for the research, development, or commercialization of environmental energy and advanced technologies;

(ii) strengthening and enhancing best practices relating to regional economic development through scientific and energy innovation, including in partnership with an Industrial Laborer-Advanced Foundation;

(iii) promoting new productive development that supports job creation;

(i) administering private competition

(I) to accelerate private economic competition and innovation; and

(II) to complement the efforts of private and other bodies of the Department;

() supporting program that advance technology, materials, especially where there may be gaps in Federal or private funding in advancing a technology

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(i) + ppor ing effor o broaden par icipa ion in energ echnolog de elopmen among indi id al from hi oricall + nderrepre en ed grø p or region ; and

(ii) facili a ing acce o Depar men facili ie , eq ipmen , and e per i e o a i in ackling na ional challenge .

(4) ACTIVITIES.

(A) STUDIES, COMPETITIONS, AND PROJECTS. The Fø nda ion ma cond c and + ppor + die , compe i ion , projec , and o her ac i i ie ha f r her he p rpo e of he Fø nda ion de cribed in paragraph (3).

(B) FELLOWSHIPS AND GRANTS.

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(ii) FORM OF AWARD. A fellow hip or gran + nder clæ e (i) ma con i of a ipend, heal h in+ rance benefi , f nd for ra el, and f nd for o her appropria e e pen e .

(iii) SELECTION. In elec ing a recipien for a fellow hip or gran + nder clæ e (i), he Fø nda ion

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(i) NATIONAL LABORATORIES. A Na ional Labora or ha applie for or accep an a ard+ nder clæ e (i) hall no be con idered o be engaging in a compe i ie proce .

(C) ACCESSING FACILITIES AND EXPERTISE. The Fø nda ion ma , ork , i h he Depar men

(i) o le erage he capabili ie and facili ie of Na ional Labora orie o commerciali e echnolog ; and

(ii) o a i i h re ø rce , inck ding b pro iding informa ion on he a e of each Na ional Labora or ha ma enable he deplo men and commerciali a ion of echnolog .

(D) TRAINING AND EDUCATION. The Fø nda ion ma + ppor program ha pro ide raining o re earcher , ci en i , o her rele an per onnel a Na ional Labora orie and in i+ ion of higher ed ca ion, and pre iø or ø r ren recipien of or applican for Depar men f nding o help re earch, de elop, demon ra e, deplo , and commerciali e federall f nded echnolog .

(E) MATURATION FUNDING. The Fø nda ion hall + ppor program ha pro ide ma+ ra ion f nding o re earcher o ad ance he echnolog of ho e re earcher for he p rpo e of mo ing prod c from a pro o pe age o a commercial age.

(F) STAKEHOLDER ENGAGEMENT. The Foundation shall convene, and maintain, in which, representatives from the Department, in addition of higher education, National Laboratories, the private sector, and commercialization organizations develop program for the purpose 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 paragraph, the term "covered foundation" means each of the following:

(I) An Individual Laboratory - Associated Foundation.

(II) A Federal Laboratory - Associated Foundation established pursuant to section (c)(1).

(ii) SUPPORT. The Foundation shall provide support and collaborate, in which covered foundation.

(iii) GUIDELINES AND TEMPLATES. For the purpose of providing support under clause (ii), the Secretary shall establish appropriate guidelines and templates for covered foundation, including:

(I) a standard adaptable organizational design for responsible management;

(II) standard and legal enablement and money-handling procedure; and

(III) a standard training curriculum oriented and expand the operating expertise of personnel employed by covered foundation.

(i) AFFILIATIONS. Nothing in this paragraph requires

(I) an existing Individual Laboratory - Associated Foundation to modify or renounce practice or affiliation, in which the Foundation; or

(II) a covered foundation to be bound by charter or corporate law a permanent affiliation, in which the Foundation.

(H) SUPPLEMENTAL PROGRAMS. The Foundation may carry out supplemental program

(i) conduct and support forums, meetings, conferences, courses, and training workshop conducted in which the purpose of the Foundation described in paragraph (3);

(ii) support and encourage the understanding and development of data has promote the realization of technology from the research stage, through the development and maturation stage, and ending in the marketplace;

(iii) for writing, editing, printing, publishing, and ending book and other material relating to research carried out under the Foundation and the Department; and

(i) conduct other activities to carry out and support the purpose of the Foundation described in paragraph (3).

(I) EVALUATIONS. The Foundation shall support the development of an evaluation methodology, to be used a

part of an program supported by the Foundation, shall

(i) consist of qualitative and quantitative metrics;

and

(ii) include periodic third party evaluation of the program and other activities of the Foundation.

(J) COMMUNICATIONS. The Foundation shall develop an expertise in communication to promote the work of grant and fellowship recipients under paragraph (B), the commercialization activities 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, endowments, and income and expend funds in support of the activities and program of the Foundation.

(L) AUTHORITY OF THE FOUNDATION. The Foundation shall be held entirely 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 exercise the pleasure of the Board. Subject to the compliance with the policies and procedures established pursuant to paragraph (2)(G), the Executive Director shall be responsible for the daily operation of the Foundation in carrying out 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 an 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 Commission on Energy and Natural Resources of the Senate and the Commission 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 hereafter (except for the amount provided each fiscal year under paragraph (11)(A)(iii));

(ii) a forecast of major cross-cutting energy challenge opportunities, including short- and long-term objectives, identified by the Board, which in part from communication representing the entities and areas of subject matter expertise, as applicable, described in paragraph (2)(B)(iii)(II);

(iii) a description of the effort that the Foundation will make to be representative in the process of the Foundation, including process relating to

(I) grant award, including election, request, and notification;

(II) communication of progress, and future research priorities; and

(III) policies and responsibilities of the
 on the opportunities identified under clause (ii);
 (i) a description of the financial goal and bench-
 mark of the Foundation for the following 10 year;
 () a description of the effort undertaken by the
 Foundation to engage historically underrepresented
 groups or regions, including through collaboration
 with historically Black colleges and universities, Tribal
 Colleges or Universities, minority-serving institutions,
 and minority-owned and women-owned business; and
 (i) a description of the effort undertaken by the
 Foundation to enter into maximum complementary and
 minimum redundant relationships with the
 Departments.

(E) ANNUAL REPORT. Not later than 1 year after the
 date on which the Foundation is established, and every
 year hereafter, the Foundation shall submit to the Com-
 mittee 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
 for the year covered by the report

- (i) describe the activities of the Foundation and
 the progress of the Foundation in furthering the pur-
 pose of the Foundation described in paragraph (3);
- (ii) provide a specific accounting of the progress
 and use of all funds made available to the Foundation
 to carry out its activities to enter into partnerships
 in the alignment of Departmental mission and policies
 with national interests;
- (iii) describe how the results of the activities of
 the Foundation could be incorporated into the pro-
 gram of the General Services Administration;
 and

(i) include a summary of each evaluation con-
 ducted during 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) an recommendation on how the Foundation
 may be improved.

(G) AUDITS. The Foundation shall
 (i) provide for annual audits of the financial condi-
 tion of the Foundation; and
 (ii) make the audits, and all other records, docu-
 ments, 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
 enter into an fund 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 operation of the Foundation, the Board shall develop and enforce procedures relating to standard of conduct, financial disclosure, amendments, conflicts of interest (including real and personal), and any other matter determined appropriate by the Board.

(ii) FINANCIAL CONFLICTS OF INTEREST. To mitigate conflicts of interest and risk from malign foreign influence, any individual who is an officer, employee, or member of the Board is prohibited from any participation in deliberation by the Foundation of a matter having a direct or predictable effect on 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 the individual; or

(III) a business organization or other entity in which the individual has an interest, including an organization or other entity in 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 developed by the Foundation or derived from the collaborative effort of the Foundation.

(K) LIABILITY.

(i) IN GENERAL. The United States shall not be liable for any debt, default, act, or omission of

(I) the Foundation;

(II) a Federal entity in which the representative of the Federal entity in the Foundation; or

(III) an Individual Laborer - Associated Foundation, in which the representative of the Federal entity in the Foundation.

(ii) FULL FAITH AND CREDIT. The full faith and credit of the United States shall not extend to any obligation of the Foundation.

(L) NONAPPLICABILITY OF FACA. The Federal Advisory Committee Act (5 U.S.C. App.) shall not apply to the Foundation or any Individual Laborer - Associated Foundation.

(6) DEPARTMENT COLLABORATION.

(A) NATIONAL LABORATORIES. The Secretary shall collaborate with the Foundation to develop a process of enhanced collaboration and coordination between the Department, the Foundation, and National Laboratories.

(i) streamlining contracting processes between National Laboratories and the Foundation, including

(I) streamlining the ability of the Foundation to transfer equipment and funds to National Laboratories;

(II) standardizing construction mechanical to be used by the Foundation in engaging, in National Laboratories; and

(III) reamlining the ability of the Foundation to fund endogenous positions in National Laboratories;

(ii) of all of a National Laboratory or office of a National Laboratory

(I) to accept and perform work for the Foundation, consistent with provided resources, notwithstanding another provision of law governing the administration, mission, or operation of the National Laboratory or office, as applicable; and

(II) to perform such work on a basis equal to other missions in the National Laboratory; and

(iii) to permit the director of a National Laboratory or office of a National Laboratory to enter into a cooperative research and development agreement or negotiate a licensing agreement, in the Foundation pursuant to section 12 of the Section-Welder Technology Innovation Act of 1980 (15 U.S.C. 3710a).

(B) DEPARTMENT LIAISONS. The Secretary shall appoint liaison from across the Department to collaborate and coordinate, in the Foundation, including no less than 1 liaison from the Office of Technology Transition, who shall ensure that the Foundation work 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 direct or carry out the procedures developed under subparagraph (A).

(7) NATIONAL SECURITY. Nothing in this subsection empowers the Foundation from an international 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 program of the Department.

(9) PREEMPTION OF AUTHORITY. This subsection shall not preempt an authority or responsibility of the Secretary under another 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 paragraph (A)(i) of this paragraph shall be used for construction.

(C) COST SHARE. Funds made available under paragraph (A)(ii) shall be required to be contributed 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 or 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 paragraph (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 activities, competition, projects, research, and other activities that further the purpose of the Laboratory Foundation;

(B) carrying out programs of foster collaboration and partnership among researchers from the Federal Government, State governments, institutions of higher education, federal 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 of leverage technologies or support new product development that support regional economic development;

(D) administering prize competition

(i) to accelerate private sector competition and innovation; and

(ii) that complement the efforts of prizes authorized by the Department;

(E) providing fellowship and grant research and development personnel, or affiliated, in the federal funded centers, in accordance with paragraph (3);

(F) carrying out program

(i) that allow scientists from foreign countries to exercise in research capacities in the United States or other countries in association with the National Energy Technology Laboratory;

(ii) that provide opportunities for employment of the National Energy Technology Laboratory or other research capacities in foreign countries;

(iii) to conduct activities, projects, or research in collaboration with national and international nonprofit

and for-profit organization, which may include the provision of stipend, rental, and other support for personnel;

(i) (I) to hold forum, meeting, conference, course, and training workshop may include undergraduate, graduate, post-graduate, and post-doctoral accredited course; and

(II) for the accreditation of home course by the Labor or Foundation of the State and National level for college degree or continuing education credit;

() to support and encourage each other and attendance of science at all level of education;

(i) to promote an understanding of science among the general public;

(ii) for writing, editing, printing, publishing, and ending of relevant book and other material; and

(iii) for the conduct of other activities to carry out and support the purpose of the Labor or Foundation; and

(G) receiving, administering, soliciting, accepting, and using funds, gifts, deities, or bequests, either absolutely or in trust of real or personal property or an income herefrom, or otherwise or equity herein for the benefit of, or in connection with, the mission of the applicable Federal labor or, in accordance with paragraph (4).

(3) FELLOWSHIPS AND GRANTS.

(A) SELECTION. Recipients of fellowship and grant described in paragraph (2)(E) shall be elected

(i) by a Labor or Foundation and the donor of a Labor or Foundation;

(ii) subject to the agreement of the head of the agency the mission of which is supported by a Labor or Foundation; and

(iii) in the case of a fellowship, based on the recommendation of the employee of the National Energy Technology Labor or, which the fellowship would serve.

(B) EXPENSES. Fellowship and grant described in paragraph (2)(E) may include stipend, rental, health insurance, benefits, and other appropriate expenses.

(4) GIFTS. An amount of funds, a gift, a deity, or a bequest described in paragraph (2)(G) may be accepted by a Labor or Foundation regardless of whether it is enumerated, recorded, or subject to a beneficial interest of a private person if an arrangement or arrangement of the funds, gifts, deities, or bequests is for the benefit of the research and development activities of the National Energy Technology Labor or.

(5) OWNERSHIP BY FEDERAL GOVERNMENT. A contribution, gift, or another transfer made to or for the use of a Labor or 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 debt, default, action, or omission of a Labor or Foundation.

(7) TRANSFER OF FUNDS. Nothing mandating another provision of law, a Labor or Foundation may transfer funds to the National Energy Technology Labor or and the National

Energy Technology Laborator may accept the transfer of funds.

(8) OTHER LAWS. This subsection shall not alter or supersede any other provision of law governing the activities, cooperation, or activities of nonprofit organizations by a Federal agency.

Subtitle J—Energizing Technology Transfer

SEC. 10701. DEFINITIONS.

In this title:

(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 or 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 Work 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 financial 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 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 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 an entity that is designed to accelerate the commercial application of clean energy technologies by providing

(A) physical, workspace, lab, and prototyping facilities to support clean energy start-up or established clean energy companies; or

(B) companies developing clean technologies, investment, research, and services, including

- (i) access to information and consulting;
- (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, which may be established by a National Laboratory, an institution of higher education or a State, territorial, local, or tribal government.

(b) PROGRAM ESTABLISHMENT. No 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 subsection (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 incubators and have operated at the local, State, and regional level;

(2) support the commercial application activities of startups, companies focused on physical hardware, computational, or integrated hardware and software technologies;

(3) are located in geographically diverse regions of the United States, including 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 training 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 no 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 an analysis of the performance of the clean energy incubators.

(i) AUTHORIZATION OF APPROPRIATIONS. There are authorized to be appropriated of the Secretary of Energy \$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 competition, under section 24 of the Section-Welder Technology Innovation Act of 1980 (15 U.S.C. 3719). In carrying out such prize competition, the Secretary shall compete to develop a best model for franchising 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 interagency training.

(d) PRIORITIZATION. In awarding grants under this section, the Secretary shall prioritize awarding grants to eligible entities that have demonstrated a minority-serving institution.

(e) COORDINATION. In carrying out this program, the Secretary shall coordinate and partner with other clean energy technology prize competition. In doing so, the Secretary may develop and disseminate best practices for administering prize competition under this section.

(f) REPORT. In accordance with section 9007 of division Z of the Consolidated Appropriation 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 Appropriation Act, 2021 (Public Law 116-260), the Secretary shall submit to the Commission on Science, Space, and Technology of the House of Representatives and the Commission on Energy and Natural Resources of the Senate an evaluation on the long-term outcome of the program established under this section and the progress toward achieving the purpose of the program in subsection (b).

(h) AUTHORIZATION OF APPROPRIATIONS. There are authorized to be appropriated of the Secretary of Energy 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 to 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 program ;

(2) coordinate research and improve cooperation among clean energy technology transfer program ;

(3) facilitate connection between entrepreneurs and start-up companies and the series of program 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 program 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 background .

(b) AUTHORIZATION OF APPROPRIATIONS. There are authorized to be appropriated of 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 Appropriation 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 of the Secretary \$2,000,000 for each of fiscal years 2023 through 2025 to carry out subsection (a), (b), and (c), and \$1,700,000 for each of fiscal years 2023 through 2025 for National Laboratory employee to provide services under subsection (d).”.

SEC. 10717. LAB-EMBEDDED ENTREPRENEURSHIP PROGRAM.

(a) IN GENERAL. The Secretary shall compete to award grants to National Laboratories for the purpose of establishing or supporting Lab-Embedded Entrepreneurship Program .

(b) PURPOSES. The purpose of such program are to provide entrepreneurial fellowships to help 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, in

(1) opportunity for entrepreneurial training, professional development, and exposure to leaders from academia, industry, government, and finance, who may serve as advisors or partners of the fellow ;

(2) financial and technical support for research, development, and commercial application activities ;

(3) fellowship award or cooperative of living, health insurance, and travel expenses for the duration of the fellowship; and

(4) any other resource determined appropriate by the Secretary.

(d) PROGRAM ACTIVITIES. Each National Laborator shall receive funding under this section shall support entrepreneurial fellowships providing

(1) access to facilities and expertise within the National Laborator;

(2) engagement with external stakeholder; and

(3) market and commercial development opportunities.

(e) ADMINISTRATION. National Laboratories shall receive grants under this section shall prioritize the support and success of the entrepreneurial fellowships in regard to professional development and development of a relevant technology.

(f) PARTNERSHIPS. In carrying out a Lab-Embedded Entrepreneurship Program, a National Laborator may partner with an external entity, including

(1) a nonprofit organization;

(2) an institution of higher education;

(3) a federally qualified corporation; or

(4) a consortium of 2 or more entities described in paragraph (1) through (3).

(g) METRICS. The Secretary shall support the development of short-term and long-term metrics to assess the effectiveness of program receiving a grant under subsection (a) in achieving the purpose of the program in subsection (a).

(h) EVALUATION. In accordance with section 9007 of division Z of the Consolidated Appropriation 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 program 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 purpose of subsection (a) of 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 within Federal laboratories, regarding opportunities to partner 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

facilities," and in referring "(as defined in section 2) and the Director of each single-purpose research facility";

(B) in paragraph (1)

(i) by striking "increase" and in referring "encourage";

and

(ii) by striking "collaborative research," and in referring "research, development, demonstration, and commercial application activities, including production development";

(C) in paragraph (2), by striking "procurement and collaborative research" and in referring "the activities described in paragraph (1)";

(D) in paragraph (3)

(i) by inserting "facilities," before "raining"; and

(ii) by striking "procurement and collaborative research activities" and in referring "the activities described in paragraph (1)"; and

(E) in paragraph (5), by striking "for the program under subsection (b)" and in referring "and merit for the program under subsection (b) and (c)";

(2) by redesignating subsection (c) and (d) as subsection (d) and (e), respectively;

(3) by inserting after subsection (b) the following:

"(c) SMALL BUSINESS VOUCHER PROGRAM.

"(1) DEFINITIONS. In this section:

"(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 Director, shall establish a program to provide small business concerns with other under paragraph (3)

"(A) to achieve the goal described in subsection (a)(1);

and

"(B) to improve the production, service, and capabilities of small business concerns in the mission space of the Department.

"(3) VOUCHERS. Under the program, the Director are authorized to provide to small business concerns other to be used at National Laboratories and single-purpose research facilities for

"(A) research, development, demonstration, technology transfer, training and workforce development, or commercial application activities; or

"(B) any other activities that the applicable Director determine appropriate.

“(4) EXPEDITED APPROVAL. The Secretary, working with the Director, shall establish a streamlined approval process for financial assistance agreements signed between

“(A) small business concerns elected to receive a grant under the program; and

“(B) the National Laboratoire 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 Appropriation Act, 2021 (Public Law 116-260), the Secretary shall report annually on the progress and implementation of the small business grant program established under this section, including the number and location of small business entities that received grants under this program.”; and

(4) in subsection (e) (a) 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 year 2023 through 2027”.

SEC. 10719. ENTREPRENEURIAL LEAVE PROGRAM.

(a) IN GENERAL. The Secretary shall delegate to the Director the authority to carry out an entrepreneurial leave program (referred to in this section as the “program”) of all National Laboratoire employees to take a full leave of absence from their position, with the option to return to their or a comparable position upon 3-year leave, or a partial leave of absence, to advance the commercial application of energy and related technologies related to the mission of the Department.

(b) TERMINATION AUTHORITY. Director shall retain the authority to terminate National Laboratoire employees who participate in the program if such employees are found to have misrepresented to the National Laboratoire a high-tech employee as employed.

(c) LICENSING. To reduce barriers to participation in the program, the Secretary shall delegate to the Director the requirement to establish streamlined mechanisms for facilitating the licensing of technologies to the benefit of National Laboratoire employees who participate in the program.

(d) REPORT. In accordance with section 9007 of division Z of the Consolidated Appropriation Act, 2021 (Public Law 116-260), the Secretary shall report annually on the utilization of this authority at the National Laboratoire, including the number of employees who participate in this program at each National Laboratoire and the number of employees who take a permanent leave from their position at the National Laboratoire as a result of participating in this program.

(e) FEDERAL ETHICS. Nothing in this section shall affect the applicability of 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 the Director of National Laboratoire the authority to allow their non-Federal employees

(1) to engage in a trade or business, including any partnership, company, or other organization, in the development of a National Labor Organization and controlling in their area of expertise, and receive compensation from such entity; and

(2) to engage in a trade or business related to their area of expertise at the National Labor Organization and maintain employment, in their employment capacity as such trade or business, to accept the National Labor Organization under the same contracting mechanism as a non-Labor Organization employee and entity, in accordance with appropriate conflict of interest protocol.

(b) REQUIREMENTS. If a Director elects to exercise authority granted by subsection (a) of this section, the Director, or their designee, shall

(1) require employee disclosure and obtain approval from the Director or their designee prior to engaging in any trade or business;

(2) develop and require appropriate conflict of interest protocol for employee who engage in trade or business;

(3) maintain the authority to terminate employee engaging in trade or business if they are found to violate terms, including conflict of interest protocol, mandated by the Director; and

(4) ensure that any such program or activities are in conformance with the Department's research and policy, including DOE Order 486.1.

(c) ADDITIONAL RESTRICTIONS. Employee engaging in trade or business may not

(1) allow such activities to interfere with or impede their duties at the National Labor Organization;

(2) engage in activities related to trade or business with National Labor Organization government employees, proper, or research, and such activities are performed under National Labor Organization contracting mechanism, such as Cooperative Research and Development Agreements or Strategic Partnership Projects, hereby all conflict of interest requirements apply; or

(3) use their position at a National Labor Organization to provide an unfair competitive advantage to any trade or business partner.

(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 to carry out the authority 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

he ac i i e a h o r i e d i n h i e c i o n \$20,000,000 for each of fi c a l e a r 2023 h r o g h 2027.”.

SEC. 10723. MANAGEMENT OF DEPARTMENT OF ENERGY DEMONSTRATION PROJECTS.

Sec i o n 41201 of t h e I n f r a s t r u c t u r e I n v e s t m e n t a n d J o b A c t (42 U.S.C. 18861) i s a m e n d e d

(1) i n s e c t i o n (b), b y i n s e r t i n g “i n c l u d i n g t h e O f f i c e of Technology Transfer, the Loan Program Office, and all applied program office,” a f t e r “D e p a r t m e n t,”;

(2) i n s e c t i o n (d), b y i n s e r t i n g “, i n c l u d i n g b u t n o t l i m i t e d t o t h e a c t i v i t i e s i n s e c t i o n 10726 of t h e R e s e a r c h a n d D e v e l o p m e n t , C o m p e t i t i o n , a n d I n n o v a t i o n A c t ,” a f t e r “p e r s o n n e l”;

(3) b y r e d e s i g n a i n g s e c t i o n (e), (f), a n d (g) a s s e c t i o n (g), (h), a n d (i), r e s p e c t i v e l y ;

(4) b y a d d i n g a f t e r s e c t i o n (d) t h e f o l l o w i n g :

“(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 on other existing covered projects carried out by the program office.”; and

(5) i n s e c t i o n (h)(1) (a s r e d e s i g n e d), b y r i p e n t i n g “The Secretary” and i n s e r t i n g “I n a c c o r d a n c e w i t h s e c t i o n 9007 of d i r e c t o r y o f t h e C o n g r e s s i o n a l A p p r o p r i a t i o n A c t , 2021 (P u b l i c L a w 116 260), t h e S e c r e t a r y”.

SEC. 10724. STREAMLINING PRIZE COMPETITIONS.

(a) REPORTING. Sec i o n 1008 of t h e E n e r g y P o l i c y A c t of 2005 (42 U.S.C. 16396) i s a m e n d e d b y a d d i n g a t t h e e n d t h e f o l l o w i n g :

“(h) REPORT. In accordance with section 9007 of d i r e c t o r y o f t h e C o n g r e s s i o n a l A p p r o p r i a t i o n A c t , 2021 (P u b l i c L a w 116 260), t h e S e c r e t a r y s h a l l r e p o r t a n n u a l l y o n a d e s c r i p t i o n of a n n u a l p r i z e c o m p e t i t i o n c a r r i e d o u t u n d e r t h e a c t i v i t i e s i n s e c t i o n 10726 of t h e R e s e a r c h a n d D e v e l o p m e n t , C o m p e t i t i o n , a n d I n n o v a t i o n A c t , i n c l u d i n g t h e o v e r a l l a m o u n t of p r i z e a w a r d e d a l o n g w i t h a n n u a l p r i z e e c o n t r i b u t i o n , t h e m e t h o d u s e d f o r s e l e c t i o n a n d e v a l u a t i o n , a n d a d e s c r i p t i o n of h o w e a c h p r i z e c o m p e t i t i o n a d a n c e d t h e m i s s i o n of t h e D e p a r t m e n t .”.

(b) TECHNICAL AMENDMENT. Sec i o n 1008 of t h e E n e r g y P o l i c y A c t of 2005 (42 U.S.C. 16396) i s a m e n d e d b y r e d e s i g n a i n g t h e s e c o n d s e c t i o n (e) (r e l a t i n g t o a c t i v i t i e s i n o f a p p r o p r i a t i o n) a s s e c t i o n (f).

SEC. 10725. COST-SHARE WAIVER EXTENSION.

(a) IN GENERAL. Sec i o n 988 of t h e E n e r g y P o l i c y A c t of 2005 (42 U.S.C. 16352) i s a m e n d e d i n s e c t i o n (b)(4)(B) b y r i p e n t i n g “t h i s p a r a g r a p h” a n d i n s e r t i n g “t h e R e s e a r c h a n d D e v e l o p m e n t , C o m p e t i t i o n , a n d I n n o v a t i o n A c t”.

(b) REPORT. Sec i o n 108(b) of t h e D e p a r t m e n t of Energy Research and Innovation Act i s a m e n d e d i n s e c t i o n (b) b y r i p e n t i n g “t h i s A c t” e a c h p l a c e i t a p p e a r s a n d i n s e r t i n g “t h e R e s e a r c h a n d D e v e l o p m e n t , C o m p e t i t i o n , a n d I n n o v a t i o n A c t”.

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 no more than 60 scientific, engineering, and professional personnel, in the regard of civil service law, of each of the Departments in meeting specific project or research need;

(2) fix the basic pay of an employee appointed under his election at a rate to be determined by the Under Secretary at a rate no in excess of Level II of the Executive Schedule (EX II) under section 5311 of title 5, United States Code, in the regard of the civil service law; and

(3) pay an employee appointed under his election payments in addition to basic pay, except that the total amount of additional payments paid to an employee under his election for an 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 the employee.

(C) The amount of the limitation shall be applicable for a calendar year under section 5307(a)(1) of title 5, United States Code.

(b) TERM.

(1) IN GENERAL. The term of an employee appointed under his election shall not exceed 3 years unless otherwise authorized in law.

(2) TERMINATION. The Under Secretary for Science shall have the authority to terminate an employee appointed under his election at any time based on performance or changing project or research need of the Department.

SEC. 10727. TECHNOLOGY TRANSFER REPORTS AND EVALUATION.

Section 9007 of division Z of the Consolidated Appropriation Act, 2021 (Public Law 116-260) is amended as follows:

“(a) ANNUAL REPORT. A part of the updated technology transfer election 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 his election 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 section 10714, 10718, 10719, 10720, and 10723 of the Research and Development, Competition, and Innovation Act.

“(b) EVALUATION. No 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 + cce ba ed on rele an hor - erm and long-erm me ric .”.

Subtitle K—Micro Act

SEC. 10731. MICROELECTRONICS RESEARCH FOR ENERGY INNOVATION.

(a) DEFINITIONS. In hi ec ion:

(1) CENTER. The erm “Cen er” mean a Microelec ronic Science Re earch Cen er e abli hed p r + an o + b ec ion (d).

(2) DEPARTMENT. The erm “Depar men ” mean he Depar men of Energ .

(3) DIRECTOR. The erm “Direc or” mean he Direc or of he Office of Science.

(4) HISTORICALLY BLACK COLLEGE OR UNIVERSITY. The erm “hi oricall Black college or + ni er i ” ha he meaning gi en he erm “par B in i + ion” in ec ion 322 of he Higher Ed ca ion Ac of 1965 (20 U.S.C. 1061).

(5) INSTITUTION OF HIGHER EDUCATION. The erm “in i + ion of higher ed ca ion” ha he meaning gi en he erm in ec ion 101(a) of he Higher Ed ca ion Ac of 1965 (20 U.S.C. 1001(a)).

(6) MICROELECTRONICS. The erm “microelec ronic ” mean

(A) a emicond c or and rela ed ma erial ;

(B) proce ing chemi rie ;

(C) de ign echnologie ;

(D) fabrica ion echnologie ;

(E) li hograph echnologie ;

(F) packaging echnologie ;

(G) a en or;

(H) a de ice;

(I) an in egra ed circ i ;

(J) a proce or;

(K) comp ing archi ec + re;

(L) modeling and im + la ion;

(M) a of , are ool; and

(N) an o her rela ed echnolog .

(7) MINORITY-SERVING INSTITUTION. The erm “minori - er ing in i + ion” mean

(A) a Hi panic- er ing in i + ion (a defined in ec ion 502(a) of he Higher Ed ca ion Ac of 1965 (20 U.S.C. 1101a(a)));

(B) an Ala ka Na i e- er ing in i + ion (a defined in ec ion 317(b) of he Higher Ed ca ion Ac of 1965 (20 U.S.C. 1059d(b)));

(C) a Na i e Ha aian- er ing in i + ion (a defined in ha ec ion);

(D) a Predominan l Black In i + ion (a defined in ec ion 371(c) of he Higher Ed ca ion Ac of 1965 (20 U.S.C. 1067q(c)));

(E) an A ian American and Na i e American Pacific I lander- er ing in i + ion (a defined in ha ec ion); and

(F) a Native American-ering non-tribal institution (as defined in this 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 this section (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 Innovation in Manufacturing, Training, and Apprenticeship 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 a major technological challenge and opportunity for the United States and has important implications for national security, economic competitiveness, and scientific discovery;

(2) further progress and innovation in microelectronics, and the maintenance of a robust domestic microelectronics supply chain, will require an approach that advances relevant materials science, electronics and photonics technologies, processing and packaging technologies, manufacturing technologies, circuitry, chip, and semiconductor, and software and algorithm development in a coordinated fashion;

(3) the National Laboratories provide unique technical expertise and resources that are essential to

(A) overcoming fundamental research challenges relevant to the topic described in paragraph (2); and

(B) advancing and transferring research outcomes to industry; and

(4) the expertise and resources 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 mission of the Department and the competitiveness of the domestic microelectronics industry, including high-performance computing, emerging data-centric computing approaches and energy-efficient computing, optical sensors, storage, and wireless networks, and power electronics and electronic delivery systems.

(c) MICROELECTRONICS RESEARCH PROGRAM.

(1) IN GENERAL. The Secretary shall carry out a cross-cutting program of research, development, and demonstration of microelectronics relevant to the mission of the Department to enable advances and breakthroughs that will

(A) accelerate and further research and development for design, development, and manufacturing of next-generation microelectronic; and

(B) enter the global competition of the United States in the field of microelectronic.

(2) RESEARCH PROJECTS.

(A) IN GENERAL. In carrying out the program, the Secretary shall provide financial assistance to eligible entities described in paragraph (B) to carry out research projects in

(i) foundational science area, including

(I) material science, chemical science, and plasma science in the field of fabrication;

(II) novel microelectronic device, including emerging memory and storage technologies;

(III) discrete computing architecture and paradigm, including analog computing and edge computing;

(IV) data-driven modeling and simulation;

(V) integrated design, packaging, and communication;

(VI) component integration and assembly;

(VII) photonic integration and packaging; and

(VIII) development of design framework for all stages of microelectronic design, development, fabrication, and application;

(ii) cyber-enabled design-oriented in-network and resilient microelectronic;

(iii) methods for leveraging advanced simulation and artificial intelligence to enhance code design and discovery in microelectronic;

(i) in collaboration with the National Institute of Standards and Technology, fabrication and processing science and technology, advanced microelectronic manufacturing, including lithography, patterning, surface deposition, etching, and cleaning;

(ii) approaches for optimizing energy efficiency of advanced computing systems, the electrical grid, power electronics, and other energy infrastructure;

(i) approaches for enhancing the durability and lifetime of radiation-hardened electronics;

(ii) enhancement of microelectronic security, including the development of integrated devices, packaging, and thermal management for extreme environments and national security;

(iii) in coordination with other relevant agencies of the Department, methods to improve the lifetime, maintenance, recycling, reuse, and sustainability of microelectronic components and systems, including technologies and strategies to reduce the energy, water, critical material, and other commodity usage of the Secretary determine are vulnerable to disruption; and

(iv) methods and techniques for domestic processing of materials for microelectronic and components of microelectronic.

(B) ELIGIBLE ENTITIES. An eligible entity referred to in paragraph (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 clause (i) through (v); and
- (vii) any other entity that the Secretary determines appropriate.

(C) NOTIFICATION. No later than 30 days after the Secretary provides financial assistance to an eligible entity under paragraph (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) compare with the purpose 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 Transition and in consultation with the private sector, shall

(A) support fundamental research and transfer of microelectronic 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 providing a hori- and mechanical available to the Department, including internships, fellowships, and other activities that the Secretary determines appropriate; and

(B) in consultation with the National Science Foundation, appropriate education and outreach activities

(i) to disseminate information and promote understanding of microelectronic and related fields among students at elementary school, secondary school, high school, undergraduate, and graduate levels; and

(ii) to have 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 underrepresented 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 program and offices of the Department; and

(B) coordinate the research carried out under the program relating to microelectronic technology carried out by other Federal agencies and program relating to microelectronic research, development, manufacturing, and supply chain efforts, including the program authorized under section (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 goal, priorities, and anticipated outcomes of the program.

(8) FUNDING. There are authorized to be appropriated to the Secretary to carry out this section

(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 appropriation, the Director shall establish no more than 4 Microelectronic 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 microelectronic; and

(B) to facilitate the translation of research results into 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 paragraph (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 microelectronic science and technology, including materials, devices, circuits, systems, architectures, fabrication tools, processes, diagnostic, modeling, simulation, and, in collaboration with the National Institute of Standards and Technology, metrology;

(B) advancing the + ainabili and energ efficienc of ne microelec ronic de ice , package , and em ;

(C) applica ion-dri en code ign and pro o ping of no el de ice o facili a e labora or - o-fabrica ion ran i- ion;

(D) ad ancng knq ledge and ex perimen al capabili ie in + rface and ma erial cience, pla ma cience, and comp + a ional and heore ical me hod , incl ding ar ificial in elligence, m l i cale code ign, and ad anc ed + percomp + ing capabili ie o in en and man fac + re re ol ionar microelec ronic de ice ;

(E) crea ing echnolog e bed for pro o ping pla - form for alida ion and erifica ion of ne capabili ie and haring of idea , in ellec + al proper , and he + niq e facili ie of he Depar men ;

(F) + ppor ing de elopmen of c ber e r i capabili- ie for comp + ing archi ec + re ha mea + rabl impro e afe and e r i and are adap able for ex i ing and f + re applica ion ; and

(G) + ppor ing long- erm and hor - erm , orkforce de elopmen in microelec ronic .

(4) REQUEST FOR PROPOSALS; MERIT REVIEW.

(A) IN GENERAL. The Direc or hall, a + ch ime, in + ch manner, and con aining + ch informa ion a he Direc or de ermine o be appropria e, i + e a req e for propo al from eligible en i ie de cribed in paragraph (2) eeking o be de igna ed a a Cen er.

(B) COMPETITIVE MERIT REVIEW. The Direc or hall elec eligible en i ie + nder + bparagraph (A) hrø gh a compe i i e, meri -ba ed proce .

(5) OPERATION.

(A) DURATION.

(i) IN GENERAL. Each Cen er hall opera e for a period of no more han 5 ear , + nle rene ed for an addi ional 5- ear period in accordance , i h clæ e (ii).

(ii) RENEWAL.

(I) INITIAL RENEWAL. In he ca e of a Cen er ha ha opera ed for no more han 5 ear , he Direc or ma rene + ppor for he Cen er on a meri -re ie ed ba i for a period of no more han 5 ear .

(II) 10-YEAR OPERATION. In he ca e of a Cen er ha ha opera ed for no le han 5 ear b no more han 10 ear , he Direc or ma rene + ppor for he Cen er on a compe i i e, meri -re ie ed ba i for a period of no more han 5 ear .

(III) 15-YEAR OPERATION. In he ca e of a Cen er ha ha opera ed for no le han 10 ear b no more han 15 ear , he Direc or ma rene + ppor for he Cen er on a meri -re ie ed ba i for a period of no more han 5 ear .

(B) TERMINATION. Con i en , i h he ex i ing a hori ie of he Depar men , he Direc or ma ermina e an + nderperforming Cen er d ring he performance period.

(6) TECHNOLOGY TRANSFER. The Director, in coordination with the Director of the Office of Technology Transition, shall seek to enter into partnership with industry groups to facilitate the translation and transfer of research results produced by the Center.

(7) COORDINATION. The Secretary shall

(A) establish a coordinating network to coordinate cross-cutting research and foster communication and collaboration among the Center; and

(B) enter into coordination, and a memorandum of understanding, of the activities of each Center, with the activities of

(i) other research entities of the Department, including

(I) the Nano Scale Science Research Center;

(II) the National Quantum Information Science Research Center;

(III) the Energy Frontier Research Center;

(IV) the Energy Innovation Hub;

(V) the National Laboratoire; 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 Authorization 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, a full-scale elementary school, secondary school, and high school student, through opportunities such as dual-enrollment program and work-based learning program, as applicable;

(B) hand-on research and equipment training program;

(C) technical training and certification program for the skilled technical workforce;

(D) facilitation of engagement among academic, industry, and laborator researchers; and

(E) public outreach activities, including elementary school, secondary school, high school, undergraduate, and graduate level, which may include educational programming with an emphasis on experiential and project-based learning.

(9) OUTREACH. The Director shall support the workforce development of Center under paragraph (8) by conducting outreach to recruit applicants and engage participants from all regions of the United States, especially individuals from underrepresented communities and groups historically underrepresented in science, technology, engineering, and mathematics.

(10) INTELLECTUAL PROPERTY. The Secretary shall enter into the intellectual property and other provisions created by the Center 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) established a Center under paragraph (1);
- (ii) renewed a proposal for a Center under paragraph (5)(A)(ii); or
- (iii) determined 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) compare with the purpose of the program described in paragraph (1).

(12) FUNDING. Subject to the availability of appropriation, the Secretary shall not exceed more than \$25,000,000 of funds each Center for each of fiscal years 2023 through 2027.

Subtitle L—National Nuclear University Research Infrastructure Reinvestment

SEC. 10741. SHORT TITLE.

This title may be cited as the “National Nuclear University Research Infrastructure Reinvestment Act of 2021”.

SEC. 10742. PURPOSES.

The purposes of this title are

- (1) to upgrade the nuclear research capabilities of nuclear science in the United States to meet the research requirements of advanced nuclear energy systems;
- (2) to enhance the continued operation of nuclear research reactors;
- (3) to coordinate a reliable resource to enable the establishment, including the rapid and efficient completion of construction, of new nuclear science and engineering facilities; and
- (4) to provide
 - (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 and 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 collaboration, partnership, and knowledge sharing between institutions of higher education, National Laboratories, other Federal agencies, industry, and academia; and”.

(2) by amending paragraph (4) to read as follows:

“(4) STRENGTHENING UNIVERSITY RESEARCH AND TRAINING REACTORS AND ASSOCIATED INFRASTRUCTURE.

“(A) IN GENERAL. In carrying out the program under this section, the Secretary may—

“(i) converting research reactors from high-enrichment fuel to low-enrichment fuel and upgrading operations in a timely manner;

“(ii) facilitating and upgrading existing nuclear science and engineering infrastructure; and

“(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 inspection, manufacturing, and nuclear material support;

“(i) to develop a training program, in collaboration with the United States Nuclear Industry, in relicensing and upgrading reactors, including through the provision of technical assistance; and

“(ii) reactor improvement has emphasis on research, training, and education, including through the Innovation in Nuclear Infrastructure and Education Program or an similar program.

“(B) Of an amount appropriated to carry out the program under this section, there is authorized to be appropriated to the Secretary to carry out clause (ii) and (iii) of paragraph (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 paragraph (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 program to be known as the Advanced Nuclear Research Infrastructure Enhancement Subprogram in order to—

“(i) demonstrate advanced nuclear reactor and nuclear microreactor concepts;

“(ii) establish medical isotope production reactors for other specialized applications; and

“(iii) advance other research infrastructure, in the determination of the Secretary, in consultation with the mission of the Department.

“(B) NEW NUCLEAR SCIENCE AND ENGINEERING FACILITIES. In carrying out the program, the Secretary shall establish

“(i) no 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 paragraph (B) shall be established in a manner that

“(i) support the regional or bregional concentration described in paragraph (4)(C); and

“(ii) encourage 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 paragraph (B) shall not be high-enriched uranium, as defined in section 2001 of division Z of the Consolidated Appropriation Act of 2021.

“(E) AUTHORIZATION OF APPROPRIATIONS. Of an amount appropriated to carry out the program under this section, there are authorized to be appropriated to the Secretary to carry out the program 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 section:

“(A) JUNIOR FACULTY. The term ‘junior faculty’ means a faculty member, who has earned 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 higher education, including additional locations, at which the highest awarded degree, or the predominant awarded degree, is an associate degree; or

“(ii) an Tribal college or university (as defined in section 316 of the Higher Education Act of 1965 (20 U.S.C. 1059e)).

“(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 ‘public 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 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 the 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 provide a diverse workforce for the complex landscape associated with effective and equitable development of advanced nuclear energy technologies, including interdisciplinary research to enable positive impact and avoid potential negative impacts across the lifespan of nuclear energy technologies.

(b) NONTECHNICAL NUCLEAR RESEARCH. Section 313 of the Omnibus Appropriation 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 non-technical nuclear research.”;

(2) in subsection (c), by inserting after paragraph (2) the following:

“(3) NONTECHNICAL NUCLEAR RESEARCH. The term ‘non-technical nuclear research’ means research, which specializes in technical social science or law, that can provide an increase in community engagement, participation, and confidence in nuclear energy systems, including the negotiation of the licensing required for advanced reactor deployment, aligned with the objective 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 non-aer greenhouse emission reduction in the production process for iron, steel, and steel mill production.

“(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 production.

“(2) CRITICAL MATERIAL. The term ‘critical material’ has the meaning given to that term in section 7002 of division Z of the Consolidated Appropriation Act, 2021 (Public Law 116-260).

“(3) CRITICAL MINERAL. The term ‘critical mineral’ has the meaning given to that term in section 7002 of division Z of the Consolidated Appropriation 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) an other relevant entity the Secretary determines appropriate; and

“(F) a partnership or consortium of two or more entities described in subparagraph (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-emission steel manufacturing’ means advanced or commercially available steelmaking, in which the reduction of the maximum energy practicable, of non-aer greenhouse gas emissions is the aim from the production of iron, steel, and steel mill production.

“(c) IN GENERAL. No later than 180 days after the date of enactment of the Research and Development, Competition, and Innovation Act, the Secretary shall establish a program of research, development, demonstration, and commercial application of advanced tools, technologies, and methods for low-emission steel manufacturing.

“(d) REQUIREMENTS. In carrying out the program under subsection (c), the Secretary shall

“(1) coordinate this program, in this program and activities authorized in title VI of division Z of the Consolidated Appropriation 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, of the extent practicable, the research infrastructure of the Department, including scientific computing, superfacilities, high-rate research, nanotechnology research facilities, and nanotechnology research centers; and

“(4) conduct research, development, and demonstration of low-emission manufacturing technologies that have the potential to increase domestic production and employment in advanced and commercial available manufacturing.

“(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 his 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-emission 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 a timeline for the accomplishment of goals developed under the plan.

“(3) UPDATES TO PLAN. Not later than once every 2 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-emission 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 high-efficiency electric boilers; and

“(E) other heat generation sources;

“(2) carbon capture technology for advanced and commercial available manufacturing processes, which may include

“(A) combustion and chemical looping technology;

“(B) use of lagoores carbon dioxide emission;

“(C) pre-combustion technology; and

“(D) post-combustion technology;

“(3) manufacturing technology and principles, digital manufacturing technology, and advanced data analytics to develop advanced technology and practice in information,

ation, monitoring, comparison, testing, modeling, and
 neorking o

“(A) model and imple manufacturing production
 line ;

“(B) monitor and communication production line ;
 and

“(C) model, imple, and optimize the energy efficiency
 of manufacturing process ;

“(4) technology and practice have minimize energy and
 natural resource consumption, which include de-

“(A) designing production have enable reuse, refurbish-
 ment, remanufacturing, and recycling;

“(B) minimizing waste from advanced and commer-
 cially available manufacturing process, including through
 reuse of waste in other industrial process
 for mutual benefit ;

“(C) increasing resource efficiency ; and

“(D) increasing the energy efficiency of advanced and
 commercially available manufacturing process ;

“(5) alternative material and technology have produc-
 tion efficiency and reduction in ferrous metal
 production, which include

“(A) innovative material ;

“(B) high-performance lightweight material ;

“(C) substitution for critical material and critical
 mineral ; and

“(D) other technology have achieve significant carbon
 emission reduction in low-emission manufacturing,
 as determined by the Secretary ; and

“(6) high-performance computing of developed ma-
 terial and manufacturing process contributing to the
 area described in paragraph (1) through (5), including

“(A) modeling, imple, and optimization of the
 design of energy efficient and sustainable produc-
 tion ; and

“(B) use of digital prototyping and additive man-
 ufacturing to enhance production design.

“(g) TESTING AND VALIDATION. The Secretary, in con-
 sultation with the Director of the National Institute of
 Standards and Technology, shall support the develop-
 ment of standardized testing and technical validation
 of advanced and commercially available manufacturing
 and low-emission manufacturing through
 collaboration with one or more National Labora-
 tories, 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, Compe-
 tition, and Innovation Act, the Secretary, in carrying out
 the program established in subsection (c), and in collabora-
 tion with industry partners, in addition to higher education,
 and the National Laboratories, shall support an initiative
 for the demonstration of low-emission manufacturing,
 as identified by the Secretary, have established

“(A) a single technology ; or

“(B) a combination of multiple technologies .

“(2) SELECTION REQUIREMENTS. Under the initiative estab-
 lished under paragraph (1), the Secretary shall elect eligible

en i ie o carr o demon ra ion projec and o he ma-
im m e en prac icable

“(A) encorage regional di er i among eligible en i-
ie , incl ding par icipa ion b r ral S a e ;

“(B) encorage echnological di er i among eligible
en i ie ; and

“(C) en+re ha pecific projec elec ed

“(i) e pand on he e i ing echnolog demon ra-
ion program of he Depar men ; and

“(ii) priori i e projec ha le erage ma ching
f nd from non-Federal o rce .

“(3) REPORTS. The Secre ar hall +bmi o he Com-
mi ee on Science, Space, and Technolog of he Ho e of Rep-
re en a i e and he Commi ee on Energ and Na+ral
Re o rce of he Sena e

“(A) no le freq en l han once e er o ear
for he d ra ion of he demon ra ion ini ia i e+nder hi
+ b ec ion, a repor de cribing he performance of he ini-
ia i e; and

“(B) if he ini ia i e e abli hed+nder hi + b ec ion
i ermina ed, an a e men of he +cce of, and ed-
ca ion pro ided b , he mea+re carried o b recipien
of financial a i ance+nder he ini ia i e.

“(i) ADDITIONAL COORDINATION.

“(1) MANUFACTURING U.S.A. In carr ing o hi ec ion
he Secre ar hall con ider

“(A) le eraging he re o rce of rele an e i ing
Man+fac+ring USA In i+ e de cribed in ec ion 34(d)
of he Na ional In i+ e of S andard and Technolog Ac
(15 U.S.C. 278 (d));

“(B) in egra ing program ac i i ie in o a rele an
e i ing Man+fac+ring USA In i+ e; or

“(C) e abli hing a ne in i+ e fo ed on lq -emi-
ion eel man+fac+ring.

“(2) OTHER FEDERAL AGENCIES. In carr ing o hi ec-
ion, he Secre ar hall coordina e, i h o her Federal agencie
ha are carr ing o re earch and de elopmen ini ia i e o
inrea e ind rial compe i i ene and achie e ignifican ne
non a er greenho e emi ion red c ion hr o gh lq -emi-
ion eel man+fac+ring, incl ding he Depar men of
Defen e, Depar men of Tran por a ion, and he Na ional
In i+ e of S andard and Technolog .”.

(b) CLERICAL AMENDMENT. Sec ion 1(b) of he Energ
Independence and Sec ri Ac of 2007 (42 U.S.C. 17001 no e)
i amended in he able of con en b in er ing af er he i em
rela ing o ec ion 454 he follq ing:

“Sec. 454A. Lq -Emi ion S eel Man+fac+ring Re earch Program.”.

Subtitle N—Applied Laboratories Infra- structure Restoration and Modernization

SEC. 10761. APPLIED LABORATORIES INFRASTRUCTURE RESTORATION AND MODERNIZATION.

(a) DEFINITION OF NATIONAL LABORATORY. In hi ec ion, he
erm “Na ional Labora or ” mean

- (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 Laboratory ;
- (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) a priori deferred maintenance projects at National Laboratories, including facilities and equipment for, upgrade of, and construction of research laboratories, administration and support building, utilities, road, power plant, and any other critical infrastructure; and

(B) laboratory modernization projects at National Laboratories, including projects relating to core infrastructure needed

(i) to support existing and emerging science mission, high performance and specialized requirements for world-leading scientific facilities and computing capabilities; and

(ii) to maintain safe, efficient, reliable, and environmentally responsible operations, including pilot projects to demonstrate net-zero emissions, high reliability 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 investments ;
- (B) minor construction projects ;
- (C) energy saving performance contracts ;
- (D) utility energy service contracts ;
- (E) alternative financing; and
- (F) open spending.

(c) SUBMISSION TO CONGRESS. For each fiscal year through fiscal year 2027, as 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 paragraph (1) through (4) of subsection (a); and

(2) \$160,000,000 is authorized to be appropriated for projects a National Laboratorie described in paragraph (5) through (7) of this section.

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 of 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 year 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, including activities carried out pursuant to paragraph (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 material research, development, and demonstration activities, including relating to packaging, recycling, and bio-based material; 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 of the Secretary, acting through the Office of Electricity, for the period of fiscal year 2023 through 2026, \$1,000,000,000 to carry out electric grid modernization and electricity 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 of the Secretary, acting through the Office of Cybersecurity, Energy Security, and Emergency Response, for the period of fiscal year 2023 through 2026, \$800,000,000 to carry out cybersecurity and energy physical security research, development, and demonstration activities.

(4) OFFICE OF NUCLEAR ENERGY. In addition to amounts hereby authorized to be appropriated or made available, hereinafter authorized to be appropriated to the Secretary, acting through the Office of Nuclear Energy, for the period of fiscal year 2023 through 2026, \$400,000,000 to carry out advanced material research, development, and demonstration activities.

(5) OFFICE OF ENVIRONMENTAL MANAGEMENT. In addition to amounts hereby authorized to be appropriated or made available, hereinafter authorized to be appropriated to the Secretary, acting through the Office of Environmental Management, for the period of fiscal year 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 hereby authorized to be appropriated or made available, hereinafter authorized to be appropriated to the Secretary, acting through the Office of Fossil Energy and Carbon Management, for the period of fiscal year 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 fuel 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 hereby authorized to be appropriated or made available, hereinafter 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 year 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+ ni of local go ernmen ;

(E) an elec ric+ ili (a defined in ec ion 3 of he Federal Po er Ac (16 U.S.C. 796));

(F) a Na ional Labora or (a defined in ec ion 2 of he Energ Polic Ac of 2005 (42 U.S.C. 15801));

(G) an in i+ ion of higher ed+ ca ion (a defined in ec ion 101(a) of he Higher Ed+ ca ion Ac of 1965 (20 U.S.C. 1001(a))); and

(H) a pri a e en i peciali ing in

(i) ad+nced n+ clear echnolog de elopmen ;

(ii) n+ clear + ppl chain ; or

(iii) i h re pec o n+ clear echnologie and non- elec ric applica ion of n+ clear echnologie , con n+ c- ion, projec financing, con rac n+ c+ ring and ri k alloca ion, or reg+ la or and licen ing proce e .

(3) PROGRAM. The erm "program" mean he program e abli hed+ nder + b ec ion (b)(1).

(4) SECRETARY. The erm "Secre ar " mean he Secre ar of Energ .

(b) ESTABLISHMENT OF PROGRAM.

(1) IN GENERAL. The Secre ar hall e abli h a program o pro ide Federal financial a i+ nce o eligible en i ie o + ppor he re earch, de elopmen , and demon ra ion of ad+nced n+ clear reac or .

(2) COMPETITIVE PROCEDURES. To he ma+im+ m e+ en prac icable, he Secre ar hall carr o+ he program + ing a compe i i e, meri -ba ed re ie proce ha i con i en i h ec ion 989 of he Energ Polic Ac of 2005 (42 U.S.C. 16353).

(c) APPLICATIONS. An eligible en i de iring Federal financial a i+ nce + nder he program hall + bmi o he Secre ar an applica ion a + ch ime, in + ch manner, and con aining + ch informa ion a he Secre ar ma req+ ire.

(d) PRIORITY. In elec ing eligible en i ie o recei e Federal financial a i+ nce + nder he program, he Secre ar hall gi e priori o eligible en i ie ha

(1) plan o carr o+ projec a or near he i e of 1 or more fo il f el elec ric genera ion facili ie ha are re ired or ched+ led o re ire, incl+ ding m+ l i+ ni facili ie ha are par ial h+ dq n

(A) o+ ppor he prod+ c i e re+ e of fo il f el elec ric genera ion facili ie ha are re ired or ched+ led o re ire; and

(B) o+ + ain and re i ali e comm+ ni ie impac ed b he clo+ re of fo il f el elec ric genera ion facili ie ;

(2) plan o+ ppor nonelec ric applica ion , incl+ ding + p- pl ing hea for

(A) energ orage;

(B) h drogen or o her liq+ id and ga e+ f el or chem- ical prod+ c ion;

(C) ind+ rial proce e ;

(D) de alina ion echnologie and proce e ;

(E) i o ope prod+ c ion;

(F) di ric hea ing; and

(G) o her applica ion , a he Secre ar de ermine o be appropria e; and

(3) have implemented or demonstrated the ability to increase full implementation, workforce training or retraining program or training, or other work to perform activities relating to the research, development, and demonstration of advanced nuclear reactor.

(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 AU- THORIZATION ACT

SEC. 10801. SHORT TITLE.

This title may be cited as the “National Aeronautic and Space Administration Authorization Act of 2022”.

SEC. 10802. DEFINITIONS.

In this title:

- (1) ADMINISTRATION. The term “Administration” means the National Aeronautic and Space Administration.
- (2) ADMINISTRATOR. The term “Administrator” means the Administrator of the National Aeronautic and Space Administration.
- (3) APPROPRIATE COMMITTEES OF CONGRESS. Except as otherwise expressly provided, the term “appropriate committee 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 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 average enrichment greater than the average

for national ranking must be less than 20 percent of the ranking in 2023 in operation.

(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 term “unmanned aircraft” and “unmanned aircraft system” has the meaning 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) advance 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 mission

(A) will make further progress on advancing the human exploration roadmap to achieve human presence beyond low-Earth orbit on the surface of Mars, as required under section 432 of the National Aeronautics and Space Administration Authorization Act of 2017 (Public Law 115-10; 51 U.S.C. 20302 note);

(B) hold fulfill the goal of landing United States astronauts, including the first woman and the next man, on the Moon; and

(C) hold seek collaboration with commercial and international partners to establish sustainable human exploration, and hold find additional sustainable human activities not directly required for the advancement of a human mission to Mars preparatory;

(3) in carrying out the Artemis mission, the Administrator shall ensure that the entire Artemis program includes and represents a share of all people of the United States, including women and minorities;

(4) safe and effective implementation of the roadmap to achieve human presence on Mars, including the Artemis mission, require

(A) a clear strategic vision for achieving lunar and Mars exploration has 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, information decision, including decision relating to workforce and infrastructure needs and the development of technical and non-technical skill;

(C) consistent NASA oversight of all relevant exploration activities, enabled by NASA leadership, high authority, responsibility, and accountability for decision and well-developed capabilities for systems engineering and integration;

(D) clearly defined role for NASA, international partners, and nongovernmental partners, including criteria for determining whether NASA should make, manage, or take capabilities; and

(E) mechanisms to ensure NASA involvement in the activities of international and nongovernmental 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. No 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 mission and activities.

(2) MOON TO MARS PROGRAM.

(A) ESTABLISHMENT. No 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 section 20302(b) and 70504 of title 51, United States Code, which shall include Artemis mission 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 section.

(iii) Exploration Ground System.

(i) An outpost in orbit around the Moon under section 70504 of title.

() Human-rated landing system.

(i) Space.

(ii) Any other elements needed to meet the requirements for the Program.

(C) DIRECTION. The Administrator shall ensure that

(i) each Artemis mission demonstrate or advance a technology or operational concept that will enable human mission to Mars;

(ii) the Program incorporate each such mission into the human exploration roadmap under section

432 of the National Aeronautic and Space Administration Transition Authority Act of 2017 (Public Law 115-10; 51 U.S.C. 20302 note); and

(iii) the Program include civilian space exploration activities;

(I) create a combination of launch of the Space Launch System and space transportation services from United States commercial providers, as appropriate, for each mission;

(II) plan for no fewer than 1 Space Launch System launch annually beginning after the first successful 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;

(aa) demonstrate technologies, systems, and operational concepts directly applicable to the space vehicle that will be used to transport humans to Mars;

(bb) have the capability for periodic human habitation; and

(cc) function at a point of departure, return, or staging for mission 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-level systems engineering and integration and integrated risk management function; and

(v) to carry out other authority, 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 procedure for the Program;

(II) a Program-level systems engineering and integration function as described in subsection (c);

(III) plan for echnolog and capabili e developmen ;

(IV) logi ic + ppor , cience da a manage- men , comm+ nica ion , and o her plan ha are rele an o he f nc ion of he Office; and

(V) performance mea+ re o a e he progre of he Program;

(ii) ad i ing he A ocia e Admini ra or of he Explora ion S em Developmen Mi ion Direc ora e on he de elopmen of

(I) Program-le el req iremen , incl+ ding for a h man Mar orbi al mi ion and a h man mi ion o he + rface of Mar ; and

(II) an archi ec+ re ba ed on he req iremen de cribed in + bcl+ e (I); and

(iii) informing he A ocia e Admini ra or of he Admini ra ion on coordina ion among NASA cen er , a req ired o mo efficien l achie e he goal of he Program.

(c) SYSTEMS ENGINEERING AND INTEGRATION. The Direc or of he Office hall

(1) e abli h , i hin he Office a Program, ide em engineering and in egra ion f nc ion; and

(2) appoin a manager for + ch f nc ion o manage em engineering and in egra ion ac i i e acro he Program, incl+ ding , i h re pec o he Program elemen de cribed in + b ec ion (b)(2).

(d) IMPLEMENTATION. In he implemen a ion of he Program, he Admini ra or hall en+ re ha

(1) for he p rpo e of red+ cing ri k and comple i and making he ma im+ m+ e of a p a er in e men o da e, in cond+ cing Ar emi ac i i e , he Admini ra ion doe no ake an ac ion in regard o he de ign of he Explora ion Upper S age-enhanced Space L+ nch S em ha , o ld pre- ct+ de i from carr ing an in egra ed h man-ra ed h nar landing em for cre+ ed h nar landing mi ion ;

(2) he Program main ain a rob+ erie of gro nd-ba ed and in-fligh e ing ac i i e , incl+ ding , i h re pec o each cre+ ed em de ign, no le han l+ ncre+ ed fligh e , follo ed b a cre+ ed fligh e , a appropria e, prior o+ e of he de ign on a h man-ra ed h nar landing em or Mar mi ion; and

(3) h man h nar landing mi ion + nder he Program, incl+ ding + rface and in- pace ac i i e , are carried o olel b go ernmen a ron+ .

(e) STUDY. No la er han 180 da af er he da e of he enac men of hi Ac , he Admini ra or hall + bmi o he appropria e commi ee of Congre a repor de ailing

(1) progre o ard he e abli hmen of

(A) he Office, he Program, and he Program archi ec+ re; and

(B) he in egra ed ma er plan, in egra ed ma er ched+ le, and in egra ed ri k managemen proced+ re for he Program;

(2) performance mea+ re and mile one for he Program and an in erim a e men , i h re pec o + ch performance mea+ re , a prac icable;

(3) initial criteria for determining whether NASA should make, manage, or be the capability within the Program or engage in international partnership to achieve capabilities;

(4) strategies to ensure consistency in the activities of NASA partners, including non-governmental partners, as required to identify and mitigate mission risk;

(5) progress toward the establishment of a common engineering and integration function; and

(6) an annual budget profile for the next five years 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 Administration 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 (a length 70 m), Block 1B (a length 105 m), and Block 2 (a length 130 m) variants of the Space Launch System; and

(2) no fewer than 2 bays of the vehicle assembly building of each ground system infrastructure are certified and dedicated to support Space Launch System stacking and preparation.

(b) **FLIGHT RATE AND SAFETY.** After the first crewed lunar landing of the Administration's Moon to Mars initiative, the Administration 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 initiative needed to enable a human mission to Mars are completed to maintain the critical human spaceflight production and operation capability necessary for the safety of human spaceflight initiative in deep space.

(c) **MOBILE LAUNCH PLATFORM.**

(1) **IN GENERAL.** The Administration 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 Administration 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 sited and constructed to accommodate the Block 2 variant of the Space Launch System.

(d) **REPORTS.** The Administration shall submit to Congress

(1) no later than 45 days after the date of the enactment of this Act, a report on the steps the Administration and industry partners are taking

(A) to address the cost, schedule, and performance challenge in the development of the Mobile Launch 2 platform; and

(B) to ensure that each platform is ready for operational use on a schedule that aligns with the current plan for an Artemis IV launch, which is currently anticipated in 2027; and

(2) no later than 90 days after the date of enactment, a report shall contain a list of the key milestones required for completing each of the Space Launch System, and an estimated date on which each milestone 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 conduct development of the Exploration Upper Stage for the Space Launch System on a schedule consistent with the Artemis IV timeline.

(2) BRIEFING. No later than 90 days after the date of the enactment of this Act, the Administrator shall brief the appropriate committee of Congress on the development and scheduled availability of the Exploration Upper Stage for the Artemis IV timeline.

(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 shall initiate development of a main propulsion test article for the integrated Exploration Upper Stage element of the Space Launch System, consistent with conditions 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, conduct operations for a program of modernized rocket propulsion 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) shall include

- (1) infrastructure and other facilities and equipment relating to rocket propulsion and rocket propulsion testing;
- (2) enhancement of existing facilities and flexibility; and

(3) each other project as the Administrator considers appropriate to meet the goal described in this 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 safety and flight certification capabilities, including for large hypersonic and altitude engine and engine test cells, and multi-engine integrated capabilities;

(2) conduct operations to make needed facilities available for commercial operations as reimbursable as possible; and

(3) ensure that no project carried out under this program adversely impacts, delays, or defers testing or other activities associated with existing 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 support exploration mission;

or

(C) nuclear propulsion engine.

(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 infrastructure developed under this section.

(e) WORKING CAPITAL FUND STUDY.

(1) IN GENERAL. No later than 1 year after the date of the enactment of this division, the Administrator shall submit to the appropriate committee 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 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 priorities, if any, of the authority under section 30102 of title 51, United States Code, to improve engine infrastructure.

(B) An analysis of any barrier to implementation of such authority for the purpose of promoting increased use of NASA rocket propulsion 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 enhance the navigational capability of the Pearl River and Little Lake channel efficiency to support NASA barge operations returning Senni Space Center and the Michoud Assembly Facility.

(b) REPORT TO CONGRESS. No later than 180 days after the date of the enactment of this division, the Administrator shall submit to the appropriate committee of Congress a report on efforts under subsection (a).

(c) APPROPRIATE COMMITTEES OF CONGRESS DEFINED. In this section, the term "appropriate committee 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 Aeronautic 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 “A soon as practicable” and all that follow 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 section 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 the health and safety of the ISS.”

(e) TRANSITION PLAN REPORTS. Section 50111(c)(2) of title 51, United States Code is amended

(1) in the matter preceding subsection (A), by striking “2023” and inserting “2028”; and

(2) in subsection (J), by striking “2028” and inserting “2030”.

(f) ASSESSMENTS AND REPORT. The Administrator shall

(1) conduct a comprehensive assessment of the capability of the ISS to operate safely and support full and productive operations through 2030, including all necessary analyses to certify ISS operations through 2030;

(2) no 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 crack and air leak in the Russian Service Module Transfer Tunnel;

(B) the certification of all United States equipment and module operations through 2030;

(C)(i) an inventory of spare or replacement for elements, equipment, and equipment, including emergency certified under subsection (B), that are currently produced, in inventory, or on order;

(ii) a description of the state of the readiness of such spare and replacement; and

(iii) a checklist for delivery of such spare and replacement to the ISS, including the planned transportation means for such delivery and the estimated cost and checklist for procurement of such spare and replacement and their delivery to the ISS; and

(D) an overview, including data, information, or analysis relevant to the safety and productivity of the ISS through 2030; and

(3) no later than 240 days after the date of the enactment of this Act, transmit to the appropriate committee of Congress

(A) a report on the results of the activities conducted under paragraph (1); and

(B) a plan to address any recommendation of the Aerospace Safety Advisory Panel, consistent with section 31101(c)(2) of title 51, United States Code, in the report to the committee.

SEC. 10816. PRIORITIES FOR INTERNATIONAL SPACE STATION.

(a) IN GENERAL. The Administrator shall advise the International Space Station research activities and shall ensure that time and resources allocated to the Administrator for the International Space Station priorities

(1) the research of the Human Research Program, including research on and development of countermeasures related to reducing human health and performance risk, behavioral and psychological risk, and other associated safety risks related to long-duration human spaceflight;

(2) risk reduction activities related to exploration technologies, including for the Environmental Control and Life Support System, extravehicular activities and space suits, environmental monitoring, safety, emergency response, and deep space communication;

(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 science decadal report of the National Academies of Science, Engineering, and Medicine; and

(4) other research and development activities identified by the Administrator as essential to Moon or Mars activities.

(b) REPORTS.

(1) ASSESSMENT AND PRIORITIZATION. No later than 180 days after the date of the enactment of this Act, the Administrator shall transmit to the appropriate committee of Congress a report on

(A) the activities; and

(B) the steps taken to achieve the priorities required by subsection (a).

(2) SPACE FLIGHT PARTICIPANTS. No later than 120 days after the date of the enactment of this Act, the Administrator shall transmit to the appropriate committee of Congress a report on measures taken, in the report to the committee on space flight participants aboard the ISS, to ensure government safety, avoid interference in ISS operation and research priorities, and to prevent undue demand on crew time and resources.

(3) ANNUAL PROGRESS REPORTS. Consistent with the annual budget transmission of the President to Congress under section 1105(a) of title 31, United States Code, the Administrator shall provide to the appropriate committee of Congress an annual accounting of the use of Administrator crew time and ISS resources, including the allocation of such resources to the priorities described in subsection (a).

SEC. 10817. TECHNICAL AMENDMENTS RELATING TO ARTEMIS MISSIONS.

(a) Section 421 of the National Aeronautic and Space Administration Authorization Act of 2017 (Public Law 115-10; 51 U.S.C. 20301) 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 Aeronautic and Space Administration Authorization Act of 2017 (Public Law 115-10; 51 U.S.C. 20302) 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 adequate funded portfolio of activities, consisting of research and analysis program, technology development, fundamental research activities, and small, medium, and large space mission, construction of a robotic and production science program and research activities for innovation and discovery; and

(2) the Research and Analysis program funded by the Science Mission Directorate are critically important for

(A) preparing the next generation of space and Earth scientists;

(B) promoting peer-reviewed cutting-edge research;

(C) maximizing scientific return from the Administration's space and Earth science mission; and

(D) developing innovative techniques and future mission concepts.

(b) GOAL. The Administrator shall pursue the goal of enabling annual funding for Research and Analysis in the Science Mission Directorate to reach a level of no 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 Science, Engineering, and Medicine outline key scientific questions and methodology on the search for the origin, evolution, distribution, and future of life in the universe; and

(2) the inauguration of lifeform, with their ironmen, a central focus of a robotic research, is a topic of broad significance of life science 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 of research for evidence of the existence or historical existence of life beyond Earth in support of

(A) the scientific priorities of the most recent decadal strategy report on planetary science and astrophysics and astronomy and astrophysics of the National Academies of Science, Engineering, and Medicine; and

(B) the objectives 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 science program of the Administrator.

(4) INSTRUMENTATION AND SENSOR TECHNOLOGY. In carrying out the program under paragraph (1), the Administrator shall make investments in the development of new instruments and sensors.

(5) TECHNOSIGNATURES. In carrying out the program under paragraph (1), the Administrator shall, as appropriate, merit-reviewed, competitive 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 series 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 astrophysical disciplines, including the origin of planetary systems, the formation and evolution of stars and galaxies, fundamental physics, and the structure of the universe;

(2) the decadal strategy of the National Academies of Science, Engineering, and Medicine entitled "Pathways to Discoveries in Astronomy and Astrophysics for the 2020s" recommends a vision of the future and the relationship between 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 the most recent decadal strategy, 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 reform not only the understanding of the universe and the process and physical paradigm 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 mission of the astronomical community and the transformational capacity of technological innovation; and

(5) in implementing a research program, in order to avoid the major growth in the cost of a research flagship-class mission 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:

(A) establishing efficient cost and schedule review;

(B) demonstrating in advance of preliminary design review, a practicable and appropriate, the maturity of necessary technologies through prototyping demonstration in a relevant environment;

(C) providing for regular updates to the cost, schedule, and risk of a project; and

(D) considering, as feasible, the impact of cost and schedule change 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 Science, 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 committee 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 each development.

SEC. 10824. EARTH SCIENCE MISSIONS AND PROGRAMS.

(a) SENSE OF CONGRESS. It is the sense of Congress that

(1) the Earth science and application program of the Administration provide increasingly available 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 application program contribute 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 application program for the

in section 60501 of title 51, United States Code, which reads: "The goal for the Administration's Earth Science program shall be to provide a program of Earth observation, research, and application activities to better understand the Earth, help improve life, and help human activities affect the ability to do so in the future. In pursuit of this goal, the Administration's Earth Science program shall ensure that ongoing practical benefits for society will be an important measure of its success in addition to ongoing 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 observation-based research program."

(c) EARTH SCIENCE MISSIONS AND PROGRAMS. With respect to the mission and program of the Earth Science Division, the Administration shall, to the maximum extent practicable, follow the recommendation and guidance provided by the scientific community through the decadal review for Earth science and application from the National Academy of Science, Engineering, and Medicine, including

- (1) the science priorities described in the review;
- (2) the execution of the series of ongoing 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, competitive selected missions.

(d) EARTH SYSTEM OBSERVATORY. The Administration shall provide an Earth System Observatory, which shall consist of an array of new and complementary Earth-observing scientific activities, instruments, and missions

- (1) to address the recommendation of the 2018 Earth science and application decadal review of the National Academy of Science, Engineering, and Medicine entitled "Thriving on Our Changing Planet", including by conducting priority observations in
 - (A) aerosols;
 - (B) cloud condensation and precipitation;
 - (C) methane change;
 - (D) surface biology and geology;
 - (E) surface deformation and change; and
 - (F) other observation areas designated as high-priority by the decadal review; 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 Administration shall arrange for the conduct of a review 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 Administration shall submit to the appropriate committee of Congress the report of the review conducted under paragraph (1).

(f) CLIMATE ARCHITECTURE PLAN. The Administration shall

(1) maintain a comprehensive, strategic Climate Architectural Plan for Earth Observation and Application from Space that describe an integrated and balanced program of Earth science and application observation to advance science, policy, and application and societal benefits; and

(2) update each plan every 5 years to align with the release of the decadal strategy in Earth science and application from space and the mid-decade assessments of the National Academies of Science, Engineering, and Medicine.

SEC. 10825. PLANETARY DEFENSE COORDINATION OFFICE.

(a) FINDINGS. Congress make 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 Strategy program to detect, track, catalog, and characterize the physical characteristics of near-Earth objects equal to, or greater than, 140 meters in diameter in order to achieve the threat of such near-Earth objects to the Earth, with the goal of 90 percent completion of the catalog of such near-Earth objects by December 30, 2020.

(3) The goal described in paragraph (2) has not been met.

(4) The report of the National Academies of Science, Engineering, and Medicine entitled "Finding Hazardous Asteroid Using Infrared and Visible Wavelength Telescopes", issued in 2019, states that

(A) NASA should develop and launch a dedicated pace-banded infrared strategy 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 pace-banded infrared strategy 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 reduce the threat 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, including the effect of potential impact of such objects, and investigate strategies and technologies for mitigating the potential impact 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-Ear h Objec S r e or mi ion, a de igned, i an icipa ed o make ignifican progre q ard carr ing o congre ional polic and direc ion, a e for h in ec ion 321(d)(1) of he Na ional Aeronæ ic and Space Admini ra ion A hori a ion Ac of 2005 (P blic La 109 155; 119 S a . 2922; 51 U.S.C. 71101 no e prec.), o de ec 90 percen of near-Ear h objec eq al o, or grea er han, 140 me er in diame er; and

(B) he Admini ra or h o ld priori i e he p blic afe role of he Near-Ear h Objec S r e or mi ion and h o ld no dela he de elopmen and læ nch of he mi ion de o co grq h on o her plane ar cience mi ion .

(2) CONTINUATION OF MISSION.

(A) IN GENERAL. The Admini ra or hall con in e he de elopmen of a dedica ed pace-ba ed infrared + r e ele cope mi ion, knq n a he “Near-Ear h Objec S r e or”, on a ched le o achie e a læ nch-readine da e no la er han March 30, 2026, or he earlie prac icable da e, for he p rpo e of accompli hing he objec i e e for h in ec ion 321(d)(1) of he Na ional Aeronæ ic and Space Admini ra ion A hori a ion Ac of 2005 (P blic La 109 155; 119 S a . 2922; 51 U.S.C. 71101 no e prec.).

(B) CONSIDERATION OF RECOMMENDATIONS. The de ign of he mi ion de cribed in + bparagraph (A) hall ake in o acco n he recommenda ion of he 2019 repor of he Na ional Academie of Science , Engineering, and Medicine en i led “Finding Ha ardø A eroid U ing Infrared and Vi ible Wa eleng h Tele cope ”, he plane ar cience decadal + r e , and he 2018 Uni ed S a e Na ional Near-Ear h Objec Preparedne S ra eg and Ac ion Plan.

(d) ANNUAL REPORT. Sec ion 321(f) of he Na ional Aeronæ ic and Space Admini ra ion A hori a ion Ac of 2005 (P blic La 109 155; 119 S a . 2922; 51 U.S.C. 71101 no e prec.) i amended o read a follo :

“(f) ANNUAL REPORT. No la er han 180 da af er he da e of he enac men of he Na ional Aeronæ ic and Space Admini ra ion A hori a ion Ac of 2022 and annø all hereaf er hrø gh 90-percen comple ion of he ca alog e req ired b + b ec ion (d)(1), he Admini ra or hall + bmi o he Commi ee on Commerce, Science, and Tran por a ion of he Sena e and he Commi ee on Science, Space, and Technolog of he Hø e of Repre en a i e a repor ha inct de he follo ing:

“(1) A + mmar of all ac i i ie carried o b he Plane ar Defen e Coordina ion Office e abli hed + nder ec ion 10825 of he Na ional Aeronæ ic and Space Admini ra ion A hori a ion Ac of 2022 ince he da e of enac men of ha Ac .

“(2) A de cription of he progre , i h re pec o he de ign, de elopmen , and læ nch of he pace-ba ed infrared + r e ele cope req ired b ec ion 10825(c) of he Na ional Aeronæ ic and Space Admini ra ion A hori a ion Ac of 2022.

“(3) An a e men of he progre q ard mee ing he req iremen + nder + b ec ion (d)(1).

“(4) A de cription of he a+ of effor o coordina e and coopera e , i h o her co n rie o de ec ha ardø

areoid and come, plan a mission range, and implement a range in the event of the discovery of an object on a likely collision course with Earth.

“(5) A program of expenditure for all activities carried out by the Planetary Defense Coordination Office since the date of enactment of the National Aeronautic 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 Aeronautic 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 no other profitable investment and fundamental role of the Administration;

(2) large-scale flight experiments and validation are necessary for

(A) ranging new technologies and material, including advanced manufacturing processes, for aviation and aerospace; and

(B) capturing the full extent of benefits from investments made by the Aeronautic Research Mission Directorate; and

(3) a level of funding has adequate support large-scale flight experiments and validation, including related infrastructure, should be extended over a sustained period of time to ensure the capacity of the Administration

(A) to evaluate a priori program through 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 a fundamental objective of the aeronautic research of the Administration the rapid progression and expansion of flight research and capabilities, including the science and technology of critical underlying discipline and competence, to

(A) computational-based analytical and predictive tools and methodologies;

(B) aerothermodynamic;

(C) propulsion;

(D) advanced material and manufacturing processes;

(E) high-temperature and material; and

(F) guidance, navigation, and flight control.

(c) EXPERIMENTAL AIRCRAFT FLIGHT DEMONSTRATIONS.

(1) IN GENERAL. In meeting the objective described in subsection (b), the Administrator shall carry out experimental aircraft demonstration, including

(A) a subsonic demonstration of performance and feasibility of advanced, high-efficiency, and low-emission subsonic flight demonstration configuration;

(B) a low boom flight demonstration of advanced design tool and technologies that can be applied to low boom commercial transport aircraft and support the development of a noise-based standard for transport overland flight; and

(C) a flight research demonstration of the performance and feasibility of advanced, high-efficiency and low-emission aircraft concept and configuration.

(2) ELEMENTS. For each demonstration under paragraph (1), the Administrator shall

(A) include the development of experimental aircraft and all necessary supporting flight data;

(B) pursue a robust technology maturation and flight evaluation effort;

(C) improve necessary facilities, flight testing capabilities, and computational tool support for the demonstration;

(D) award a primary contract for design, procurement, and manufacturing of United States person, consistent with international obligation and commitment; and

(E) coordinate research and flight 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 of the United States; or

(B) an entity organized under the laws of the United States or of an jurisdiction within the United States, including a foreign branch of a chain entity.

(d) COLLABORATION WITH INDUSTRY AND ACADEMIA. The Administrator 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 demonstration required by subsection (c).

(e) ADVANCED MATERIALS AND MANUFACTURING TECHNOLOGY PROGRAM.

(1) IN GENERAL. The Administrator may establish an advanced material and manufacturing technology program

(A) to develop

(i) new material, including composite and high-temperature material, from basic material formulation through full-scale practical evaluation and manufacturing;

(ii) advanced material and manufacturing processes, including additive manufacturing, to reduce the cost of manufacturing scale production and certification for use in aeronautics; and

(iii) nonin a i e or nonde n c i e echniq e for e ing or e al a ing a ia ion and aeronæ ic n c + re , incl ding for ma erial and man fac + ring proc e e ;

(B) o red ce he ime i ake o de ign, ind riali e, and cer if ad anced ma erial and man fac + ring proc e e ;

(C) o pro ide ed ca ion and raining oppor + ni ie for he aero pace, orkforce; and

(D) o addre global co and h man capi al compe i i ene for Uni ed S a e aeronæ ical ind rie and echnological leader hip in ad anced ma erial and man fac + ring echnolog .

(2) ELEMENTS. In carr ing o a program + nder paragraph (1), he Admini ra or ma

(A) b ild on, ork ha a carried o b he Ad anced Compo i e Projec of he Admini ra ion;

(B) par ner i h he pri a e and academic ec or , + ch a member of he Ad anced Compo i e Con or i m of he Admini ra ion, he Join Ad anced Ma erial and S n c + re Cen er of E cellence of he Federal A ia ion Admini ra ion, he Man fac + ring USA in i + e of he Depar men of Commerce, and na ional labora orie , a he Admini ra or con ider appropria e;

(C) pro ide a n c + re for managing in ellec + al prop er genera ed b he program ba ed on or con i en i h he n c + re e abli hed for he Ad anced Compo i e Con or i m of he Admini ra ion;

(D) en + re adeq a e Federal co hare for applicable re earch; and

(E) coordina e i h ad anced man fac + ring and compo i e ini ia i e in o her mi ion direc ora e of he Admini ra ion, a he Admini ra or con ider appropria e.

(f) RESEARCH PARTNERSHIPS. In carr ing o he demon ra ion + nder + b ec ion (c) and a program + nder + b ec ion (e), he Admini ra or ma engage in coopera i e re earch program i h

(1) academia; and

(2) commercial a ia ion and aero pace man fac + rer .

SEC. 10832. UNMANNED AIRCRAFT SYSTEMS.

(a) UNMANNED AIRCRAFT SYSTEMS OPERATION PROGRAM. The Admini ra or hall

(1) re earch and e capabili e and concep , incl ding + nmanned airraf em comm nica ion , for in egra ing + nmanned airraf em in o he na ional air pace em;

(2) le erage he par ner hip NASA ha i h ind r foed on he ad ancemen of echnologie for f + re air raffic managemen em for + nmanned airraf em ; and

(3) con in e o le erage he re earch and e ing por folio of NASA o inform he in egra ion of + nmanned airraf em in o he na ional air pace em, con i en i h p blic afe and na ional eeri objec i e .

(b) SENSE OF CONGRESS ON COORDINATION WITH FEDERAL AVIA-TION ADMINISTRATION. I i he en e of Congre ha

(1) NASA h o ld con in e

- (A) to coordinate with the Federal Aviation Administration on research on air traffic management for unmanned aircraft; and
 - (B) to assist the Federal Aviation Administration in the integration of air traffic management for unmanned aircraft into the national airspace; and
- (2) the range (as defined in section 44801 of title 49, United States Code) shall continue to be leveraged for research on
- (A) air traffic management for unmanned aircraft; and
 - (B) the integration of unmanned aircraft into the national airspace.

SEC. 10833. CLEANER, QUIETER AIRPLANES.

(a) INITIATIVE REQUIRED. Section 40112 of title 51, United States Code, is amended

- (1) by redacting subsection (b) through (f) and subsection (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 oxide, other greenhouse gases, aerosols, black carbon and sulfate aerosols, and increased climate change contribution;

“(B) to reduce aviation noise emissions; and

“(C) to enable advanced aircraft performance characteristics.

“(2) GOALS. The goal of the initiative required by paragraph (1) shall be

“(A) to ensure United States leadership in research and technology innovation leading to substantial reduction in aviation noise and greenhouse gas emissions;

“(B) to enhance and expand basic research, and the translation of basic research into application, to make leadership in advanced technology in reducing aviation noise and greenhouse gas emissions;

“(C) to accelerate research and development to have contributing emerging technologies for reducing aircraft noise and greenhouse gas emissions; and

“(D) to obtain and disseminate advanced engineering and performance data to facilitate the incorporation of new technologies into commercial aircraft development as soon as practicable.

“(3) OBJECTIVES. The objective of the initiative established under paragraph (1) and the goal 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 technology in service as of December 31, 2021;

“(B) noise level from aircraft throughout all phases of flight shall do not exceed ambient noise level in the absence of flight operation in the vicinity of the flight route;

“(C) noise level from aircraft by 2050; and

“(D) demonstration of new technologies developed prior to the initiation of

“(i) regional aircraft in ended operation by 2030; and

“(ii) single-aisle aircraft designed to accommodate more than 125 passengers in ended operation by 2040.”.

(b) TECHNOLOGY FOCUS AREAS. In carrying out the research and development initiatives established under section 40112(b) of title 51, United States Code, the Administrator shall advance research, development, and demonstration projects promising technologies that

(1) advanced propulsion technology, design, and integration;

(2) electric and hybrid-electric propulsion, including battery electric and hydrogen fuel cell electric engines;

(3) airframe concept and configuration;

(4) analysis of technology options, including cost-benefit analysis of greenhouse gas and noise emission reduction technologies;

(5) analytical tools for engine-level and engine-off engine-level modeling and integration;

(6) air space operation improvement;

(7) noise emission reduction; and

(8) any other effort, as determined by the Administrator, that contributes to the achievement of the Administrator's goals.

(c) IMPLEMENTATION. In implementing the initiatives established under section 40112(b) of title 51, United States Code, the Administrator shall, to the extent practicable

(1) ensure high efficiency and performance data integration with the relevant of community acceptance and the conditions by the Federal Aviation Administration and other relevant parties, including the impact of new noise effects from noise level propulsion engines and from air space operation change;

(2) provide funding 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 requirements for policy, infrastructure, and administrative capacity necessary to enable the safe integration of new technologies on aircraft;

(3) promote partnerships with organizations, government, commercial production aircraft producers, 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, where appropriate, academic institutions, and other research organizations in the partnerships described in paragraph (3);

(5) expand basic research;

(6) encourage in research, development, and partnership opportunities, including, underrepresentation of women, racial, and minority engineering and technology;

(7) continue to coordinate with the Secretary of Energy on basic 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-led high speed aircraft concept hardware development and aircraft noise reduction to achieve the goal and objective under paragraph (2) and (3) of this subsection; and

(9) continue to support research, development, and demonstration of aircraft concept, including electromagnetic, material and component, integration of engine and airframe structure, human factors, air space planning and operation, and the integration of related advanced technologies and concepts, with the goal of carrying out the flight within eight years of the end of 2025.

(d) ANNUAL REPORT. No later than 1 year after the date of the enactment of this Act, and annually thereafter, the Administrator shall submit to the appropriate committee of Congress a report on the progress of the effort carried out under the initiative established under subsection (b) of section 40112 of title 51, United States Code, including

(1) the state of progress on the initiative;

(2) any proposed, anticipated timeframe for readiness of technology and aircraft to be adopted by industry with the emission reduction level directed under this subsection; and

(3) an identification of fundamental aeronautics research activities contributing to achieving the goal and objective of the initiative, as described in paragraph (2) and (3) of this subsection, and a description of any obstacles to achieving the goal and objective.

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 industry, shall make all necessary steps to carry out research and development, ground-based testing and in-space testing, and other activities to enable the use of space nuclear propulsion in Administrator robotic and human exploration activities, including in cargo missions to Mars in the late 2020s and crewed missions to Mars in the 2030s.

(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 subsection (a) shall include the following:

(i) Research and development in both nuclear electric and nuclear thermal propulsion technology, maximum effort, 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 Science, Engineering, and Medicine in the report entitled "Space Nuclear Propulsion for Human Mars Exploration", to advise and inform a decision on a nuclear electric or nuclear thermal propulsion system by 2026, or as early as practicable.

(ii) Ground-based testing, to the extent practicable, including no later than 1 ground-based test of a full-scale, integrated nuclear propulsion system before an in-space test or demonstration of a system.

(iii) In-space demonstration of a nuclear propulsion system in the late 2020's, which may be carried out as a cargo mission in 2030.

(3) PLAN.

(A) IN GENERAL. No later than 180 days after the date of the enactment of this Act, the Administrator shall submit to the appropriate committee of Congress a plan to achieve an in-space flight test of a nuclear propulsion system that would support the first crewed mission to Mars in the 2030's.

(B) ELEMENTS. The plan required by this paragraph

(A) shall include the following:

(i) A timeline of maturing enabling technologies and a timeline of major milestones for integration of a technology in the larger nuclear propulsion system.

(ii) A cost estimate for maturing a technology.

(iii) A description of facilities requirements for the program under paragraph (2) associated with a technology.

(iv) A description of the manner in which the Administrator will evaluate the effort described in paragraph (2)(B) to determine whether the in-space flight test would demonstrate a nuclear electric propulsion system or a nuclear thermal propulsion system.

(C) An identification of any policy or regulatory challenge or barrier to conducting a test in-space or an precursor or ground-based test, and a description of options for addressing a challenge or barrier.

(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 a plan opportunities for participation by United States commercial entities.

(B) SUBMISSION. No later than 1 year after the date of the enactment of this Act, the Administrator shall submit

o the appropriate committee of Congress the plan developed under paragraph (A).

(c) ASSESSMENT OF IN-SPACE PROPULSION TESTING FACILITIES.

(1) IN GENERAL. The Administrator shall carry out a need 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 committee 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 development 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 head of other relevant Federal agencies on technology development, knowledge exchange, lessons learned regarding nuclear power and propulsion technologies, common fuel, flight demonstration, and operational demonstration for space application.

(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 committee of Congress a report that details the actions taken and planned, including a timeline for each action, 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 degree and career.

(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 goal 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 a unique opportunity 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 connection 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 of Similar Competitive Research under section 40903 of title 51 United States Code;

(3) the Minorities Undergraduate Research and Education Project;

(4) the Next Gen 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 hereafter, the Administrator shall submit to the appropriate committee of Congress a report on the United States industrial base for NASA civil space mission and operations.

(2) ELEMENTS. The report required by paragraph (1) shall include the following:

(A) A comprehensive description of the current state of the United States industrial base for NASA civil space mission and operations.

(B) A description and assessment of the weaknesses in the supply chain, skill, manufacturing capacity, raw material, key components, and other areas of the United States industrial base for NASA civil space mission and operations that could adversely impact the mission and operations if not addressed.

(C) A description and assessment of critical mechanical components and mitigation of the weaknesses described in paragraph (B).

(D) A comprehensive list of the collaborative efforts, including foreign and proposed collaborative efforts, between NASA and the Manufacturing USA initiative of the Department of Commerce.

(E) An assessment of

(i) the defense and aerospace manufacturing supply chain reliance on NASA in each region of the United States; and

(ii) the feasibility and benefits of establishing a top-level chain center of excellence in a State in which NASA does not, and of the date of the enactment of this Act, have a research center or facilities.

(F) Such other matters relating to the United States industrial base for NASA civil space mission 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 Science, Engineering, and Medicine to carry out a comprehensive review of the workforce, industrial base, and modeling and test facilities of the Administrator.

(B) ELEMENTS. The review conducted under this paragraph (A) shall include the following:

(i) A consideration of the state of emerging technologies in relevant engineering and science disciplines and the skills needed to apply such capabilities to Administrator mission activities across all mission directorates.

(ii) Prioritized recommendations on actions needed to align the Administrator's workforce, research objectives and strategic goals and on the improvement and addition of modeling capabilities and test facilities needed to meet the Administrator's strategic goals and objectives.

(C) REPORT. No later than 18 months after the date of the enactment of this Act, the Administrator shall submit to the appropriate committee of Congress a report on the results of the review conducted under this paragraph (A).

(2) IMPLEMENTATION PLAN. No later than 120 days after the date on which the review under paragraph (1) is completed, the Administrator shall submit to the appropriate committee of Congress a plan for implementing the recommendations contained in the review.

(3) REPORT ON NASA INFRASTRUCTURE, WORKFORCE SKILLS AND CAPABILITIES.

(A) POLICY AND PROCEDURE.

(i) IN GENERAL. The Administrator shall develop an Administrator policy and procedure for a minimum, no less frequent than every 5 years, of the strategic capabilities of the Administrator, 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 Administrator decision and recommendation on strategic capabilities, including on infrastructure and facilities, and workforce skills and capabilities needed to support the goals and objectives of the Administrator through 2040.

(B) REPORT. No later than 1 year after the date of the enactment of this Act, the Administrator shall submit the policy and procedure developed under this paragraph (A) to the appropriate committee 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 the purpose of independent analysis of program performance, making programmatic, technical risk mitigation and informational 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, other than maintaining its independence as a matter of principle.

(C) ACTIVITIES AUTHORIZED. In conducting the functions of the Office, the Administrator may carry out

(i) research on program activities;

(ii) cost, schedule, and technical estimation; and

(iii) other relevant activities for the purpose of obtaining the highest level of expertise and the most effective decision-making tools, which to inform the Administrator.

(D) MOON TO MARS ACTIVITIES. The Office shall maintain an ongoing, focused effort to achieve the goal, objective, requirements, architectural approach, cost and schedule, and progress of the Administrator's Moon to Mars activities.

(5) INTERNATIONAL SPACE STATION. No later than 1 year after the date of the enactment of this Act, the Administrator shall submit to the appropriate committee of Congress the report 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 hospitable activity 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 sentence, by striking "December 31, 2022" and inserting "December 31, 2032".

(b) REPORTING REQUIREMENTS. Subsection (f) of subsection (b) 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 centers and facilities.

"(4) ESTIMATED COST SAVINGS. For each active lease agreement under this section, the estimated cost savings to the Administrator resulting from reduced maintenance, operations, and associated costs in the preceding fiscal year.

"(5) OTHER QUANTIFIABLE BENEFITS. Other quantifiable benefits, including additional costs that are not included under

paragraph (4), of the Administration relating from the date of lease under his 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 Aeronautic and Space Administration Authorization Act of 2022, the Administrator shall prepare and transmit 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 leasing requirements for applications seeking a lease under his section, including

“(1) any requirements related to the inclusion of foreign entities, foreign entities, and foreign entities; and

“(2) a description of the Administrator, any other requirements related to the provision and execution of Administration mission and facilities.”.

DIVISION C—SUPPLEMENTAL APPROPRIATIONS TO ADDRESS THREATS TO THE SUPREME COURT OF THE UNITED STATES

The following amounts are appropriated, out of any money in the Treasury not otherwise appropriated, for the fiscal year ending September 30, 2022, and for other periods, 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 in addition to amounts otherwise appropriated for the fiscal year in which—

SEC. 302. No part of an appropriation contained in this Act shall remain available for obligation beyond the current fiscal year unless expressly provided herein.

SEC. 303. Unless otherwise provided for by this Act, the additional amount appropriated by this Act to an appropriation account shall be available under the authority and conditions applicable to such appropriation account 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”.

Speaker of the House of Representatives.

*Vice President of the United States and
President of the Senate.*