

117TH CONGRESS
1ST SESSION

H. R. 2153

To invest in basic scientific research and support technology innovation for the economic and national security of the United States, and for other purposes.

IN THE HOUSE OF REPRESENTATIVES

MARCH 23, 2021

Mr. LUCAS (for himself, Mr. WEBER of Texas, Mr. BABIN, Mr. WALTZ, Mrs. BICE of Oklahoma, Mr. OBERNOLTE, Mr. POSEY, Mr. GONZALEZ of Ohio, Mr. BAIRD, Mr. SESSIONS, Mr. GARCIA of California, Mrs. KIM of California, Mr. FEENSTRA, Mr. LATURNER, Mr. GIMENEZ, and Mr. MELJER) introduced the following bill; which was referred to the Committee on Science, Space, and Technology, and in addition to the Committees on the Judiciary, and Small Business, for a period to be subsequently determined by the Speaker, in each case for consideration of such provisions as fall within the jurisdiction of the committee concerned

A BILL

To invest in basic scientific research and support technology innovation for the economic and national security of the United States, and for other purposes.

1 *Be it enacted by the Senate and House of Representa-*
2 *tives of the United States of America in Congress assembled,*

3 **SECTION 1. SHORT TITLE.**

4 This Act may be cited as the “Securing American
5 Leadership in Science and Technology Act of 2021”.

1 SEC. 2. TABLE OF CONTENTS.

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

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- Sec. 3. Purposes.

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- Sec. 701. Authorization of appropriations.
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1 **SEC. 3. PURPOSES.**

2 The purpose of this Act is to ensure the continued
 3 leadership of the United States in science and technology
 4 by—

5 (1) providing for a coordinated national science
 6 and technology strategy for the economic and na-
 7 tional security of the United States;

8 (2) prioritizing investment in Federal basic re-
 9 search by authorizing a doubling of basic research
 10 funding over the next 10 years at the Department
 11 of Energy, the National Science Foundation, the
 12 National Institute of Standards and Technology, and
 13 the National Oceanic and Atmospheric Administra-
 14 tion;

15 (3) providing for investment in key areas nec-
 16 essary for the competitiveness of the United States,
 17 including computing, cybersecurity, artificial intel-

1 ligence and autonomous technology, materials and
2 advanced manufacturing, energy and climate, and
3 the biosciences;

4 (4) improving the security and integrity of
5 American research and development;

6 (5) providing for investment in critical science
7 and technology infrastructure to maintain world-
8 class research and user facilities;

9 (6) expanding the STEM workforce at all levels
10 to meet the demands of a 21st century economy;

11 (7) promoting regional innovation to support
12 local economic growth across all regions of the
13 United States;

14 (8) maximizing the effectiveness of the Federal
15 Government's research and development activities;

16 (9) promoting collaboration among the Federal
17 Government, Federal laboratories, universities, and
18 industry; and

19 (10) improving technology transfer from the
20 Federal Government and Federal laboratories to the
21 private sector for commercialization.

1 **TITLE I—NATIONAL SCIENCE**
2 **AND TECHNOLOGY STRATEGY**
3 **AND OFFICE OF SCIENCE AND**
4 **TECHNOLOGY POLICY**
5 **Subtitle A—National Science and**
6 **Technology Strategy**

7 **SEC. 101. NATIONAL SCIENCE AND TECHNOLOGY STRAT-**
8 **EGY.**

9 Section 206 of the National Science and Technology
10 Policy, Organization, and Priorities Act of 1976 (42
11 U.S.C. 6615) is amended to read as follows:

12 **“SEC. 206. NATIONAL SCIENCE AND TECHNOLOGY STRAT-**
13 **EGY.**

14 “(a) IN GENERAL.—Not later than the end of each
15 calendar year immediately after the calendar year in which
16 a review under section 206b is completed, the Director of
17 the Office of Science and Technology Policy, in consulta-
18 tion with the National Science and Technology Council,
19 shall develop and submit to Congress a comprehensive na-
20 tional science and technology strategy of the United States
21 to meet national research and development objectives for
22 the following 4-year period (in this Act referred to as ‘the
23 national science and technology strategy’).

24 “(b) REQUIREMENTS.—Each national science and
25 technology strategy required by subsection (a) shall delin-

1 eate a national science and technology strategy consistent
2 with—

3 “(1) the recommendations and priorities devel-
4 oped by the review established in section 206b;

5 “(2) the most recent national security strategy
6 report submitted pursuant to section 1032 of the
7 National Defense Authorization Act for Fiscal Year
8 2012 (50 U.S.C. 3043);

9 “(3) other relevant national plans; and

10 “(4) the strategic plans of relevant Federal de-
11 partments and agencies.

12 “(c) CONSULTATION.—The Director shall consult as
13 necessary with the Office of Management and Budget and
14 other appropriate elements of the Executive Office of the
15 President to ensure that the recommendations and prior-
16 ities delineated in the science and technology strategy are
17 incorporated in the development of annual budget re-
18 quests.

19 “(d) REPORT.—The President shall submit to Con-
20 gress each year a comprehensive report on the national
21 science and technology strategy of the United States. Each
22 report on the national science and technology strategy of
23 the United States shall include a description of—

24 “(1) strategic objectives and priorities necessary
25 to maintain the leadership of the United States in

1 science and technology, including near-term, me-
 2 dium-term, and long-term research priorities;

3 “(2) programs, policies, and activities that the
 4 President recommends across all Federal agencies to
 5 achieve the strategic objectives in paragraph (1);
 6 and

7 “(3) global trends in science and technology, in-
 8 cluding potential threats to the leadership of the
 9 United States in science and technology.

10 “(e) PUBLICATION.—The Director shall, consistent
 11 with the protection of national security and other sensitive
 12 matters to the maximum extent practicable, make each re-
 13 port submitted under subsection (e) publicly available on
 14 an internet website of the Office of Science and Tech-
 15 nology Policy.”.

16 **SEC. 102. QUADRENNIAL SCIENCE AND TECHNOLOGY RE-**
 17 **VIEW.**

18 The National Science and Technology Policy, Organi-
 19 zation, and Priorities Act of 1976 (42 U.S.C. 6601 et seq.)
 20 is amended by inserting after section 206 the following:

21 **“SEC. 206b. QUADRENNIAL SCIENCE AND TECHNOLOGY RE-**
 22 **VIEW.**

23 “(a) REQUIREMENTS.—

24 “(1) QUADRENNIAL REVIEWS REQUIRED.—Not
 25 later than December 31, 2022, and every 4 years

1 thereafter, the Director of the Office of Science and
2 Technology Policy shall complete a review of the
3 science and technology enterprise of the United
4 States (in this section referred to as the ‘quadren-
5 nial science and technology review’).

6 “(2) SCOPE.—The quadrennial science and
7 technology review shall be a comprehensive examina-
8 tion of the science and technology strategy of the
9 United States, including recommendations for main-
10 taining global leadership in science and technology
11 and guidance on the coordination of programs, as-
12 sets, capabilities, budget, policies, and authorities
13 across all Federal research and development pro-
14 grams.

15 “(3) CONSULTATION.—The Director of the Of-
16 fice of Science and Technology shall conduct each
17 quadrennial science and technology review under this
18 subsection in consultation with—

19 “(A) the National Science and Technology
20 Council;

21 “(B) the heads of other relevant Federal
22 agencies;

23 “(C) the President’s Council of Advisors
24 on Science and Technology;

25 “(D) the National Science Board;

1 “(E) the National Security Council; and

2 “(F) other relevant governmental and non-
3 governmental entities, including representatives
4 from industry, institutions of higher education,
5 nonprofit institutions, Members of Congress,
6 and other policy experts.

7 “(4) COORDINATION.—The Director shall en-
8 sure that each quadrennial science and technology
9 review conducted under this section is coordinated
10 with other relevant statutorily required reviews, and
11 to the maximum extent practicable incorporates in-
12 formation and recommendations from existing re-
13 views to avoid duplication.

14 “(b) CONTENTS.—In each quadrennial science and
15 technology review, the Director shall—

16 “(1) provide an integrated view of, and rec-
17 ommendations for, science and technology policy
18 across the Federal Government, while considering
19 economic and national security;

20 “(2) assess and recommend priorities for re-
21 search, development and demonstration programs to
22 maintain American leadership in science and tech-
23 nology;

24 “(3) assess the global competition in science
25 and technology and identify potential threats to the

1 leadership of the United States in science and tech-
2 nology;

3 “(4) assess and make recommendations on the
4 science, technology, engineering, mathematics and
5 computer science workforce in the United States;

6 “(5) assess and make recommendations to im-
7 prove regional innovation across the United States;

8 “(6) assess and make recommendations to im-
9 prove translation of basic research and the enhance-
10 ment of technology transfer of federally funded re-
11 search;

12 “(7) assess and identify the infrastructure and
13 tools needed to maintain the leadership of the
14 United States in science and technology; and

15 “(8) review administrative or legislative policies
16 that affect the science and technology enterprise and
17 identify and make recommendations on policies that
18 hinder research and development in the United
19 States.

20 “(c) REPORTING.—

21 “(1) IN GENERAL.—Not later than December
22 31 of the year in which a quadrennial science and
23 technology review is conducted, the Director shall
24 submit a report of the review to Congress.

1 “(2) PUBLICATION.—The Director shall, con-
 2 sistent with the protection of national security and
 3 other sensitive matters to the maximum extent pos-
 4 sible, make each report submitted under paragraph
 5 (1) publicly available on an internet website of the
 6 Office of Science and Technology Policy.”.

7 **Subtitle B—Office of Science and**
 8 **Technology Policy**

9 **SEC. 111. AUTHORIZATION OF APPROPRIATIONS.**

10 There are authorized to be appropriated for the Of-
 11 fice of Science and Technology Policy—

- 12 (1) \$5,544,000 for fiscal year 2022;
 13 (2) \$6,100,000 for fiscal year 2023;
 14 (3) \$6,500,000 for fiscal year 2024;
 15 (4) \$6,500,000 for fiscal year 2025;
 16 (5) \$6,500,000 for fiscal year 2026;
 17 (6) \$6,500,000 for fiscal year 2027;
 18 (7) \$6,500,000 for fiscal year 2028;
 19 (8) \$6,500,000 for fiscal year 2029;
 20 (9) \$6,500,000 for fiscal year 2030; and
 21 (10) \$6,500,000 for fiscal year 2031.

1 **TITLE II—RESEARCH SECURITY**
2 **AND INTEGRITY**

3 **SEC. 201. FOREIGN TALENT PROGRAM PROHIBITION.**

4 (a) IN GENERAL.—Not later than 180 days after the
5 date of enactment of this Act, each Federal research agen-
6 cy head shall develop a policy to prohibit all agency per-
7 sonnel, including Federal employees, contract employees,
8 independent contractors, and special government employ-
9 ees, from participating in a foreign government talent re-
10 cruitment program.

11 (b) COORDINATION.—The Director of the Office of
12 Science and Technology Policy, acting through the Na-
13 tional Science and Technology Council and in accordance
14 with the authority provided under section 1746 of the Na-
15 tional Defense Authorization Act for Fiscal Year 2020
16 (Public Law 116–92; 42 U.S.C. 6601 note) shall to the
17 maximum extent practicable ensure that the policies devel-
18 oped by Federal research agencies under subsection (a)
19 are consistent.

20 (c) EXEMPTION.—Each policy developed under sub-
21 section (a) shall include an exemption for participation in
22 international conferences or other international exchanges,
23 partnerships or programs, as sanctioned or approved by
24 each Federal research agency head or their designee.

25 (d) DEFINITIONS.—In this section:

1 (1) FEDERAL RESEARCH AGENCY.—The term
2 “Federal research agency” means any Federal agen-
3 cy with an annual extramural research expenditure
4 of over \$100,000,000.

5 (2) FOREIGN GOVERNMENT TALENT RECRUIT-
6 MENT PROGRAM.—The term “foreign government
7 talent recruitment program” means any program
8 that includes compensation, including cash, research
9 funding, honorific titles, promised future compensa-
10 tion, or other types of remuneration, provided by the
11 foreign state or an entity sponsored by the foreign
12 state to the targeted individual in exchange for the
13 individual transferring knowledge and expertise to
14 the foreign country.

15 **SEC. 202. COMPUTING ENCLAVE PILOT PROGRAM.**

16 (a) IN GENERAL.—The Director of the National
17 Science Foundation, in consultation with the Director of
18 the National Institute of Standards and Technology and
19 the Secretary of Energy, shall award grants to establish
20 a pilot program to ensure the security of federally sup-
21 ported research data and to assist regional institutions of
22 higher education and their researchers in compliance with
23 regulations regarding the safeguarding of sensitive infor-
24 mation and other relevant regulations and Federal guide-
25 lines.

1 (b) STRUCTURE.—In carrying out the pilot program
2 established pursuant to subsection (a), the Director of the
3 National Science Foundation shall select three institutions
4 of higher education from among institutions classified
5 under the Indiana University Center for Postsecondary
6 Research Carnegie Classification as a doctorate-granting
7 university with a very high level of research activity, and
8 with a history of working with secure information for the
9 development, installation, maintenance, or sustainment of
10 secure computing enclaves.

11 (c) REGIONALIZATION.—

12 (1) In selecting universities pursuant to sub-
13 section (b), the Director of the National Science
14 Foundation shall give preference to institutions of
15 higher education with the capability of serving other
16 regional universities.

17 (2) The enclaves should be geographically dis-
18 persed to better meet the needs of regional interests.

19 (d) PROGRAM ELEMENTS.—The Director of the Na-
20 tional Science Foundation shall work with institutions of
21 higher education selected pursuant to subsection (b) to—

22 (1) develop an approved design blueprint for
23 compliance with Federal data protection protocols;

24 (2) develop a comprehensive and confidential
25 list, or a bill of materials, of each binary component

1 of the software, firmware, or product that is re-
2 quired to deploy additional secure computing en-
3 claves;

4 (3) develop templates for all policies and proce-
5 dures required to operate the secure computing en-
6 clave in a research setting;

7 (4) develop a system security plan template;
8 and

9 (5) develop a process for managing a plan of
10 action and milestones for the secure computing en-
11 clave.

12 (e) DURATION.—The pilot program established pur-
13 suant to subsection (a) shall operate for not less than 3
14 years.

15 (f) REPORT.—

16 (1) IN GENERAL.—The Director of the National
17 Science Foundation shall report to Congress not
18 later than 6 months after the completion of the pilot
19 program under subsection (a).

20 (2) CONTENTS.—The report required under
21 paragraph (1) shall include—

22 (A) an assessment of the pilot program
23 under subsection (a), including an assessment
24 of the security benefits provided by such secure
25 computing enclaves;

1 (B) recommendations related to the value
 2 of expanding the network of secure computing
 3 enclaves; and

4 (C) recommendations on the efficacy of the
 5 use of secure computing enclaves by other Fed-
 6 eral agencies in a broader effort to expand se-
 7 curity of Federal research.

8 **SEC. 203. PROTECTING RESEARCH FROM CYBER THEFT.**

9 (a) IMPROVING CYBERSECURITY OF INSTITUTIONS
 10 OF HIGHER EDUCATION.—Section 2(e)(1)(A) of the Na-
 11 tional Institute of Standards and Technology Act (15
 12 U.S.C. 272(e)(1)(A)) is amended—

13 (1) in clause (viii), by striking “and” after the
 14 semicolon;

15 (2) by redesignating clause (ix) as clause (x);
 16 and

17 (3) by inserting after clause (viii) the following:

18 “(ix) consider institutions of higher
 19 education (as defined in section 101 of the
 20 Higher Education Act of 1965 (20 U.S.C.
 21 1001)); and”.

22 (b) DISSEMINATION OF RESOURCES FOR RESEARCH
 23 INSTITUTIONS.—

24 (1) IN GENERAL.—Not later than 90 days after
 25 the date of the enactment of this Act, the Director

1 shall, using the authorities of the Director under
2 subsections (c)(15) and (e)(1)(A)(ix) of section 2 of
3 the National Institute of Standards and Technology
4 Act (15 U.S.C. 272), as amended by subsection (a),
5 disseminate and make publicly available resources to
6 help research institutions and institutions of higher
7 education identify, assess, manage, and reduce their
8 cybersecurity risk related to conducting research.

9 (2) REQUIREMENTS.—The Director shall en-
10 sure that the resources disseminated pursuant to
11 paragraph (1)—

12 (A) are generally applicable and usable by
13 a wide range of research institutions and insti-
14 tutions of higher education;

15 (B) vary with the nature and size of the
16 implementing research institutions or institu-
17 tions of higher education, and the nature and
18 sensitivity of the data collected or stored on the
19 information systems or devices of the imple-
20 menting research institutions or institutions of
21 higher education;

22 (C) include elements that promote aware-
23 ness of simple, basic controls, a workplace cy-
24 bersecurity culture, and third-party stakeholder
25 relationships, to assist research institutions or

1 institutions of higher education in mitigating
2 common cybersecurity risks;

3 (D) include case studies of practical appli-
4 cation;

5 (E) are technology-neutral and can be im-
6 plemented using technologies that are commer-
7 cial and off-the-shelf; and

8 (F) to the extent practicable, are based on
9 international standards.

10 (3) NATIONAL CYBERSECURITY AWARENESS
11 AND EDUCATION PROGRAM.—The Director shall en-
12 sure that the resources disseminated under para-
13 graph (1) are consistent with the efforts of the Di-
14 rector under section 401 of the Cybersecurity En-
15 hancement Act of 2014 (15 U.S.C. 7451).

16 (4) UPDATES.—The Director shall review peri-
17 odically and update the resources under paragraph
18 (1) as the Director determines appropriate.

19 (5) VOLUNTARY RESOURCES.—The use of the
20 resources disseminated under paragraph (1) shall be
21 considered voluntary.

22 (6) OTHER FEDERAL CYBERSECURITY RE-
23 QUIREMENTS.—Nothing in this section may be con-
24 strued to supersede, alter, or otherwise affect any

1 cybersecurity requirements applicable to Federal
2 agencies.

3 (c) DEFINITIONS.—In this section:

4 (1) DIRECTOR.—The term “Director” means
5 the Director of the National Institute of Standards
6 and Technology.

7 (2) INSTITUTION OF HIGHER EDUCATION.—The
8 term “institution of higher education” has the
9 meaning given such term in section 101 of the High-
10 er Education Act of 1965 (20 U.S.C. 1001).

11 (3) RESOURCES.—The term “resources” means
12 guidelines, tools, best practices, standards, meth-
13 odologies, and other ways of providing information.

14 (4) RESEARCH INSTITUTION.—The term “re-
15 search institution”—

16 (A) means a nonprofit institution (as de-
17 fined in section 4(3) of the Stevenson-Wydler
18 Technology Innovation Act of 1980 (15 U.S.C.
19 3703(3))); and

20 (B) includes federally funded research and
21 development centers, as identified by the Na-
22 tional Science Foundation in accordance with
23 the Federal Acquisition Regulation issued in ac-
24 cordance with section 1303(a)(1) of title 41 (or
25 any successor regulation).

1 **SEC. 204. CHINESE RESEARCH FUNDS ACCOUNTING ACT.**

2 (a) STUDY.—The Comptroller General of the United
3 States shall conduct a study on Federal funding made
4 available to covered entities for research during the study
5 period.

6 (b) MATTERS TO BE INCLUDED.—The study con-
7 ducted under subsection (a) shall include, to the extent
8 practicable with respect to the study period, an assessment
9 of—

10 (1) the total amount of Federal funding made
11 available to covered entities for research;

12 (2) the total number and types of covered enti-
13 ties to whom such funding was made available;

14 (3) the requirements relating to the awarding,
15 tracking, and monitoring of such funding;

16 (4) any other data available with respect to
17 Federal funding made available to covered entities
18 for research; and

19 (5) other matters the Comptroller General de-
20 termines appropriate.

21 (c) BRIEFING ON AVAILABLE DATA.—Not later than
22 120 days after the date of enactment of this Act, the
23 Comptroller General shall brief the Committee on Science,
24 Space, and Technology and the Committee on Foreign Af-
25 fairs of the House of Representatives and the Committee
26 on Commerce, Science, and Transportation and the Com-

1 mittee on Foreign Relations of the Senate on the data that
 2 is available with respect to Federal funding made available
 3 to covered entities for research.

4 (d) REPORT.—Not later than 240 days after the date
 5 of enactment of this Act, the Comptroller General shall
 6 submit to the congressional committees specified in sub-
 7 section (c) a report on the findings of the study conducted
 8 under subsection (a).

9 (e) DEFINITIONS.—In this section:

10 (1) COVERED ENTITY.—The term “covered en-
 11 tity” means an entity—

12 (A) located in the People’s Republic of
 13 China; or

14 (B) majority owned or controlled by the
 15 Chinese Communist Party.

16 (2) STUDY PERIOD.—The term “study period”
 17 means the 5-year period ending on the date of enact-
 18 ment of this Act.

19 **TITLE III—SUPPLY CHAIN AND** 20 **CRITICAL MATERIALS SECURITY**

21 **SEC. 301. NATIONAL SUPPLY CHAIN DATABASE.**

22 (a) ESTABLISHMENT OF NATIONAL SUPPLY CHAIN
 23 DATABASE.—The Director of the National Institute of
 24 Standards and Technology (referred to in this section as

1 “NIST”) shall establish a National Supply Chain Data-
2 base.

3 (b) PURPOSE.—The purpose of the National Supply
4 Chain Database shall be to assist the Federal government
5 and industry sectors in minimizing disruptions to the
6 United States supply chain by having an assessment of
7 United States manufacturers’ capabilities.

8 (c) STUDY ON NATIONAL SUPPLY CHAIN DATA-
9 BASE.—In establishing the National Supply Chain Data-
10 base, the Director of NIST shall take into consideration
11 the findings and recommendations from the study author-
12 ized in section 9413 of the National Defense Authorization
13 Act for Fiscal Year 2021 (Public Law 116–283), including
14 measures to secure and protect the National Supply Chain
15 Database from adversarial attacks and vulnerabilities.

16 (d) DATABASE AND MANUFACTURING EXTENSION
17 PARTNERSHIP.—

18 (1) IN GENERAL.—The National Supply Chain
19 Database shall be carried out and managed through
20 the Hollings Manufacturing Extension Partnership
21 program and the Director of NIST shall ensure that
22 the Hollings Manufacturing Extension Partnership
23 Centers are connected to the National Supply Chain
24 Database.

1 (2) CAPABILITIES.—The National Supply Chain
2 Database shall be capable of providing a national
3 view of the supply chain and enable authorized data-
4 base users to determine in near real-time the United
5 States manufacturing capabilities for critical prod-
6 ucts, including defense supplies, food, and medical
7 devices, including personal protective equipment.

8 (3) INDIVIDUAL STATE DATABASES.—Each
9 State’s supply chain database maintained by the
10 NIST-recognized Manufacturing Extension Partner-
11 ship Center within the State shall be complementary
12 in design to the National Supply Chain Database.

13 (e) MAINTENANCE OF NATIONAL SUPPLY CHAIN
14 DATABASE.—The Director of NIST through the Hollings
15 Manufacturing Extension Partnership program shall
16 maintain the National Supply Chain Database as an inte-
17 gration of the State level databases from each State’s
18 Manufacturing Extension Partnership Center and may be
19 populated with information from past, current, or poten-
20 tial Center clients.

21 (f) EXEMPT FROM PUBLIC DISCLOSURE.—The Na-
22 tional Supply Chain Database and any information related
23 to it not publicly released by NIST shall be exempt from
24 public disclosure under section 552 of title 5, United
25 States Code, and access to non-public content shall be lim-

1 ited to the contributing company and Manufacturing Ex-
2 tension Partnership Center staff who sign an appropriate
3 non-disclosure agreement.

4 **SEC. 302. CRITICAL MINERALS MINING RESEARCH AND DE-**
5 **VELOPMENT AT THE NATIONAL SCIENCE**
6 **FOUNDATION.**

7 (a) IN GENERAL.—The Director of the National
8 Science Foundation shall award grants, on a competitive
9 basis, to institutions of higher education or nonprofit orga-
10 nizations (or consortium of such institutions or organiza-
11 tions) to support basic research that will accelerate inno-
12 vation to advance critical minerals mining strategies and
13 technologies for the purpose of making better use of do-
14 mestic resources and eliminating national reliance on min-
15 erals and mineral materials that are subject to supply dis-
16 ruptions.

17 (b) USE OF FUNDS.—Activities funded by a grant
18 under this section may include—

19 (1) advancing mining research and development
20 activities to develop new mapping and mining tech-
21 nologies and techniques, including advanced critical
22 mineral extraction, production, separation, alloying,
23 or processing techniques and technologies that can
24 decrease energy intensity, potential environmental
25 impact and costs of those activities;

1 (2) conducting long-term earth observatory of
2 reclaimed mine sites, including the study of the evo-
3 lution of microbial diversity at such sites;

4 (3) examining the application of artificial intel-
5 ligence for geological exploration of critical minerals,
6 including what the size and diversity of data sets
7 would be required;

8 (4) examining the application of machine learn-
9 ing for detection and sorting of critical minerals, in-
10 cluding what the size and diversity of data sets
11 would be required;

12 (5) conducting detailed isotope studies of crit-
13 ical minerals and the development of more refined
14 geologic models; or

15 (6) providing training and researcher opportu-
16 nities to undergraduate and graduate students to
17 prepare the next generation of mining engineers and
18 researchers.

19 **SEC. 303. ADVANCED RECYCLING RESEARCH AND DEVEL-**
20 **OPMENT.**

21 (a) **SHORT TITLE.**—This section may be cited as the
22 “Advanced Recycling Research and Development Act of
23 2021”.

24 (b) **DEFINITIONS.**—In this section:

1 (1) DEPARTMENT.—The term “Department”
2 means the Department of Energy.

3 (2) NATIONAL LABORATORY.—The term “Na-
4 tional Laboratory” has the meaning given that term
5 in section 2 of the Energy Policy Act of 2005 (42
6 U.S.C. 15801).

7 (3) SECRETARY.—The term “Secretary” means
8 the Secretary of Energy.

9 (4) RECYCLABLE PLASTIC.—The term “recycla-
10 ble plastic” means plastic that is designed to be
11 readily, economically, and efficiently recyclable or
12 otherwise recoverable for beneficial use.

13 (5) CRITICAL MATERIAL.—The term “critical
14 material” means material that serves an essential
15 function in the manufacturing of a product and has
16 a high risk of a supply disruption, such that a short-
17 age of such material would have significant con-
18 sequences for the economic or national security of
19 the United States.

20 (6) COMPOSITE.—The term “composite” means
21 plastic reinforced with fiber or particulate secondary
22 material like bio-derived fibers, carbon fibers, glass
23 or any other solid material.

24 (c) OPTIMIZED PLASTICS RECYCLING RESEARCH
25 AND DEVELOPMENT PROGRAM.—

1 (1) IN GENERAL.—The Secretary shall carry
2 out a research, development, and demonstration pro-
3 gram to accelerate innovation in energy-efficient re-
4 cyclable plastics, next-generation plastics, and com-
5 posites recycling and upcycling strategies and tech-
6 nologies, in order to increase the economic value of
7 plastics supply streams and to reduce the environ-
8 mental impact of global plastics consumption.

9 (2) EXECUTION.—In carrying out the program
10 under this subsection, the Secretary shall—

11 (A) develop novel collection and sorting
12 technologies to prevent plastics and composites,
13 including waterborne plastics, from entering
14 landfills and the marine environment;

15 (B) develop biological, chemical, and hy-
16 brid bio-chemical technologies and methods for
17 deconstructing plastic and composite waste, in-
18 cluding environmental waste, into useful chem-
19 ical and material streams;

20 (C) develop technologies to upcycle waste,
21 including chemical, material, and gaseous
22 streams, into higher-value products;

23 (D) develop new economically recyclable-
24 by-design plastics and composites that can be

1 scaled for domestic manufacturability and re-
2 covery;

3 (E) develop new energy-efficient advanced
4 manufacturing techniques for reclaimed plastics
5 and composites; and

6 (F) develop new data collection methods
7 and practices in collaboration with relevant
8 Federal agencies.

9 (3) LEVERAGING.—In carrying out the program
10 under this subsection, the Secretary shall leverage
11 resources and expertise from—

12 (A) the Basic Energy Sciences Program
13 and the Biological and Environmental Research
14 Program of the Office of Science; and

15 (B) the Office of Energy Efficiency and
16 Renewable Energy.

17 (4) STANDARD OF REVIEW.—The Secretary
18 shall periodically review activities carried out under
19 the program under this subsection to determine the
20 achievement of technical milestones as determined
21 by the Secretary.

22 (5) FUNDING.—

23 (A) IN GENERAL.—From within funds au-
24 thorized to be appropriated—

1 (i) to the Department's Office of
 2 Science, there shall be made available to
 3 the Secretary to carry out the program
 4 under this subsection \$15,000,000 for each
 5 of fiscal years 2022 through 2026; and

6 (ii) to the Department's Office of En-
 7 ergy Efficiency and Renewable Energy,
 8 there shall be made available to the Sec-
 9 retary to carry out the program under this
 10 subsection \$25,000,000 for each of fiscal
 11 years 2022 through 2026.

12 (B) PROHIBITION.—In carrying out the
 13 program under this subsection, the Secretary
 14 shall not use funds made available under para-
 15 graph (1) for commercial application of energy
 16 technology.

17 (d) LITHIUM-ION BATTERY RECYCLING RESEARCH
 18 AND DEVELOPMENT PROGRAM.—

19 (1) IN GENERAL.—The Secretary shall carry
 20 out a research, development, and demonstration pro-
 21 gram to support the development of—

22 (A) advanced materials for batteries with
 23 considerations given to resource availability and
 24 environmentally benign disposal and recycling;
 25 and

1 (B) innovative technologies to reclaim and
2 recycle critical materials from advanced and
3 lithium-ion based battery technologies used in
4 consumer electronics, defense, stationary stor-
5 age, and transportation applications.

6 (2) EXECUTION.—In carrying out the program
7 under this subsection, the Secretary shall—

8 (A) promote the discovery of new domesti-
9 cally sourced raw materials for batteries that
10 can degrade without causing damage to the en-
11 vironment;

12 (B) develop innovative and cost-effective
13 technologies and processes for the collection,
14 storage, and transportation of discarded lith-
15 ium-ion batteries that use domestic mining re-
16 sources and increase availability of domestically
17 sourced raw materials for batteries; and

18 (C) develop cost-effective recycling proc-
19 esses to recover critical materials from dis-
20 carded lithium-ion batteries and enable their re-
21 introduction in new lithium-ion cell technologies
22 and for use in other relevant industries.

23 (3) LEVERAGING.—In carrying out the program
24 under this subsection, the Secretary shall leverage
25 resources and expertise from—

1 (A) the Basic Energy Sciences Program of
2 the Office of Science;

3 (B) the Office of Energy Efficiency and
4 Renewable Energy, including current lithium-
5 ion battery recycling activities supported by the
6 Vehicle Technologies Office within the Office of
7 Energy Efficiency and Renewable Energy; and

8 (C) the Office of Technology Transitions.

9 (4) STANDARD OF REVIEW.—The Secretary
10 shall periodically review activities carried out under
11 the program under this subsection to determine the
12 achievement of technical milestones as determined
13 by the Secretary.

14 (5) FUNDING.—

15 (A) IN GENERAL.—From within funds au-
16 thorized to be appropriated—

17 (i) to the Department's Office of
18 Science, there shall be made available to
19 the Secretary to carry out the activities
20 under this subsection \$10,000,000 for each
21 of fiscal years 2022 through 2026; and

22 (ii) to the Department's Office of En-
23 ergy Efficiency and Renewable Energy,
24 there shall be made available to the Sec-
25 retary to carry out the activities under this

1 subsection \$10,000,000 for each of fiscal
2 years 2022 through 2026.

3 (B) PROHIBITION.—In carrying out the
4 program under this subsection, the Secretary
5 shall not use funds made available under sub-
6 paragraph (A) for commercial application of en-
7 ergy technology.

8 **SEC. 304. CRITICAL MINERALS INTERAGENCY SUB-**
9 **COMMITTEE.**

10 (a) IN GENERAL.—The Critical Minerals Sub-
11 committee of the National Science and Technology Council
12 (referred to in this section as “Subcommittee”) shall co-
13 ordinate Federal science and technology efforts to ensure
14 secure and reliable supplies of critical minerals to the
15 United States.

16 (b) PURPOSES.—The purposes of the Subcommittee
17 shall be—

18 (1) to advise and assist the Committee on
19 Homeland and National Security and the National
20 Science and Technology Council on United States
21 policies, procedures, and plans as it relates to crit-
22 ical minerals, including—

23 (A) Federal research, development, and de-
24 ployment efforts to optimize methods for ex-
25 tractions, concentration, separation and purifi-

1 cation of conventional, secondary, and uncon-
2 ventional sources of critical minerals;

3 (B) efficient use and reuse of critical min-
4 erals;

5 (C) the critical minerals workforce of the
6 United States; and

7 (D) United States private industry invest-
8 ments in innovation and technology transfer
9 from federally funded science and technology;

10 (2) to identify emerging opportunities, stimu-
11 late international cooperation, and foster the devel-
12 opment of secure and reliable supply chains of crit-
13 ical minerals;

14 (3) to ensure the transparency of information
15 and data related to critical minerals; and

16 (4) to provide recommendations on coordination
17 and collaboration among the research, development,
18 and deployment programs and activities of Federal
19 agencies to promote a secure and reliable supply of
20 critical minerals necessary to maintain national se-
21 curity, economic well-being, and industrial produc-
22 tion.

23 (c) RESPONSIBILITIES.—In carrying out paragraphs
24 (1) and (2), the Subcommittee may, taking into account

1 the findings and recommendations of relevant advisory
2 committees—

3 (1) provide recommendations on how Federal
4 agencies may improve the topographic, geologic, and
5 geophysical mapping of the United States and im-
6 prove the discoverability, accessibility, and usability
7 of the resulting and existing data, to the extent per-
8 mitted by law and subject to appropriate limitation
9 for purposes of privacy and security; assess the
10 progress towards developing critical minerals recy-
11 cling and reprocessing technologies, and techno-
12 logical alternatives to critical minerals;

13 (2) examine options for accessing and devel-
14 oping critical minerals through investment and trade
15 with our allies and partners and provide rec-
16 ommendations;

17 (3) evaluate and provide recommendations to
18 incentivize the development and use of advances in
19 science and technology in the private industry;

20 (4) assess the need for and make recommenda-
21 tions to address the challenges the United States
22 critical minerals supply chain workforce faces, in-
23 cluding aging and retiring personnel and faculty;
24 public perceptions about the nature of mining and

1 mineral processing; and foreign competition for
2 United States talent;

3 (5) develop, and update as necessary, a stra-
4 tegic plan to guide Federal programs and activities
5 to enhance scientific and technical capabilities across
6 critical mineral supply chains, including a roadmap
7 that identifies key research and development needs
8 and coordinates ongoing activities for source diver-
9 sification, more efficient use, recycling, and substi-
10 tution for critical minerals; as well as cross-cutting
11 mining science, data science techniques, materials
12 science, manufacturing science and engineering,
13 computational modeling, and environmental health
14 and safety research and development; and

15 (6) report to the appropriate committees of
16 Congress on activities and findings under this sec-
17 tion.

18 **SEC. 305. HEAVY FREIGHT AUTONOMOUS TRUCKING RE-**
19 **SEARCH CORRIDOR.**

20 (a) IN GENERAL.—Not later than 1 year after the
21 date of enactment of this Act, the Secretary of Transpor-
22 tation shall establish a Heavy Freight Autonomous Truck-
23 ing Research Initiative to lay the foundation for the broad
24 scale adoption of autonomous freight trucking.

1 (b) RESPONSIBILITIES.—In carrying out the Initia-
2 tive established under subsection (a), the Secretary shall—

3 (1) support and conduct research and develop-
4 ment on automated and connected freight trucking
5 with private industry, and industry associations,
6 other Federal agencies, State and local Transpor-
7 tation agencies, research universities, and a National
8 Transportation center selected under section
9 5505(c)(2) of title 49, United States Code; and

10 (2) support or establish a heavy freight autono-
11 mous trucking research and development corridor
12 and related pilot programs.

13 (c) RESEARCH AND DEVELOPMENT AGENDA.—The
14 Secretary, in consultation with interested parties, shall es-
15 tablish an agenda for research and development conducted
16 under subsection (b)(1) and the programs described in
17 subsection (b)(2) that at a minimum, include—

18 (1) analyzing, modeling, and piloting the feasi-
19 bility and benefits of dedicated autonomous trucking
20 corridors, including their impact on—

21 (A) long distance freight movement;

22 (B) supply chains that are critical to the
23 United States economy;

24 (C) fuel economy and emissions;

25 (D) transportation infrastructure;

1 (E) vehicle miles traveled;

2 (F) the freight trucking workforce; and

3 (G) safety, accidents, and fatalities; and

4 (2) providing deployment guidance, including
5 for—

6 (A) utilization costs models;

7 (B) cyber-physical security; and

8 (C) human factors, including training the
9 next generation of the transportation workforce.

10 (d) ELIGIBILITY.—An institution of higher education
11 (as defined by section 102 of the Higher Education Act
12 of 1965 (20 U.S.C. 1002)) or a consortium composed of
13 nonprofits and institutions of higher education shall be eli-
14 gible to receive grants under this program.

15 (e) SELECTION CRITERIA.—In awarding a grant, the
16 Secretary shall—

17 (1) give preference to the recipient's past and
18 current collaboration with local and state transpor-
19 tation agencies in activities related to section;

20 (2) give preference to a recipient whose geo-
21 graphic location offer access to long haul tucking
22 corridors;

23 (3) consider the extent to which an applicant's
24 proposal would involve participation by local, re-
25 gional, and national stakeholders; and

1 (4) consider the local, regional, and national
2 impacts of the applicant’s proposal.

3 (f) FEDERAL SHARE.—The Federal share of a grant
4 under this subsection shall be 50 percent of the costs of
5 establishing and operating the test corridor and related
6 activities carried out by the grant recipient.

7 (g) AUTHORIZATION OF APPROPRIATIONS.—There
8 are authorized to be appropriated to the Secretary
9 \$6,000,000 for each of the fiscal years 2022 through 2026
10 for grants under this section.

11 **SEC. 306. NIST UAV CHALLENGES AND CREDENTIALING**
12 **PROGRAM.**

13 (a) UNMANNED AERIAL VEHICLE RESEARCH CHAL-
14 LENGE.—

15 (1) PRIZE CHALLENGE.—Pursuant to section
16 24 of the Stevenson-Wydler Technology Innovation
17 Act of 1980 (15 U.S.C. 3719), the Secretary of
18 Commerce, acting through the Under Secretary of
19 Commerce for Standards and Technology (referred
20 to in this subsection as the “Secretary”), shall, sub-
21 ject to appropriations, carry out a program to part-
22 ner with academic institutions to award prizes com-
23 petitively to stimulate research and development of
24 innovative unmanned aerial vehicle (UAV) tech-

1 nologies in order to expand upon and improve emer-
2 gency response operations.

3 (2) PLAN FOR EMERGENCY RESPONSE OPER-
4 ATIONS.—Each proposal submitted pursuant to
5 paragraph (1) shall include a plan for UAV imple-
6 mentation in emergency response operations.

7 (3) PRIZE AMOUNT.—In carrying out the pro-
8 gram under paragraph (1), the Secretary may award
9 not more than a total of \$2,250,000 to one or more
10 winners of the prize challenge.

11 (4) REPORT.—Not later than 60 days after the
12 date on which a prize is awarded under the prize
13 challenge, the Secretary shall submit to the relevant
14 committees of Congress a report that describes the
15 winning proposal of the prize challenge.

16 (5) CONSULTATION.—In carrying out the pro-
17 gram under subsection (a), the Secretary may con-
18 sult with the heads of relevant departments and
19 agencies of the Federal Government.

20 (b) UNMANNED AERIAL VEHICLE CREDENTIALING
21 PROGRAM.—The Secretary shall partner with academic in-
22 stitutions to establish the measurements and standards in-
23 frastructure necessary for credentialing remote pilots, in-
24 cluding implementation and demonstration of distributed

1 pilot training and evaluation using standard test methods,
2 and support flight test simulations.

3 (c) AUTHORIZATION OF APPROPRIATIONS.—There
4 are authorized to be appropriated to the Secretary to carry
5 out this section \$3,250,000 for fiscal years 2022 through
6 2032, of which not less than \$1,000,000 shall be used to
7 carry out subsection (b).

8 **TITLE IV—DEPARTMENT OF** 9 **ENERGY**

10 **Subtitle A—Office of Science**

11 **SEC. 401. DEFINITIONS.**

12 In this title:

13 (1) DEPARTMENT.—The term “Department”
14 means the Department of Energy.

15 (2) DIRECTOR.—The term “Director” means
16 the Director of the Office of Science of the Depart-
17 ment.

18 (3) NATIONAL LABORATORY.—The term “Na-
19 tional Laboratory” has the meaning given that term
20 in section 2 of the Energy Policy Act of 2005 (42
21 U.S.C. 15801).

22 (4) SECRETARY.—The term “Secretary” means
23 the Secretary of Energy.

1 **SEC. 402. BASIC ENERGY SCIENCES.**

2 (a) IN GENERAL.—Section 303 of the Department of
3 Energy Research and Innovation Act (42 U.S.C. 18641)
4 is amended—

5 (1) by redesignating subsections (a) through (e)
6 as subsections (b) through (f), respectively; and

7 (2) by inserting before subsection (b), as rededesignated
8 by paragraph (1), the following:

9 “(a) PROGRAM.—The Director shall carry out a fun-
10 damental research program in basic energy sciences, in-
11 cluding materials sciences and engineering, chemical
12 sciences, physical biosciences, and geosciences, in order to
13 provide the foundations for new energy technologies and
14 to support Department missions in energy, environment,
15 and national security.”.

16 (b) BASIC ENERGY SCIENCES USER FACILITIES.—
17 Paragraph (3) of subsection (c) of such section, as redesignated
18 by subsection (a)(1), is amended—

19 (1) in subparagraph (C), by striking “and”;

20 (2) by redesignating subparagraph (D) as sub-
21 paragraph (E); and

22 (3) by inserting after subparagraph (C) the fol-
23 lowing:

24 “(D) autonomous chemistry and materials
25 synthesis facilities that leverage advances in ar-
26 tificial intelligence; and”.

1 (c) BASIC ENERGY SCIENCES RESEARCH INFRA-
2 STRUCTURE.—Such section, as amended by subsection
3 (a), is further amended by adding at the end the following:

4 “(g) BASIC ENERGY SCIENCES RESEARCH INFRA-
5 STRUCTURE.—

6 “(1) ADVANCED PHOTON SOURCE UPGRADE.—

7 “(A) IN GENERAL.—The Secretary shall
8 provide for the upgrade to the Advanced Pho-
9 ton Source described in the publication ap-
10 proved by the Basic Energy Sciences Advisory
11 Committee on June 9, 2016, titled ‘Report on
12 Facility Upgrades’, including the development
13 of a multi-bend achromat lattice to produce a
14 high flux of coherent x-rays within the hard x-
15 ray energy region and a suite of beamlines opti-
16 mized for this source.

17 “(B) DEFINITIONS.—In this paragraph:

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

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

23 “(C) START OF OPERATIONS.—The Sec-
24 retary shall, to the maximum extent practicable,
25 ensure that the start of full operations of the

1 upgrade under this paragraph occurs before
2 March 31, 2026.

3 “(D) FUNDING.—Out of funds authorized
4 to be appropriated under section 409 for Basic
5 Energy Sciences, there shall be made available
6 to the Secretary to carry out the upgrade under
7 this paragraph—

8 “(i) \$106,200,000 for fiscal year
9 2022; and

10 “(ii) \$5,000,000 for fiscal year 2023.

11 “(2) SPALLATION NEUTRON SOURCE PROTON
12 POWER UPGRADE.—

13 “(A) IN GENERAL.—The Secretary shall
14 provide for a proton power upgrade to the
15 Spallation Neutron Source.

16 “(B) PROTON POWER UPGRADE DE-
17 FINED.—For the purposes of this paragraph,
18 the term ‘proton power upgrade’ means the
19 Spallation Neutron Source power upgrade de-
20 scribed in—

21 “(i) the publication of the Office of
22 Science of the Department of Energy titled
23 ‘Facilities for the Future of Science: A
24 Twenty-Year Outlook’, published December
25 2003;

1 “(ii) the publication of the Office of
2 Science of the Department of Energy titled
3 ‘Four Years Later: An Interim Report on
4 Facilities for the Future of Science: A
5 Twenty-Year Outlook’, published August
6 2007; and

7 “(iii) the publication approved by the
8 Basic Energy Sciences Advisory Committee
9 on June 9, 2016, titled ‘Report on Facility
10 Upgrades’.

11 “(C) START OF OPERATIONS.—The Sec-
12 retary shall, to the maximum extent practicable,
13 ensure that the start of full operations of the
14 upgrade under this paragraph occurs before De-
15 cember 31, 2025.

16 “(D) FUNDING.—Out of funds authorized
17 to be appropriated under section 409 for Basic
18 Energy Sciences, there shall be made available
19 to the Secretary to carry out the upgrade under
20 this paragraph—

21 “(i) \$25,000,000 for fiscal year 2022;

22 “(ii) \$17,000,000 for fiscal year 2023;

23 and

24 “(iii) \$7,800,000 for fiscal year 2024.

1 “(3) SPALLATION NEUTRON SOURCE SECOND
2 TARGET STATION.—

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

6 “(B) DEFINITION OF SECOND TARGET
7 STATION.—For the purposes of this paragraph,
8 the term ‘second target station’ means the
9 Spallation Neutron Source second target station
10 described in—

11 “(i) the publication of the Office of
12 Science of the Department of Energy titled
13 ‘Facilities for the Future of Science: A
14 Twenty-Year Outlook’, published December
15 2003;

16 “(ii) the publication of the Office of
17 Science of the Department of Energy titled
18 ‘Four Years Later: An Interim Report on
19 Facilities for the Future of Science: A
20 Twenty-Year Outlook’, published August
21 2007; and

22 “(iii) the publication approved by the
23 Basic Energy Sciences Advisory Committee
24 on June 9, 2016, titled ‘Report on Facility
25 Upgrades’.

1 “(C) START OF OPERATIONS.—The Sec-
2 retary shall, to the maximum extent practicable,
3 ensure that the start of full operations of the
4 second target station under this paragraph oc-
5 curs before December 31, 2030, with the option
6 for early operation in 2028.

7 “(D) FUNDING.—Out of funds authorized
8 to be appropriated under section 409 for Basic
9 Energy Sciences, there shall be made available
10 to the Secretary to carry out activities, includ-
11 ing construction, under this paragraph—

12 “(i) \$50,000,000 for fiscal year 2022;

13 “(ii) \$200,000,000 for fiscal year
14 2023;

15 “(iii) \$275,000,000 for fiscal year
16 2024;

17 “(iv) \$275,000,000 for fiscal year
18 2025;

19 “(v) \$275,000,000 for fiscal year
20 2026;

21 “(vi) \$250,000,000 for fiscal year
22 2027; and

23 “(vii) \$120,000,000 for fiscal year
24 2028.

25 “(4) ADVANCED LIGHT SOURCE UPGRADE.—

1 “(A) IN GENERAL.—The Secretary shall
2 provide for the upgrade to the Advanced Light
3 Source described in the publication approved by
4 the Basic Energy Sciences Advisory Committee
5 on June 9, 2016, titled ‘Report on Facility Up-
6 grades’, including the development of a multi-
7 bend achromat lattice to produce a high flux of
8 coherent x-rays within the soft x-ray energy re-
9 gion.

10 “(B) DEFINITIONS.—In this paragraph:

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

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

16 “(C) START OF OPERATIONS.—The Sec-
17 retary shall, to the maximum extent practicable,
18 ensure that the start of full operations of the
19 upgrade under this paragraph occurs before De-
20 cember 31, 2026.

21 “(D) FUNDING.—Out of funds authorized
22 to be appropriated under section 409 for Basic
23 Energy Sciences, there shall be made available
24 to the Secretary to carry out the upgrade under
25 this paragraph—

1 “(i) \$100,000,000 for fiscal year
2 2022;

3 “(ii) \$130,000,000 for fiscal year
4 2023;

5 “(iii) \$102,500,000 for fiscal year
6 2024; and

7 “(iv) \$21,500,000 for fiscal year
8 2025.

9 “(5) LINAC COHERENT LIGHT SOURCE II HIGH
10 ENERGY UPGRADE.—

11 “(A) IN GENERAL.—The Secretary shall
12 provide for the upgrade to the Linac Coherent
13 Light Source II facility described in the publi-
14 cation approved by the Basic Energy Sciences
15 Advisory Committee on June 9, 2016, titled
16 ‘Report on Facility Upgrades’, including the de-
17 velopment of experimental capabilities for high
18 energy x-rays to reveal fundamental scientific
19 discoveries. The Secretary shall ensure the up-
20 grade under this paragraph enables the produc-
21 tion and use of high energy, ultra-short pulse x-
22 rays delivered at a high repetition rate.

23 “(B) DEFINITIONS.—In this paragraph:

24 “(i) HIGH ENERGY X-RAY.—The term
25 ‘high energy x-ray’ means a photon with

1 an energy in the 5 to 13 kiloelectron volt
2 range.

3 “(ii) HIGH REPETITION RATE.—The
4 term ‘high repetition rate’ means the deliv-
5 ery of x-ray pulses up to 1 million pulses
6 per second.

7 “(iii) ULTRA-SHORT PULSE X-RAYS.—
8 The term ‘ultra-short pulse x-rays’ means
9 x-ray bursts capable of durations of less
10 than 100 femtoseconds.

11 “(C) START OF OPERATIONS.—The Sec-
12 retary shall, to the maximum extent practicable,
13 ensure that the start of full operations of the
14 upgrade under this paragraph occurs before De-
15 cember 31, 2026.

16 “(D) FUNDING.—Out of funds authorized
17 to be appropriated under section 409 for Basic
18 Energy Sciences, there shall be made available
19 to the Secretary to carry out the upgrade under
20 this paragraph—

21 “(i) \$87,000,000 for fiscal year 2022;

22 “(ii) \$100,000,000 for fiscal year
23 2023;

24 “(iii) \$100,000,000 for fiscal year
25 2024;

1 “(iv) \$100,000,000 for fiscal year
2 2025; and
3 “(v) \$83,000,000 for fiscal year
4 2026.”.

5 (d) ARTIFICIAL PHOTOSYNTHESIS.—Subtitle G of
6 title IX of the Energy Policy Act of 2005 (42 U.S.C.
7 16311 et seq.) is amended—

8 (1) in section 973(b), by striking paragraph (4)
9 and inserting:

10 “(4)(A) FUNDING.—From within funds author-
11 ized to be appropriated under section 409 of the Se-
12 curing American Leadership in Science and Tech-
13 nology Act of 2021 for Basic Energy Sciences, the
14 Secretary shall make available for carrying out ac-
15 tivities under this subsection \$50,000,000 for each
16 of fiscal years 2022 through 2031.

17 “(B) PROHIBITION.—No funds allocated to the
18 program described in paragraph (1) may be obli-
19 gated or expended for commercial application of en-
20 ergy technology.”; and

21 (2) in section 975(c), by striking paragraph (4)
22 and inserting:

23 “(4)(A) FUNDING.—From within funds author-
24 ized to be appropriated under section 409 of the Se-
25 curing American Leadership in Science and Tech-

1 nology Act of 2021 for Basic Energy Sciences and
2 Biological and Environmental Research, the Sec-
3 retary shall make available for carrying out activities
4 under this subsection \$50,000,000 for each of fiscal
5 years 2022 through 2031.

6 “(B) PROHIBITION.—No funds allocated to the
7 program described in paragraph (1) may be obli-
8 gated or expended for commercial application of en-
9 ergy technology.”.

10 (e) ELECTRICITY STORAGE RESEARCH INITIATIVE.—
11 Section 975 of the Energy Policy Act of 2005 (42 U.S.C.
12 16315) is amended—

13 (1) in subsection (b), by striking paragraph (4)
14 and inserting:

15 “(4)(A) FUNDING.—From within funds author-
16 ized to be appropriated under section 409 of the Se-
17 curing American Leadership in Science and Tech-
18 nology Act of 2021 for Basic Energy Sciences, the
19 Secretary shall make available for carrying out ac-
20 tivities under this subsection \$50,000,000 for each
21 of fiscal years 2022 through 2031.

22 “(B) PROHIBITION.—No funds allocated to the
23 program described in paragraph (1) may be obli-
24 gated or expended for commercial application of en-
25 ergy technology.”;

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

3 “(4)(A) FUNDING.—From within funds author-
4 ized to be appropriated under section 409 of the Se-
5 curing American Leadership in Science and Tech-
6 nology Act of 2021 for Basic Energy Sciences and
7 Advanced Scientific Computing Research, the Sec-
8 retary shall make available for carrying out activities
9 under this subsection \$30,000,000 for each of fiscal
10 years 2022 through 2031.

11 “(B) PROHIBITION.—No funds allocated to the
12 program described in paragraph (1) may be obli-
13 gated or expended for commercial application of en-
14 ergy technology.”; and

15 (3) in subsection (d), by striking paragraph (4)
16 and inserting:

17 “(4)(A) FUNDING.—From within funds author-
18 ized to be appropriated under section 409 of the Se-
19 curing American Leadership in Science and Tech-
20 nology Act of 2021 for Basic Energy Sciences and
21 Biological and Environmental Research, the Sec-
22 retary shall make available for carrying out activities
23 under this subsection \$20,000,000 for each of fiscal
24 years 2022 through 2031.

1 “(B) PROHIBITION.—No funds allocated to the
2 program described in paragraph (1) may be obli-
3 gated or expended for commercial application of en-
4 ergy technology.”.

5 (f) COMPUTATIONAL MATERIALS AND CHEMISTRY.—
6 Section 303 of the Department of Energy Research and
7 Innovation Act (42 U.S.C. 18641) is amended by inserting
8 after subsection (d) as so redesignated, the following:

9 “(1) IN GENERAL.—The Director shall support
10 a program of fundamental research for the applica-
11 tion of advanced computing practices to foundational
12 and emerging research problems in chemistry and
13 materials science.

14 “(2) COMPUTATIONAL MATERIALS AND CHEM-
15 ISTRY SCIENCE CENTERS.—

16 “(A) IN GENERAL.—In carrying out the
17 activities authorized under paragraph (1), the
18 Director shall select and establish up to four
19 computational materials and chemistry science
20 centers to develop open-source, robust, and vali-
21 dated computational codes and user-friendly
22 software, coupled with innovative use of experi-
23 mental and theoretical data, to enable the de-
24 sign, discovery, and development of new mate-
25 rials and chemical systems including chemical

1 catalysis research and development. These cen-
2 ters shall also focus on overcoming challenges
3 and maximizing the benefits of exascale and
4 other high performance computing systems.

5 “(B) SELECTION.—The Director shall se-
6 lect centers under paragraph (1) on a competi-
7 tive, merit-reviewed basis. The Director shall
8 consider applications from the National Labora-
9 tories, institutes of higher education, multi-in-
10 stitutional collaborations, and other appropriate
11 entities.

12 “(C) DURATION.—A center established
13 under this subsection shall receive support for
14 a period of not more than 5 years, subject to
15 the availability of appropriations.

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

21 “(E) TERMINATION.—Consistent with the
22 existing authorities of the Department, the Di-
23 rector may terminate an underperforming cen-
24 ter for cause during the performance period.

25 “(3) MATERIALS RESEARCH DATABASE.—

1 “(A) IN GENERAL.—The Director shall
2 support the development of a web-based plat-
3 form to provide access to a database of com-
4 puted information on known and predicted ma-
5 terials properties and computational tools to ac-
6 celerate breakthroughs in materials discovery
7 and design.

8 “(B) PROGRAM.—In carrying out this sec-
9 tion, the Director shall—

10 “(i) conduct cooperative research with
11 industry, academia, and other research in-
12 stitutions to facilitate the design of novel
13 materials;

14 “(ii) leverage existing high perform-
15 ance computing systems to conduct high-
16 throughput calculations, and develop com-
17 putational and data mining algorithms for
18 the prediction of material properties;

19 “(iii) advance understanding, pre-
20 diction, and manipulation of materials;

21 “(iv) strengthen the foundation for
22 new technologies and advanced manufac-
23 turing; and

24 “(v) drive the development of ad-
25 vanced materials for applications that span

1 the Department’s missions in energy, envi-
2 ronment, and national security.

3 “(C) COORDINATION.—In carrying out this
4 section, the Director shall leverage programs
5 and activities across the Department.

6 “(D) FUNDING.—Out of funds authorized
7 to be appropriated under section 409 for Basic
8 Energy Sciences there shall be made available
9 to the Secretary to carry out activities under
10 this subsection \$10,000,000 for each of the fis-
11 cal years 2022 through 2031.”.

12 **SEC. 403. ADVANCED SCIENTIFIC COMPUTING RESEARCH.**

13 (a) IN GENERAL.—Section 304 of the Department of
14 Energy Research and Innovation Act (42 U.S.C. 18642)
15 is amended—

16 (1) by redesignating subsections (a) through (c)
17 as subsections (b) through (d), respectively; and

18 (2) by inserting before subsection (b), as redes-
19 ignated by paragraph (1), the following:

20 “(a) PROGRAM.—The Director shall carry out a re-
21 search, development, and demonstration program to ad-
22 vance computational and networking capabilities to ana-
23 lyze, model, simulate, and predict complex phenomena rel-
24 evant to the development of new energy technologies and
25 the competitiveness of the United States.”.

1 (b) ADDITIONAL PROGRAMS.—Such section, as
2 amended by subsection (a), is further amended by adding
3 at the end the following:

4 “(e) BEYOND EXASCALE COMPUTING PROGRAM.—

5 “(1) IN GENERAL.—The Secretary shall estab-
6 lish a program to develop and implement a strategy
7 for achieving computing systems with capabilities be-
8 yond exascale computing systems. In establishing
9 this program, the Secretary shall—

10 “(A) maintain foundational research pro-
11 grams in mathematical, computational, and
12 computer sciences focused on new and emerging
13 computing needs within the mission of the De-
14 partment, including but not limited to post-
15 Moore’s law computing architectures, novel ap-
16 proaches to modeling and simulation, artificial
17 intelligence and scientific machine learning,
18 quantum computing, and extreme heterogeneity;
19 and

20 “(B) retain best practices and maintain
21 support for essential hardware and software ele-
22 ments of the Exascale Computing Project that
23 are necessary for sustaining the vitality of a
24 long-term exascale ecosystem.

1 “(2) REPORT.—Not later than one year after
2 the date of the enactment of this Act, the Secretary
3 shall submit to the Committee on Science, Space,
4 and Technology of the House of Representatives,
5 and the Committee on Energy and Natural Re-
6 sources of the Senate, a report on the development
7 and implementation of the strategy outlined in para-
8 graph (1).

9 “(f) ENERGY EFFICIENT COMPUTING PROGRAM.—

10 “(1) IN GENERAL.—The Secretary shall sup-
11 port a program of fundamental research, develop-
12 ment, and demonstration of energy efficient com-
13 puting technologies relevant to advanced computing
14 applications in high performance computing, artifi-
15 cial intelligence, and scientific machine learning.

16 “(2) EXECUTION.—

17 “(A) PROGRAM.—In carrying out the pro-
18 gram, the Secretary shall—

19 “(i) establish a partnership for Na-
20 tional Laboratories, industry partners, and
21 institutions of higher education for co-
22 design of energy efficient hardware, tech-
23 nology, software, and applications across
24 all applicable program offices of the De-
25 partment;

1 “(ii) develop hardware and software
2 technologies that decrease the energy needs
3 of advanced computing practices;

4 “(iii) consider multiple heterogeneous
5 computing architectures, including neuro-
6 morphic computing, persistent computing,
7 and ultrafast networking; and

8 “(iv) provide, as appropriate, on a
9 competitive, merit-reviewed basis, access
10 for researchers from institutions of higher
11 education, National Laboratories, industry,
12 and other Federal agencies to the energy
13 efficient computing technologies developed
14 pursuant to clause (i).

15 “(B) SELECTION OF PARTNERS.—In se-
16 lecting participants for the partnership estab-
17 lished under subparagraph (A)(i), the Secretary
18 shall select participants through a competitive,
19 merit-review process.

20 “(3) REPORT.—Not later than one year after
21 the date of the enactment of this Act, the Secretary
22 shall submit to the Committee on Science, Space,
23 and Technology of the House of Representatives,
24 and the Committee on Energy and Natural Re-
25 sources of the Senate, a report on—

1 “(A) the activities conducted under sub-
2 paragraph (A); and

3 “(B) the coordination and management of
4 the Program to ensure an integrated research
5 program across the Department.

6 “(g) ARTIFICIAL INTELLIGENCE, DATA ANALYTICS,
7 AND COMPUTATIONAL RESEARCH.—

8 “(1) IN GENERAL.—The Secretary shall carry
9 out a program to develop tools for big data analytics
10 by utilizing data sets generated by Federal agencies,
11 institutions of higher education, nonprofit research
12 organizations, and industry in order to advance arti-
13 ficial intelligence technologies to solve complex, big
14 data challenges. The Secretary shall carry out this
15 program through a competitive, merit-reviewed proc-
16 ess, and consider applications from National Labora-
17 tories, institutions of higher education, multi-institu-
18 tional collaborations, and other appropriate entities.

19 “(2) PROGRAM COMPONENTS.—In carrying out
20 the program established under paragraph (1), the
21 Secretary shall—

22 “(A) establish a cross-cutting research ini-
23 tiative to prevent duplication and coordinate re-
24 search efforts in artificial intelligence and data
25 analytics across the Department;

1 “(B) conduct basic research in modeling
2 and simulation, artificial intelligence, machine
3 learning, large-scale data analytics, natural lan-
4 guage processing, and predictive analysis in
5 order to develop novel or optimized predictive
6 algorithms suitable for high-performance com-
7 puting systems and large biomedical data sets;

8 “(C) develop multivariate optimization
9 models to accommodate large data sets with
10 variable quality and scale in order to visualize
11 complex systems;

12 “(D) establish multiple scientific com-
13 puting facilities to serve as data enclaves capa-
14 ble of securely storing data sets created by Fed-
15 eral agencies, institutions of higher education,
16 nonprofit organizations, or industry at National
17 Laboratories; and

18 “(E) promote collaboration and data shar-
19 ing between National Laboratories, research en-
20 tities, and facilities of the Department by pro-
21 viding the necessary access and secure data
22 transfer capabilities.

23 “(3) REPORT.—Not later than 2 years after the
24 date of the enactment of this Act, the Secretary
25 shall submit to the Committee on Science, Space,

1 and Technology of the House of Representatives and
2 the Committee on Energy and Natural Resources of
3 the Senate a report evaluating the effectiveness of
4 the program under paragraph (1), including basic
5 research discoveries achieved in the course of the
6 program and potential opportunities to expand the
7 technical capabilities of the Department through the
8 development of artificial intelligence and data ana-
9 lytics technologies.

10 “(h) ENERGY SCIENCES NETWORK.—

11 “(1) IN GENERAL.—The Secretary shall provide
12 for an upgrade to the Energy Sciences Network user
13 facility in order to meet Federal research needs for
14 highly reliable data transport capabilities optimized
15 for the requirements of large-scale science.

16 “(2) CAPABILITIES.—In carrying out paragraph
17 (1), the Secretary shall ensure the following capabili-
18 ties:

19 “(A) To provide high bandwidth scientific
20 networking across the continental United States
21 and the Atlantic Ocean.

22 “(B) To maximize network reliability.

23 “(C) To protect the network and data from
24 cyber-attacks.

1 “(D) To support exponentially increasing
2 levels of data from the Department’s scientific
3 user facilities, experiments, and sensors.

4 “(E) To integrate heterogeneous com-
5 puting frameworks and systems.

6 “(i) WORKFORCE DEVELOPMENT.—The Director of
7 the Office of Advanced Scientific Computing Research
8 shall support the development of a computational science
9 workforce through a program that—

10 “(1) facilitates collaboration between university
11 students and researchers at the National Labora-
12 tories; and

13 “(2) endeavors to advance science in areas rel-
14 evant to the mission of the Department through the
15 application of computational science.

16 “(j) COMPUTATIONAL SCIENCE GRADUATE FELLOW-
17 SHIP.—

18 “(1) IN GENERAL.—The Secretary shall sup-
19 port the Computational Science Graduate Fellowship
20 program in order to facilitate collaboration between
21 graduate students and researchers at the National
22 Laboratories, and contribute to the development of
23 a computational workforce to help advance research
24 in areas relevant to the mission of the Department.

1 “(2) FUNDING.—From within funds authorized
2 to be appropriated under section 409 of the Securing
3 American Leadership in Science and Technology Act
4 of 2021 for Advanced Scientific Computing Research
5 Program, the Secretary shall make available for car-
6 rying out the activities under this section—

7 “(A) \$21,000,000 for fiscal year 2022;

8 “(B) \$22,050,000 for fiscal year 2023;

9 “(C) \$23,152,500 for fiscal year 2024; and

10 “(D) 24,310,125 for fiscal year 2025.”.

11 (c) APPLIED MATHEMATICS AND SOFTWARE DEVEL-
12 OPMENT.—Subsection (d) of such section, as redesignated
13 by subsection (a)(1), is amended to read as follows:

14 “(c) APPLIED MATHEMATICS AND SOFTWARE DE-
15 VELOPMENT FOR HIGH-END COMPUTING SYSTEMS, COM-
16 PUTATIONAL, AND COMPUTER SCIENCES RESEARCH.—

17 “(1) IN GENERAL.—The Director shall carry
18 out activities to develop, test, and support—

19 “(A) mathematics, models, statistics, and
20 algorithms for modeling complex systems on ad-
21 vanced computing architectures; and

22 “(B) tools, languages, programming envi-
23 ronments, and operations for high-end com-
24 puting systems (as defined in section 2 of the

1 American Super Computing Leadership Act (15
2 U.S.C. 5541), as renamed by this section).

3 “(2) PORTFOLIO BALANCE.—The Director shall
4 maintain a balanced portfolio within the advanced
5 scientific computing research and development pro-
6 gram established under section 976 of the Energy
7 Policy Act of 2005 (42 U.S.C. 16316) that supports
8 robust investment in—

9 “(A) applied mathematical, computational,
10 and computer sciences research needs relevant
11 to the mission of the Department, including ac-
12 tivities related to data science, artificial intel-
13 ligence, scientific machine learning, quantum
14 information science, and other emerging areas;
15 and

16 “(B) associated high-performance com-
17 puting hardware and facilities.”.

18 (d) QUANTUM SCIENCE NETWORK.—

19 (1) DEFINITIONS.—Section 2 of the National
20 Quantum Initiative Act (15 U.S.C. 8801) is amend-
21 ed—

22 (A) by redesignating paragraph (7) as
23 paragraph (8); and

24 (B) by inserting after paragraph (6) the
25 following:

1 “(7) QUANTUM NETWORK INFRASTRUCTURE.—

2 The term ‘quantum network infrastructure’ means
3 any facility, expertise, or capability that is necessary
4 to enable the development and deployment of scal-
5 able and diverse quantum network technologies.”.

6 (2) DEPARTMENT OF ENERGY QUANTUM NET-
7 WORK INFRASTRUCTURE RESEARCH AND DEVELOP-
8 MENT PROGRAM.—Title IV of the National Quantum
9 Initiative Act (15 U.S.C. 8851 et seq.) is amended
10 by adding at the end the following:

11 **“SEC. 403. DEPARTMENT OF ENERGY QUANTUM NETWORK**
12 **INFRASTRUCTURE RESEARCH AND DEVELOP-**
13 **MENT PROGRAM.**

14 “(a) IN GENERAL.—The Secretary of Energy (re-
15 ferred to in this section as the ‘Secretary’) shall carry out
16 a research, development, and demonstration program to
17 accelerate innovation in quantum network infrastructure
18 in order to—

19 “(1) facilitate the advancement of distributed
20 quantum computing systems through the internet
21 and intranet;

22 “(2) improve the precision of measurements of
23 scientific phenomena and physical imaging tech-
24 nologies; and

1 “(3) develop secure national quantum commu-
2 nications technologies and strategies.

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

5 “(1) coordinate with—

6 “(A) the Director of the National Science
7 Foundation;

8 “(B) the Director of the National Institute
9 of Standards and Technology;

10 “(C) the Chair of the subcommittee on
11 Quantum Information Science of the National
12 Science and Technology Council established
13 under section 103(a); and

14 “(D) the Chair of the subcommittee on the
15 Economic and Security Implications of Quan-
16 tum Science;

17 “(2) conduct cooperative research with indus-
18 try, National Laboratories, institutions of higher
19 education, and other research institutions to facili-
20 tate new quantum infrastructure methods and tech-
21 nologies, including—

22 “(A) quantum-limited detectors, ultra-low
23 loss optical channels, space-to-ground connec-
24 tions, and classical networking and cybersecu-
25 rity protocols;

1 “(B) entanglement and hyper-entangled
2 state sources and transmission, control, and
3 measurement of quantum states;

4 “(C) quantum interconnects that allow
5 short range local connections between quantum
6 processors;

7 “(D) transducers for quantum sources and
8 signals between optical and telecommunications
9 regimes and quantum computer-relevant do-
10 mains, including microwaves;

11 “(E) development of quantum memory
12 buffers and small-scale quantum computers
13 that are compatible with photon-based quantum
14 bits in the optical or telecommunications wave-
15 lengths;

16 “(F) long-range entanglement distribution
17 at both the terrestrial and space-based level
18 using quantum repeaters, allowing entangle-
19 ment-based protocols between small- and large-
20 scale quantum processors;

21 “(G) quantum routers, multiplexers, re-
22 peaters, and related technologies necessary to
23 create secure long-distance quantum commu-
24 nication; and

1 “(H) integration of systems across the
2 quantum technology stack into traditional com-
3 puting networks, including the development of
4 remote controlled, high performance, and reli-
5 able implementations of key quantum network
6 components;

7 “(3) engage with the Quantum Economic De-
8 velopment Consortium (QED–C) to transition com-
9 ponent technologies to help facilitate as appropriate
10 the development of a quantum supply chain for
11 quantum network technologies;

12 “(4) advance basic research in advanced sci-
13 entific computing and material science to enhance
14 the understanding, prediction, and manipulation of
15 materials and processes relevant to quantum net-
16 work infrastructure;

17 “(5) develop experimental tools and testbeds
18 necessary to support cross-cutting fundamental re-
19 search and development activities with diverse stake-
20 holders from industry and institutions of higher edu-
21 cation; and

22 “(6) consider quantum network infrastructure
23 applications that span the Department of Energy’s
24 missions in energy, environment, and national secu-
25 rity.

1 “(c) LEVERAGING.—In carrying out this section, the
2 Secretary shall leverage resources, infrastructure, and ex-
3 pertise across the Department of Energy and from—

4 “(1) the National Institute of Standards and
5 Technology;

6 “(2) the National Science Foundation;

7 “(3) the National Aeronautics and Space Ad-
8 ministration;

9 “(4) other relevant Federal agencies;

10 “(5) the National Laboratories;

11 “(6) industry stakeholders;

12 “(7) institutions of higher education; and

13 “(8) the National Quantum Information
14 Science Research Centers.

15 “(d) RESEARCH PLAN.—Not later than 180 days
16 after the date of the enactment of the Securing American
17 Leadership in Science and Technology Act of 2021, the
18 Secretary shall submit to the Committee on Science,
19 Space, and Technology of the House of Representatives
20 and the Committee on Energy and Natural Resources of
21 the Senate, a 4-year research plan that identifies and
22 prioritizes basic research needs relating to quantum net-
23 work infrastructure.

1 “(e) STANDARD OF REVIEW.—The Secretary shall
2 review activities carried out under this section to deter-
3 mine the achievement of technical milestones.

4 “(f) FUNDING.—Funds authorized to be appro-
5 priated for the Department of Energy’s Office of Science,
6 there shall be made available to the Secretary to carry out
7 the activities under this section, \$100,000,000 for each
8 of fiscal years 2022 through 2026.

9 **“SEC. 404. DEPARTMENT OF ENERGY QUANTUM USER EX-**
10 **PANSION FOR SCIENCE AND TECHNOLOGY**
11 **PROGRAM.**

12 “(a) IN GENERAL.—Not later than 90 days of the
13 date of the enactment of the Securing American Leader-
14 ship in Science and Technology Act, the Secretary of En-
15 ergy (referred to in this section as the ‘Secretary’) shall,
16 establish and carry out a program (to be known as the
17 ‘Quantum User Expansion for Science and Technology
18 program’ or ‘QUEST program’) to encourage and facili-
19 tate access to United States quantum computing hardware
20 and quantum computing clouds for research purposes in
21 order to—

22 “(1) enhance the United States quantum re-
23 search enterprise;

24 “(2) educate the future quantum computing
25 workforce; and

1 “(3) accelerate the advancement of United
2 States quantum computing capabilities.

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

5 “(1) coordinate with—

6 “(A) the Director of the National Science
7 Foundation;

8 “(B) the Director of the National Institute
9 of Standards and Technology;

10 “(C) the Chair of the Quantum Informa-
11 tion Science of the National Science and Tech-
12 nology Council established under section
13 103(a); and

14 “(D) the Chair of the subcommittee on the
15 Economic and Security Implications of Quan-
16 tum Science;

17 “(2) provide researchers based within the
18 United States with access to, and use of, United
19 States quantum computing resources through a com-
20 petitive, merit-reviewed process;

21 “(3) consider applications from the National
22 Laboratories, multi-institutional collaborations, insti-
23 tutions of higher education, industry stakeholders,
24 and any other entities that the Secretary determines

1 are appropriate to provide national leadership on
2 quantum computing related issues; and

3 “(4) consult and coordinate with private sector
4 stakeholders, the user community, and interagency
5 partners on program development and best manage-
6 ment practices.

7 “(c) LEVERAGING.—In carrying out this section, the
8 Secretary shall leverage resources and expertise across the
9 Department of Energy and from—

10 “(1) the National Institute of Standards and
11 Technology;

12 “(2) the National Science Foundation;

13 “(3) the National Aeronautics and Space Ad-
14 ministration;

15 “(4) other relevant Federal agencies;

16 “(5) the National Laboratories;

17 “(6) industry stakeholders;

18 “(7) institutions of higher education; and

19 “(8) the National Quantum Information
20 Science Research Centers.

21 “(d) SECURITY.—In carrying out the activities au-
22 thorized by this section, the Secretary, in consultation
23 with the Director of the National Science Foundation and
24 the Director of the National Institute of Standards and

1 Technology, shall ensure proper security controls are in
2 place to protect sensitive information, as appropriate.

3 “(e) REPORT.—Not later than 180 days after the
4 date of the enactment of the Securing American Leader-
5 ship in Science and Technology Act of 2021, the Secretary
6 shall submit to the Committee on Science, Space, and
7 Technology of the House of Representatives and the Com-
8 mittee on Energy and Natural Resources of the Senate,
9 a report on the results of the QUEST program activities
10 and any other information the Secretary determines ap-
11 propriate.

12 “(f) FUNDING.—Funds authorized to be appro-
13 priated for the Department of Energy’s Office of Science,
14 there shall be made available to the Secretary to carry out
15 the activities under this section,

16 “(1) \$30,000,000 for fiscal year 2022;

17 “(2) \$50,000,000 for fiscal year 2023;

18 “(3) \$70,000,000 for fiscal year 2024;

19 “(4) \$90,000,000 for fiscal year 2025; and

20 “(5) \$100,000,000 for fiscal year 2026.”.

21 **SEC. 404. HIGH ENERGY PHYSICS.**

22 (a) IN GENERAL.—Section 305 of the Department of
23 Energy Research and Innovation Act (42 U.S.C. 18643)
24 is amended—

1 (1) by redesignating subsections (a) through (d)
2 as subsections (b) through (e);

3 (2) by inserting before subsection (b), as redes-
4 ignated by paragraph (1), the following:

5 “(a) PROGRAM.—The Director shall carry out a re-
6 search program on the fundamental constituents of matter
7 and energy and the nature of space and time in order to
8 support theoretical and experimental research in both ele-
9 mentary particle physics and fundamental accelerator
10 science and technology and understand fundamental prop-
11 erties of the universe.”;

12 (3) by amending subsection (c), as redesignated
13 by paragraph (1), to read as follows:

14 “(c) INTERNATIONAL COLLABORATION.—The Direc-
15 tor shall—

16 “(1) as practicable and in coordination with
17 other appropriate Federal agencies as necessary, en-
18 sure the access of United States researchers to the
19 most advanced accelerator facilities and research ca-
20 pabilities in the world, including the Large Hadron
21 Collider;

22 “(2) to the maximum extent practicable, con-
23 tinue to leverage United States participation in the
24 Large Hadron Collider, and prioritize expanding
25 international partnerships and investments in the

1 Long-Baseline Neutrino Facility/Deep Underground
2 Neutrino Experiment; and

3 “(3) to the maximum extent practicable,
4 prioritize engagement in collaborative efforts in sup-
5 port of future international facilities that would pro-
6 vide access to United States researchers of the most
7 advanced accelerator facilities in the world.”; and

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

9 “(f) LONG-BASELINE NEUTRINO FACILITY FOR
10 DEEP UNDERGROUND NEUTRINO EXPERIMENT.—

11 “(1) IN GENERAL.—The Secretary shall provide
12 for a Long-Baseline Neutrino Facility to facilitate
13 the international Deep Underground Neutrino Ex-
14 periment to enable a program in neutrino physics to
15 measure the fundamental properties of neutrinos, ex-
16 plore physics beyond the Standard Model, and better
17 clarify the nature of matter and antimatter.

18 “(2) FACILITY CAPABILITIES.—The Secretary
19 shall ensure that the facility described in paragraph
20 (1) will provide, at a minimum, the following capa-
21 bilities:

22 “(A) A neutrino beam with wideband capa-
23 bility of 1.2 megawatts (MW) of beam power
24 and upgradable to 2.4 MW of beam power.

1 “(B) Three caverns excavated for a 70 kil-
2 oton fiducial detector mass and supporting sur-
3 face buildings and utilities.

4 “(C) Neutrino detector facilities at both
5 the Far Site in South Dakota and the Near
6 Site in Illinois to categorize and study neutrinos
7 on their 800-mile journey between the two sites.

8 “(D) Cryogenic systems to support neu-
9 trino detectors.

10 “(3) START OF OPERATIONS.—The Secretary
11 shall, to the maximum extent practicable, ensure
12 that the start of full operations of the facility under
13 this subsection occurs before December 31, 2031.

14 “(4) FUNDING.—Out of funds authorized to be
15 appropriated under section 409 for High Energy
16 Physics, there shall be made available to the Sec-
17 retary to carry out activities, including construction
18 of the facility, under this subsection—

19 “(A) \$200,000,000 for fiscal year 2022;

20 “(B) \$325,000,000 for fiscal year 2023;

21 “(C) \$400,000,000 for fiscal year 2024;

22 “(D) \$375,000,000 for fiscal year 2025;

23 “(E) \$250,000,000 for fiscal year 2026;

24 “(F) \$250,000,000 for fiscal year 2027;

1 “(G) \$250,000,000 for fiscal year 2028;

2 and

3 “(H) \$208,000,000 for fiscal year 2029.

4 “(g) PROTON IMPROVEMENT PLAN–II ACCELERATOR
5 UPGRADE PROJECT.—

6 “(1) IN GENERAL.—The Secretary of Energy
7 shall provide for the Proton Improvement Plan II
8 (PIP–II), an upgrade to the Fermilab accelerator
9 complex identified in the 2014 Particle Physics
10 Project Prioritization Panel (P5) report titled
11 ‘Building for Discovery’, to provide the world’s most
12 intense beam of neutrinos to the international
13 LBNF/DUNE experiment as well as a broad range
14 of future high energy physics experiments. The Sec-
15 retary of Energy shall work with international part-
16 ners to provide key contributions.

17 “(2) FACILITY CAPABILITIES.—The Secretary
18 shall ensure that the facility described in paragraph
19 (1) will provide, at a minimum, the following capa-
20 bilities:

21 “(A) A state-of-the-art 800 megaelectron
22 volt (MeV) superconducting linear accelerator.

23 “(B) Proton beam power of 1.2 MW at the
24 start of LBNF/DUNE, upgradeable to 2.4 MW
25 of beam power.

1 “(C) A flexible design to enable high power
2 beam delivery to multiple users simultaneously
3 and customized beams tailored to specific sci-
4 entific needs.

5 “(D) Sustained high reliability operation of
6 the Fermilab accelerator complex.

7 “(3) START OF OPERATIONS.—The Secretary
8 shall, to the maximum extent practicable, ensure
9 that the start of full operations of the facility under
10 this section occurs before December 31, 2028.

11 “(4) FUNDING.—Out of funds authorized to be
12 appropriated under section 409 for High Energy
13 Physics, there shall be made available to the Sec-
14 retary to carry out activities, including construction
15 of the facility, under this subsection—

16 “(A) \$100,000,000 for fiscal year 2022;

17 “(B) \$120,000,000 for fiscal year 2023;

18 “(C) \$120,000,000 for fiscal year 2024;

19 “(D) \$120,000,000 for fiscal year 2025;

20 “(E) \$115,000,000 for fiscal year 2026;

21 “(F) \$110,000,000 for fiscal year 2027;

22 and

23 “(G) \$56,500,000 for fiscal year 2028;

24 “(h) ACCELERATOR AND DETECTOR UPGRADES.—

25 The Director shall upgrade accelerator facilities and detec-

1 tors, as necessary and appropriate, to increase beam
2 power, sustain high reliability, and improve precision
3 measurement to advance the highest priority particle phys-
4 ics research programs. In carrying out facility upgrades,
5 the Director shall continue to work with international
6 partners, when appropriate and in the United States inter-
7 est, to leverage investments and expertise in critical tech-
8 nologies to maintain leading facilities in the United States.

9 “(i) ACCELERATOR AND DETECTOR RESEARCH AND
10 DEVELOPMENT.—The Director shall carry out a program
11 in accelerator and detector research and development, in
12 order to develop and deploy next generation technologies
13 to support discovery science in particle physics.

14 “(j) RESEARCH COLLABORATIONS.—In developing
15 accelerator technologies under the program authorized in
16 subsection (e), the Director shall—

17 “(1) consider the requirements necessary to
18 support translational research and development for
19 medical, industrial, security, and defense applica-
20 tions; and

21 “(2) leverage investments in accelerator tech-
22 nologies and basic research in particle physics by
23 partnering with institutes of higher education, indus-
24 try, and other Federal agencies to help commer-
25 cialize technologies with promising applications.

1 “(k) COSMIC MICROWAVE BACKGROUND STAGE 4.—

2 “(1) IN GENERAL.—The Secretary, in coordina-
3 tion with the Director of the National Science Foun-
4 dation shall provide for the construction of the Cos-
5 mic Microwave Background Stage 4 experiment as
6 described in the 2014 Particle Physics Prioritization
7 Panel (P5) report titled ‘Building for Discovery:
8 Strategic Plan for U.S. Particle Physics in the Glob-
9 al Context.’ The Secretary shall consult with the pri-
10 vate sector, universities, National Laboratories, and
11 relevant Federal agencies to ensure that this experi-
12 ment is capable of meeting Federal research needs
13 in accessing the ultra-high energy physics of infla-
14 tion and important neutrino properties.

15 “(2) EXPERIMENTAL CAPABILITIES.—The Sec-
16 retary shall ensure that the facility described in sub-
17 section (a) will provide at minimum, 500,000 super-
18 conducting detectors deployed on an array of mm-
19 wave telescopes with the required range in fre-
20 quency, sensitivity, and survey speed to enable an
21 order of magnitude advance in observations of the
22 Cosmic Microwave Background, delivering trans-
23 formative discoveries in fundamental physics, cos-
24 mology, and astrophysics.

1 “(3) START OF OPERATIONS.—The Secretary
2 shall, to the maximum extent practicable, ensure
3 that the start of full operations of the facility under
4 this section occurs before December 31, 2030.

5 “(4) FUNDING.—Out of funds authorized to be
6 appropriated under section 409 for High Energy
7 Physics, there shall be made available to the Sec-
8 retary to complete construction of the facility, under
9 this subsection—

10 “(A) \$37,000,000 for fiscal year 2022;

11 “(B) \$45,000,000 for fiscal year 2023;

12 “(C) \$71,000,000 for fiscal year 2024; and

13 “(D) \$50,000,000 for fiscal year 2025.

14 “(I) CRYOMODULE REPAIR AND MAINTENANCE FA-
15 CILITY.—The Secretary shall provide for the construction
16 of a cryomodule repair and maintenance facility, including
17 SRF cryomodules that make up the new superconducting
18 accelerator being constructed by the LCLS–II and LCLS–
19 II–HE projects, to service the Linac Coherent Light
20 Source. The Secretary shall consult with the private sec-
21 tor, universities, National Laboratories, and relevant Fed-
22 eral agencies to ensure that this facility has the capability
23 to maintain, repair, and test superconducting radio-
24 frequency (SRF) accelerator components.”.

1 **SEC. 405. BIOLOGICAL AND ENVIRONMENTAL RESEARCH.**

2 (a) IN GENERAL.—Section 306 of the Department of
3 Energy Research and Innovation Act (42 U.S.C. 18644)
4 is amended to read as follows:

5 **“SEC. 306. BIOLOGICAL AND ENVIRONMENTAL RESEARCH.**

6 “(a) PROGRAM.—The Director shall carry out a pro-
7 gram of basic research in the areas of biological systems
8 science and environmental science relevant to the develop-
9 ment of new energy technologies and to support Depart-
10 ment missions in energy, environment, and national secu-
11 rity.

12 “(b) BIOLOGICAL SYSTEMS.—The Director shall
13 carry out research and development activities in funda-
14 mental, structural, computational, and systems biology to
15 increase systems-level understanding of the complex bio-
16 logical systems, which may include activities—

17 “(1) to accelerate breakthroughs and new
18 knowledge that would enable the cost-effective, sus-
19 tainable production of—

20 “(A) biomass-based liquid transportation
21 fuels;

22 “(B) bioenergy; and

23 “(C) biobased materials;

24 “(2) to improve understanding of the global
25 carbon cycle, including processes for removing car-
26 bon dioxide from the atmosphere, through photosyn-

1 thesis and other biological processes, for sequestra-
2 tion and storage; and

3 “(3) to understand the biological mechanisms
4 used to transform, immobilize, or remove contami-
5 nants from subsurface environments.

6 “(c) LIMITATION FOR RESEARCH FUNDS.—The Di-
7 rector shall not approve new climate science-related initia-
8 tives without making a determination that such work is
9 well-coordinated with any relevant work carried out by
10 other Federal agencies.

11 “(d) BIOENERGY RESEARCH CENTERS.—

12 “(1) IN GENERAL.—In carrying out activities
13 under subsection (a), the Director shall select and
14 establish up to four bioenergy research centers to
15 conduct basic and fundamental research in plant
16 and microbial systems biology, bio imaging and anal-
17 ysis, and genomics to inform the production of fuels,
18 chemicals from sustainable biomass resources, and
19 to facilitate the translation of basic research results
20 to industry.

21 “(2) SELECTION.—The Director shall select
22 centers under paragraph (1) on a competitive, merit-
23 reviewed basis. The Director shall consider applica-
24 tions from National Laboratories, multi-institutional
25 collaborations, and other appropriate entities.

1 “(3) DURATION.—A center established under
2 this subsection shall receive support for a period of
3 not more than 5 years, subject to the availability of
4 appropriations.

5 “(4) EXISTING CENTERS.—The Director may
6 select a center for participation under this sub-
7 section that is in existence, or undergoing a renewal
8 process, on the date of enactment of this Act. Such
9 center shall be eligible to receive support for the du-
10 ration the 5-year period beginning on the date of es-
11 tablishment of such center.

12 “(5) RENEWAL.—Upon the expiration of any
13 period of support of a center under this subsection,
14 the Director may renew support for the center, on
15 a merit-reviewed basis, for a period of not more than
16 5 years.

17 “(6) TERMINATION.—Consistent with the exist-
18 ing authorities of the Department, the Director may
19 terminate an underperforming center for cause dur-
20 ing the performance period.

21 “(e) LOW-DOSE RADIATION RESEARCH PROGRAM.—

22 “(1) IN GENERAL.—The Secretary shall carry
23 out a research program on low-dose and low dose-
24 rate radiation to—

1 “(A) enhance the scientific understanding
2 of, and reduce uncertainties associated with, the
3 effects of exposure to low-dose and low dose-
4 rate radiation; and

5 “(B) inform improved risk-assessment and
6 risk-management methods with respect to such
7 radiation.

8 “(2) PROGRAM COMPONENTS.—In carrying out
9 the program required under paragraph (1), the Sec-
10 retary shall—

11 “(A) support and carry out the directives
12 under section 106(b) of the American Innova-
13 tion and Competitiveness Act (42 U.S.C. 6601
14 note), except that such section shall be treated
15 for purposes of this subsection as applying to
16 low dose and low-dose rate radiation research,
17 in coordination with the Physical Science Sub-
18 committee of the National Science and Tech-
19 nology Council;

20 “(B) identify and, to the extent possible,
21 quantify, potential monetary and health-related
22 impacts to Federal agencies, the general public,
23 industry, research communities, and other users
24 of information produced by such research pro-
25 gram;

1 “(C) leverage the collective body of knowl-
2 edge from existing low-dose and low dose-rate
3 radiation research;

4 “(D) engage with other Federal agencies,
5 research communities, and potential users of in-
6 formation produced under this section, includ-
7 ing institutions performing or utilizing radiation
8 research, medical physics, radiology, health
9 physics, and emergency response measures; and

10 “(E) support education and outreach ac-
11 tivities to disseminate information and promote
12 public understanding of low-dose radiation, with
13 a focus on non-emergency situations such as
14 medical physics, space exploration, and natu-
15 rally occurring radiation.

16 “(3) RESEARCH PLAN.—

17 “(A) Not later than 90 days after the date
18 of enactment of the Energy Act of 2020, the
19 Secretary shall enter into an agreement with
20 the National Academy of Sciences to develop a
21 long-term strategic and prioritized research
22 agenda for the program described in paragraph
23 (2);

24 “(B) Not later than one year after the
25 date of enactment of the Energy Act of 2020,

1 the Secretary shall transmit this research plan
2 developed in subparagraph (A) to the Com-
3 mittee on Science, Space, and Technology of
4 the House of Representatives and the Com-
5 mittee on Energy and Natural Resources of the
6 Senate.

7 “(4) GAO STUDY.—Not later than 3 years after
8 the date of enactment of the Energy Act of 2020,
9 the Comptroller General shall transmit to the Com-
10 mittee on Science, Space, and Technology of the
11 House of Representatives and the Committee on En-
12 ergy and Natural Resources of the Senate, a report
13 on:

14 “(A) an evaluation of the program activi-
15 ties carried out under this section;

16 “(B) the effectiveness of the coordination
17 and management of the program; and

18 “(C) the implementation of the research
19 plan outlined in paragraph (3).

20 “(5) DEFINITIONS.—In this subsection:

21 “(A) LOW-DOSE RADIATION.—The term
22 ‘low-dose radiation’ means a radiation dose of
23 less than 100 millisieverts.

1 “(B) LOW DOSE-RATE RADIATION.—The
 2 term ‘low dose-rate radiation’ means a radiation
 3 dose rate of less than 5 millisieverts per hour.

4 “(6) RULE OF CONSTRUCTION.—Nothing in
 5 this subsection shall be construed to subject any re-
 6 search carried out by the Secretary for the program
 7 under this subsection to any limitations described in
 8 section 977(e) of the Energy Policy Act of 2005 (42
 9 U.S.C. 16317(e)).

10 “(7) FUNDING.—For purposes of carrying out
 11 this subsection, the Secretary is authorized to make
 12 available from funds provided to the Biological and
 13 Environmental Research Program—

14 “(A) \$20,000,000 for fiscal year 2021;

15 “(B) \$20,000,000 for fiscal year 2022;

16 “(C) \$30,000,000 for fiscal year 2023;

17 “(D) \$40,000,000 for fiscal year 2024.

18 “(E) \$40,000,000 for fiscal year 2025;

19 “(F) \$50,000,000 for fiscal year 2026;

20 “(G) \$50,000,000 for fiscal year 2027;

21 “(H) \$60,000,000 for fiscal year 2028;

22 “(I) \$60,000,000 for fiscal year 2029;

23 “(J) \$70,000,000 for fiscal year 2030; and

24 “(K) \$70,000,000 for fiscal year 2031.

1 “(f) EARTH AND ENVIRONMENTAL SYSTEMS RE-
2 SEARCH.—

3 “(1) IN GENERAL.—The Director shall carry
4 out a program of fundamental research to develop
5 high-resolution Earth system modeling, analysis, and
6 intercomparison capabilities, in order to further the
7 understanding of the biological, biogeochemical, and
8 physical processes across the multiple scales that
9 control the flux of environmentally relevant com-
10 pounds between the terrestrial surface and the at-
11 mosphere.

12 “(2) PRIORITIZATION.—In carrying out the
13 program authorized under paragraph (1), the Direc-
14 tor shall prioritize—

15 “(A) the development of software and algo-
16 rithms to enable the productive application of
17 environmental systems and extreme weather
18 prediction models in high-performance com-
19 puting systems; and

20 “(B) capabilities that support the Depart-
21 ment’s mission needs for energy and infrastruc-
22 ture security, resilience, and reliability.

23 “(3) USER FACILITIES.—

24 “(A) IN GENERAL.—In carrying out the
25 activities authorized under paragraph (1), the

1 Director shall establish and operate user facili-
2 ties to advance the collection, validation, and
3 analysis of atmospheric data, including activi-
4 ties to advance knowledge and improve model
5 representations and measure the impact of at-
6 mospheric gases, aerosols, and clouds on earth
7 and environmental systems.

8 “(B) EXISTING FACILITIES.—To the max-
9 imum extent practicable, the Director shall uti-
10 lize existing facilities to carry out this sub-
11 section.

12 “(C) SELECTION.—The Director shall se-
13 lect user facilities under paragraph (1) on a
14 competitive, merit-reviewed basis. The Director
15 shall consider applications from the National
16 Laboratories, institutes of higher education,
17 multi-institutional collaborations, and other ap-
18 propriate entities.

19 “(D) TERMINATION.—Consistent with the
20 existing authorities of the Department, the Di-
21 rector may terminate an underperforming user
22 facility for cause during the performance pe-
23 riod.

1 “(4) COORDINATION.—In carrying out the pro-
2 gram authorized in paragraph (1), the Director shall
3 ensure that the Office of Science—

4 “(A) consults and coordinates with the Na-
5 tional Oceanic Atmospheric Administration, the
6 Environmental Protection Agency, and any
7 other relevant Federal agency on the collection,
8 validation, and analysis of atmospheric data;
9 and

10 “(B) coordinates with relevant stake-
11 holders, including institutes of higher education,
12 nonprofit research institutions, industry, State,
13 local, and tribal governments, and other appro-
14 priate entities to ensure access to the best avail-
15 able relevant atmospheric and environmental
16 data, including historical weather data.

17 “(g) COASTAL ZONE RESEARCH INITIATIVE.—

18 “(1) IN GENERAL.—The Director shall carry
19 out a basic research program to enhance the under-
20 standing of coastal ecosystems. In carrying out this
21 program, the Director shall prioritize efforts to en-
22 hance the collection of observational data, and shall
23 develop models to analyze the ecological, biogeo-
24 chemical, hydrological and physical processes that
25 interact in coastal zones.

1 “(2) NATIONAL SYSTEM FOR COASTAL DATA
2 COLLECTION.—The Director shall establish an inte-
3 grated system of field research sites in order to im-
4 prove the quantity and quality of observational data,
5 and that encompass at least three of the major land-
6 water interfaces of the United States, including—

7 “(A) the Great Lakes region;

8 “(B) the Pacific coast;

9 “(C) the Atlantic coast;

10 “(D) the Arctic; and

11 “(E) the Gulf coast.

12 “(3) EXISTING INFRASTRUCTURE.—In carrying
13 out the programs and establishing the field research
14 sites under paragraph (1) and (2), the Secretary
15 shall leverage existing Department of Energy infra-
16 structure, including the Department’s existing ma-
17 rine sciences lab.

18 “(4) COORDINATION.—For the purposes of car-
19 rying out the programs and establishing the field re-
20 search sites under the Initiative, the Secretary may
21 enter into agreements with Federal Departments
22 and agencies with complementary capabilities.

23 “(5) REPORT.—Not less than 2 years after the
24 date of the enactment of this Act, the Director shall
25 provide to the Committee on Science, Space, and

1 Technology and the Committee on Appropriations of
2 the House of Representatives and the Committee on
3 Energy and Natural Resources and the Committee
4 on Appropriations of the Senate a report examining
5 whether the system described in this section should
6 be established as a National User Facility.

7 “(h) BIOLOGICAL AND ENVIRONMENTAL RESEARCH
8 USER FACILITIES.—

9 “(1) IN GENERAL.—The Director shall carry
10 out a program for the development, construction, op-
11 eration, and maintenance of user facilities to en-
12 hance the collection and analysis of observational
13 data related to complex biological, earth, and envi-
14 ronmental systems.

15 “(2) FACILITY REQUIREMENTS.—To the max-
16 imum extent practicable, the user facilities devel-
17 oped, constructed, operated, or maintained under
18 paragraph (1) shall include—

19 “(A) distributed field research and obser-
20 vation platforms for understanding earth sys-
21 tem processes;

22 “(B) instruments and modeling resources
23 for understanding the physical, chemical, and
24 cellular processes of biological and environ-
25 mental systems;

1 “(C) integrated high-throughput sequenc-
2 ing, DNA design and synthesis, metabolomics
3 and computational analysis; and

4 “(D) such other facilities as the Director
5 considers appropriate, consistent with section
6 209 of the Department of Energy Organization
7 Act (42 U.S.C. 7139).

8 “(3) EXISTING FACILITIES.—In carrying out
9 the program established in paragraph (1), the Direc-
10 tor is encouraged to evaluate the capabilities of ex-
11 isting user facilities and, to the maximum extent
12 practicable, invest in modernization of those capa-
13 bilities to address emerging research priorities.

14 “(i) LOW-DOSE RADIATION AND SPACE RADIATION
15 RESEARCH PROGRAM.—

16 “(1) IN GENERAL.—The Secretary of Energy,
17 in consultation with the Administrator of the Na-
18 tional Aeronautics and Space Administration shall
19 carry out a basic research program on the similar-
20 ities and differences between the effects of exposure
21 to low dose radiation on Earth, in low Earth orbit,
22 and in the space environment.

23 “(2) PURPOSE.—The purpose of this program
24 is to accelerate breakthroughs in low dose and low-
25 dose rate radiation research and development as de-

1 scribed in section (e) and to inform the advancement
2 of new tools, technologies, and advanced materials
3 needed to facilitate long-duration space exploration.

4 “(j) EMERGING TECHNOLOGIES.—

5 “(1) IN GENERAL.—The Secretary shall estab-
6 lish within the Biological and Environmental Re-
7 search program an initiative focused on the develop-
8 ment of engineered ecosystems through the applica-
9 tion of artificial intelligence, novel sensing capabili-
10 ties, and other emerging technologies.

11 “(2) INTERAGENCY COORDINATION.—The Sec-
12 retary shall coordinate with the Director of the Na-
13 tional Science Foundation, the Administrator of the
14 National Oceanic and Atmospheric Administration,
15 the Director of the U.S. Geological Survey, and
16 other relevant officials to avoid duplication of re-
17 search and observational activities and to ensure
18 that activities carried out under this initiative are
19 complimentary to those currently being undertaken
20 by other agencies.

21 “(3) REPORT.—Not later than 180 days after
22 the enactment of this Act, the Secretary shall pro-
23 vide a report to the Committee on Science, Space,
24 and Technology of the House, and the Committee on

1 Energy and Natural Resources of the Senate, on the
2 activity mandated in subsection (j).

3 “(k) EMERGING INFECTIOUS DISEASE RESEARCH
4 PROGRAM.—

5 “(1) IN GENERAL.—The Secretary, in coordina-
6 tion with the Director of the National Science Foun-
7 dation and the Administrator of the National Aero-
8 nautics and Space Administration, shall carry out a
9 research program to leverage the Federal Govern-
10 ment’s innovative analytical resources and tools, user
11 facilities, and advanced computational and net-
12 working capabilities in order to prevent, prepare for,
13 and respond to emerging infectious diseases, includ-
14 ing COVID–19. The Secretary shall carry out this
15 program through a competitive, merit reviewed proc-
16 ess, and consider applications from National Labora-
17 tories, institutions of higher education, multi-institu-
18 tional collaborations, industry partners and other
19 appropriate entities.

20 “(2) PROGRAM COMPONENTS.—In carrying out
21 the program established under paragraph (1), the
22 Secretary shall coordinate with relevant Federal
23 agencies to determine a comprehensive set of tech-
24 nical milestones for these research activities and
25 prioritize the following objectives—

1 “(A) supporting fundamental research and
2 development in advanced analytics, experi-
3 mental studies, materials synthesis, high-per-
4 formance computing technologies needed to
5 characterize, model, simulate, and predict com-
6 plex phenomena and biological materials related
7 to emerging infectious diseases, including
8 COVID–19 mitigation challenges, including a
9 focus on bioinformatics, epidemiology, and mo-
10 lecular modeling;

11 “(B) using expertise from the private sec-
12 tor and institutions of higher education, and
13 the National Laboratories to develop computa-
14 tional software and capabilities that prospective
15 users may accelerate emerging infectious dis-
16 eases research and development;

17 “(C) increasing the utility of the research
18 infrastructure of the Department, including sci-
19 entific computing user facilities, x-ray light
20 sources, neutron scattering facilities, nanoscale
21 science research centers, and sequencing and
22 bio-characterization facilities by coordinating
23 with the Advanced Scientific Computing Re-
24 search, Basic Energy Sciences, and Biological

1 and Environmental Research programs within
2 the Office of Science;

3 “(D) leveraging experience from existing
4 modeling and simulation research and work
5 sponsored by the Department and promoting
6 collaboration and data sharing between Na-
7 tional Laboratories, research entities, and user
8 facilities of the Department by providing the
9 necessary access and secure data transfer capa-
10 bilities; and

11 “(E) ensuring that new experimental and
12 computational tools are accessible to relevant
13 research communities, including private sector
14 entities engaged in technology development to
15 address emerging infectious diseases, including
16 COVID–19 challenges.

17 “(3) COORDINATION.—In carrying out these
18 programs, the Secretary shall ensure, to the max-
19 imum extent practicable, coordination of these activi-
20 ties with the Department of Energy National Lab-
21 oratories, institutions of higher education, and the
22 private sector.

23 “(4) EMERGING INFECTIOUS DISEASES HIGH
24 PERFORMANCE COMPUTING RESEARCH CONSOR-
25 TIUM.—

1 “(A) IN GENERAL.—The Secretary in co-
2 ordination with the Director of the National
3 Science Foundation and the Director of the Of-
4 fice of Science and Technology Policy shall es-
5 tablish and operate an Emerging Infectious
6 Diseases High Performance Computing Re-
7 search Consortium (referred to in this section
8 as the ‘Consortium’), in order to support the
9 program under paragraph (1) by providing, to
10 the extent practicable, a centralized location for
11 multidisciplinary, collaborative, emerging infec-
12 tious disease research and development through
13 high performance computing and advanced data
14 analytics technologies and processes.

15 “(B) MEMBERSHIP.—The members of
16 such consortium shall be representatives from
17 relevant Federal agencies, the private sector, in-
18 stitutions of higher education, which can each
19 contribute relevant compute time, capabilities,
20 or other resources.

21 “(C) ACTIVITIES.—The Consortium
22 shall—

23 “(i) match applicants with available
24 Federal and private sector computing re-
25 sources;

1 “(ii) consider supplemental awards for
2 computing partnerships with Consortium
3 members to qualifying entities on a com-
4 petitive merit-review basis;

5 “(iii) encourage collaboration and
6 communication among member representa-
7 tives of the consortium and awardees;

8 “(iv) make available the high-perform-
9 ance computing capabilities, expertise, and
10 user facilities of the Department and the
11 National Laboratories; and

12 “(v) submit an annual report to the
13 Secretary summarizing the activities of the
14 Consortium, including—

15 “(I) describing each project un-
16 dertaken by the Consortium;

17 “(II) detailing organizational ex-
18 penditures; and

19 “(III) evaluating contribution to
20 the achievement of technical mile-
21 stones as determined in paragraph
22 (1).

23 “(D) COORDINATION.—The Secretary shall
24 ensure the coordination of, and avoid unneces-
25 sary duplication of, the activities of the Consor-

1 tium with the activities of other research enti-
2 ties of the Department, institutions of higher
3 education and the private sector.

4 “(5) REPORT.—Not later than 2 years after the
5 date of enactment of this Act, the Secretary shall
6 submit to the Committee on Science, Space, and
7 Technology of the House, and the Committee on En-
8 ergy and Natural Resources of the Senate, and the
9 Committee on Commerce, Science, and Transpor-
10 tation of the Senate a report detailing the effective-
11 ness of—

12 “(A) the interagency coordination between
13 each Federal agency involved in the research
14 program carried out under this section;

15 “(B) the collaborative research achieve-
16 ments of the program, including the achieve-
17 ment of the technical milestones determined
18 under paragraph (1); and

19 “(C) potential opportunities to expand the
20 technical capabilities of the Department.

21 “(6) PROHIBITION.—No funds allocated to the
22 program described in paragraph (1) may be obli-
23 gated or expended for commercial application of
24 technology.

1 “(7) FUNDING.—From within funds authorized
2 to be appropriated for the Department’s Office of
3 Science, there shall be made available to the Sec-
4 retary to carry out the activities under this sub-
5 section, \$50,000,000 for fiscal years 2022 and
6 2023.”.

7 **SEC. 406. FUSION ENERGY.**

8 (a) IN GENERAL.—Section 307 of the Department of
9 Energy Research and Innovation Act (42 U.S.C. 18645)
10 is amended by adding at the end the following:

11 “(p) HIGH-PERFORMANCE COMPUTATION COLLABO-
12 RATIVE RESEARCH PROGRAM.—

13 “(1) IN GENERAL.—The Secretary shall carry
14 out a program to conduct and support collaborative
15 research, development, and demonstration of fusion
16 energy technologies, through high-performance com-
17 putation modeling and simulation techniques, in
18 order to—

19 “(A) support basic science research in
20 plasmas and matter at very high temperatures
21 and densities;

22 “(B) inform the development of a broad
23 range of fusion energy systems; and

1 “(C) facilitate the translation of basic re-
2 search results in fusion energy science to indus-
3 try.

4 “(2) COORDINATION.—In carrying out the pro-
5 gram under paragraph (1), the Secretary shall co-
6 ordinate with relevant Federal agencies, and
7 prioritize the following objectives:

8 “(A) Using expertise from the private sec-
9 tor, institutions of higher education, and the
10 National Laboratories to develop computational
11 software and capabilities that prospective users
12 may use to accelerate research and development
13 of fusion energy systems.

14 “(B) Developing computational tools to
15 simulate and predict fusion energy science phe-
16 nomena that may be validated through physical
17 experimentation.

18 “(C) Increasing the utility of the research
19 infrastructure of the Department by coordi-
20 nating with the Advanced Scientific Computing
21 Research program within the Office of Science.

22 “(D) Leveraging experience from existing
23 modeling and simulation entities sponsored by
24 the Department.

1 “(E) Ensuring that new experimental and
2 computational tools are accessible to relevant
3 research communities, including private sector
4 entities engaged in fusion energy technology de-
5 velopment.

6 “(3) DUPLICATION.—The Secretary shall en-
7 sure the coordination of, and avoid unnecessary du-
8 plication of, the activities of this program with the
9 activities of—

10 “(A) other research entities of the Depart-
11 ment, including the National Laboratories, the
12 Advanced Research Projects Agency–Energy,
13 the Advanced Scientific Computing Research
14 program; and

15 “(B) industry.

16 “(4) HIGH-PERFORMANCE COMPUTING FOR FU-
17 SION INNOVATION HUB.—In carrying out the pro-
18 gram under paragraph (1), the Secretary shall es-
19 tablish and operate a national High-Performance
20 Computing for Fusion Innovation Hub (referred to
21 in this section as the ‘Hub’), which shall focus on
22 the early stage research and development activities
23 described under paragraph (1).

24 “(5) SELECTION.—The Secretary shall select
25 the Hub under this subsection on a competitive,

1 merit-reviewed basis. The Secretary shall consider
2 applications from National Laboratories, institutions
3 of higher education, multi-institutional collabora-
4 tions, and other appropriate entities.

5 “(6) DURATION.—The Hub established under
6 this subsection shall receive support for a period of
7 not more than 5 years, subject to the availability of
8 appropriations.

9 “(7) RENEWAL.—Upon the expiration of any
10 period of support of the Hub, the Secretary may
11 renew support for the Hub, on a merit-reviewed
12 basis, for a period of not more than 5 years.

13 “(8) TERMINATION.—Consistent with the exist-
14 ing authorities of the Department, the Secretary
15 may terminate the Hub for cause during the per-
16 formance period.

17 “(q) BRIGHTEST LIGHT RESEARCH INITIATIVE.—

18 “(1) IN GENERAL.—The Secretary shall estab-
19 lish a high intensity laser research initiative con-
20 sistent with the recommendations of the National
21 Academies report, ‘Opportunities in Intense
22 Ultrafast Lasers: Reaching for the Brightest Light’,
23 and the Brightest Light Initiative workshop report,
24 ‘The Future of Intense Ultrafast Lasers in the
25 U.S.’. This initiative should include research and de-

1 velopment of multi petawatt-scale laser technologies
 2 necessary for discovery science and to advance en-
 3 ergy technologies and investments in future facili-
 4 ties, including an open-access laser user facility in
 5 the U.S. with multiple beamlines and short-pulse
 6 and high-peak-power lasers with very high-average
 7 power. This initiative should also provide support for
 8 a user network of academic and national laboratory
 9 high intensity laser facilities. The Director shall also
 10 leverage new laser technologies for more compact,
 11 less complex, and low-cost accelerator systems need-
 12 ed for science applications.

13 “(2) AUTHORIZATION OF APPROPRIATIONS.—
 14 Out of funds authorized to be appropriated under
 15 subsection (o), there are authorized to be appro-
 16 priated to the Secretary to carry out the activities
 17 described in this subsection—

18 “(A) \$50,000,000 for fiscal year 2022;
 19 “(B) \$100,000,000 for fiscal year 2023;
 20 “(C) \$150,000,000 for fiscal year 2024;
 21 “(D) \$200,000,000 for fiscal year 2025;
 22 and
 23 “(E) \$250,000,000 for fiscal year 2026.
 24 “(r) MATERIAL PLASMA EXPOSURE EXPERIMENT.—

1 “(1) IN GENERAL.—The Secretary shall con-
2 struct a Material Plasma Exposure Experiment fa-
3 cility as described in the 2020 publication approved
4 by the Fusion Energy Sciences Advisory Committee
5 titled ‘Powering the Future: Fusion and Plasmas’.
6 The Secretary shall consult with the private sector,
7 universities, National Laboratories, and relevant
8 Federal agencies to ensure that this facility is capa-
9 ble of meeting Federal research needs for steady-
10 state, high-heat-flux and plasma-material interaction
11 testing of fusion materials over a range of fusion en-
12 ergy relevant parameters.

13 “(2) FACILITY CAPABILITIES.—The Secretary
14 shall ensure that the facility described in subsection
15 (a) will provide the following capabilities:

16 “(A) A magnetic field at the target of 1
17 Tesla.

18 “(B) An energy flux at the target of 10
19 MW/m².

20 “(C) The ability to expose previously irra-
21 diated plasma facing material samples to plas-
22 ma.

23 “(3) START OF OPERATIONS.—The Secretary
24 shall, to the maximum extent practicable, ensure

1 that the start of full operations of the facility under
2 this section occurs before December 31, 2027.

3 “(4) FUNDING.—Out of funds authorized to be
4 appropriated under section 409 for Fusion Energy
5 Sciences, there are funds authorized to be appro-
6 priated to the Secretary for the Office of Fusion En-
7 ergy Science to carry out to completion the construc-
8 tion of the facility under this section:

9 “(A) \$32,800,000 for fiscal year 2022;

10 “(B) \$13,400,000 for fiscal year 2023;

11 “(C) \$12,600,000 for fiscal year 2024; and

12 “(D) \$400,000 for fiscal year 2025.

13 “(s) MATTER IN EXTREME CONDITIONS INSTRU-
14 MENT UPGRADE.—

15 “(1) IN GENERAL.—The Secretary shall provide
16 for the upgrade to the Matter in Extreme Conditions
17 endstation at the Linac Coherent Light Source as
18 described in the 2020 publication approved by the
19 Fusion Energy Sciences Advisory Committee titled
20 ‘Powering the Future: Fusion and Plasmas’. The
21 Secretary shall consult with the private sector, uni-
22 versities, National Laboratories, and relevant Fed-
23 eral agencies to ensure that this facility is capable
24 of meeting Federal research needs for understanding
25 physical and chemical changes to plasmas at funda-

1 mental timescales, and explore new regimes of dense
 2 material physics, astrophysics, planetary physics,
 3 and short-pulse laser-plasma interactions.

4 “(2) START OF OPERATIONS.—The Secretary
 5 shall, to the maximum extent practicable, ensure
 6 that the start of full operations of the facility under
 7 this section occurs before December 31, 2028.”.

8 (b) INTERNATIONAL THERMONUCLEAR EXPERI-
 9 MENTAL REACTOR CONSTRUCTION.—Section 972(c) of
 10 the Energy Policy Act of 2005 (42 U.S.C. 16312) is
 11 amended by adding at the end the following:

12 “(C) \$281,000,000 for fiscal year 2026;

13 “(D) \$281,000,000 for fiscal year 2027;

14 “(E) \$281,000,000 for fiscal year 2028;

15 “(F) \$281,000,000 for fiscal year 2029;

16 “(G) \$281,000,000 for fiscal year 2030;

17 and

18 “(H) \$281,000,000 for fiscal year 2031.”.

19 **SEC. 407. NUCLEAR PHYSICS.**

20 Section 308 of the Department of Energy Research
 21 and Innovation Act (42 U.S.C. 18646) is amended by in-
 22 serting at the end the following:

23 “(c) FACILITY FOR RARE ISOTOPE BEAMS INSTRU-
 24 MENTATION.—The Secretary shall provide for the con-
 25 struction of a high rigidity spectrometer and a gamma-

1 ray energy tracking array for use at the Facility for Rare
2 Isotope Beams to maximize the capabilities of this facility
3 and advance the understanding of rare nuclear isotopes
4 and the evolution of the cosmos.

5 “(d) ELECTRON-ION COLLIDER.—

6 “(1) IN GENERAL.—The Secretary shall provide
7 for an Electron Ion Collider as described in the
8 2015 Nuclear Science Advisory Committee’s Long
9 Range Plan and endorsed by the report from the
10 National Academies of Science, Engineering, and
11 Medicine report titled ‘An Assessment of U.S.-Based
12 Electron-Ion Collider Science’, in order to measure
13 the internal structure of the proton and the nucleus
14 and answer fundamental questions about the nature
15 of visible matter.

16 “(2) FACILITY CAPABILITY.—The Secretary
17 shall ensure that the facility meets the requirements
18 in the 2015 Long Range Plan, including—

19 “(A) at least 70 percent polarized beams
20 of electrons and light ions;

21 “(B) ion beams from deuterium to the
22 heaviest nuclei;

23 “(C) variable center of mass energy from
24 20 to 140 GeV; high luminosity of 10^{33} – 10^{34}
25 $\text{cm}^{-2}\text{s}^{-1}$; and

1 “(D) the possibility of more than one
2 interaction region.

3 “(3) START OF OPERATIONS.—The Secretary
4 shall, to the maximum extent practicable, ensure
5 that the start of full operations of the facility under
6 this section occurs before December 31, 2030.”.

7 **SEC. 408. SCIENCE LABORATORIES INFRASTRUCTURE PRO-**
8 **GRAM.**

9 Section 309 of the Department of Energy Research
10 and Innovation Act (42 U.S.C. 18647) is amended by add-
11 ing at the end the following:

12 “(c) USE OF AVAILABLE APPROACHES AND MECHA-
13 NISMS.—In carrying out this section, the Director shall
14 utilize all available approaches and mechanisms, including
15 capital line items, minor construction projects, energy sav-
16 ings performance contracts, utility energy service con-
17 tracts, alternative financing, and expense funding, as ap-
18 propriate.

19 “(d) MID-SCALE INSTRUMENTATION PROGRAM.—
20 The Director shall establish a mid-scale instrumentation
21 program to enable the development and acquisition of
22 novel, state-of-the-art instruments that would significantly
23 accelerate scientific breakthroughs at national laboratory
24 user facilities.”.

1 **SEC. 409. AUTHORIZATION OF APPROPRIATIONS.**

2 (a) FISCAL YEAR 2022.—There are authorized to be
3 appropriated to the Secretary for the Office of Science for
4 fiscal year 2022 \$7,727,950,391, of which—

5 (1) \$2,514,400,000 shall be for Basic Energy
6 Sciences;

7 (2) \$1,128,976,445 shall be for High Energy
8 Physics;

9 (3) \$812,733,521 shall be for Biological and
10 Environmental Research;

11 (4) \$769,560,425 shall be for Nuclear Physics;

12 (5) \$1,136,800,000 shall be for Advanced Sci-
13 entific Computing Research;

14 (6) \$921,000,000 shall be for Fusion Energy
15 Sciences;

16 (7) \$264,000,000 shall be for Science Labora-
17 tories Infrastructure;

18 (8) \$195,840,000 shall be for Science Program
19 Direction;

20 (9) \$123,420,000 shall be for Safeguards and
21 Security; and

22 (10) \$29,580,000 shall be for Workforce Devel-
23 opment for Teachers and Scientists.

24 (b) FISCAL YEAR 2023.—There are authorized to be
25 appropriated to the Secretary for the Office of Science for
26 fiscal year 2023 \$8,430,037,582, of which—

1 (1) \$2,783,800,000 shall be for Basic Energy
2 Sciences;

3 (2) \$1,211,952,889 shall be for High Energy
4 Physics;

5 (3) \$872,467,042 shall be for Biological and
6 Environmental Research;

7 (4) \$826,120,851 shall be for Nuclear Physics;

8 (5) \$1,258,600,000 shall be for Advanced Sci-
9 entific Computing Research;

10 (6) \$961,000,000 shall be for Fusion Energy
11 Sciences;

12 (7) \$288,000,000 shall be for Science Labora-
13 tories Infrastructure;

14 (8) \$199,756,800 shall be for Science Program
15 Direction;

16 (9) \$125,888,400 shall be for Safeguards and
17 Security; and

18 (10) \$30,171,600 shall be for Workforce Devel-
19 opment for Teachers and Scientists.

20 (c) FISCAL YEAR 2024.—There are authorized to be
21 appropriated to the Secretary for the Office of Science for
22 fiscal year 2024 \$9,132,264,309, of which—

23 (1) \$3,053,200,000 shall be for Basic Energy
24 Sciences;

1 (2) \$1,294,929,334 shall be for High Energy
2 Physics;

3 (3) \$932,200,562 shall be for Biological and
4 Environmental Research;

5 (4) \$882,681,276 shall be for Nuclear Physics;

6 (5) \$1,380,400,000 shall be for Advanced Sci-
7 entific Computing Research;

8 (6) \$921,000,000 shall be for Fusion Energy
9 Sciences;

10 (7) \$312,000,000 shall be for Science Labora-
11 tories Infrastructure;

12 (8) \$203,751,936 shall be for Science Program
13 Direction;

14 (9) \$128,406,168 shall be for Safeguards and
15 Security; and

16 (10) \$30,775,032 shall be for Workforce Devel-
17 opment for Teachers and Scientists.

18 (d) FISCAL YEAR 2025.—There are authorized to be
19 appropriated to the Secretary for the Office of Science for
20 fiscal year 2025 \$9,834,633,362, of which—

21 (1) \$3,322,600,000 shall be for Basic Energy
22 Sciences;

23 (2) \$1,377,905,778 shall be for High Energy
24 Physics;

1 (3) \$991,934,083 shall be for Biological and
2 Environmental Research;

3 (4) \$939,241,702 shall be for Nuclear Physics;

4 (5) \$1,502,200,000 shall be for Advanced Sci-
5 entific Computing Research;

6 (6) \$901,000,000 shall be for Fusion Energy
7 Sciences;

8 (7) \$336,000,000 shall be for Science Labora-
9 tories Infrastructure;

10 (8) \$207,826,975 shall be for Science Program
11 Direction;

12 (9) \$130,974,291 shall be for Safeguards and
13 Security; and

14 (10) \$31,390,533 shall be for Workforce Devel-
15 opment for Teachers and Scientists.

16 (e) FISCAL YEAR 2026.—There are authorized to be
17 appropriated to the Secretary for the Office of Science for
18 fiscal year 2026 \$10,537,147,589, of which—

19 (1) \$3,592,000,000 shall be for Basic Energy
20 Sciences;

21 (2) \$1,460,882,223 shall be for High Energy
22 Physics;

23 (3) \$1,051,667,604 shall be for Biological and
24 Environmental Research;

25 (4) \$995,802,127 shall be for Nuclear Physics;

1 (5) \$1,624,000,000 shall be for Advanced Sci-
2 entific Computing Research;

3 (6) \$1,075,200,000 shall be for Fusion Energy
4 Sciences;

5 (7) \$360,000,000 shall be for Science Labora-
6 tories Infrastructure;

7 (8) \$211,983,514 shall be for Science Program
8 Direction;

9 (9) \$133,593,777 shall be for Safeguards and
10 Security; and

11 (10) \$32,018,343 shall be for Workforce Devel-
12 opment for Teachers and Scientists.

13 (f) FISCAL YEAR 2027.—There are authorized to be
14 appropriated to the Secretary for the Office of Science for
15 fiscal year 2027 \$11,239,809,892, of which—

16 (1) \$3,861,400,000 shall be for Basic Energy
17 Sciences;

18 (2) \$1,543,858,668 shall be for High Energy
19 Physics;

20 (3) \$1,111,401,125 shall be for Biological and
21 Environmental Research;

22 (4) \$1,052,362,553 shall be for Nuclear Phys-
23 ics;

24 (5) \$1,745,800,000 shall be for Advanced Sci-
25 entific Computing Research;

1 (6) \$1,155,840,000 shall be for Fusion Energy
2 Sciences;

3 (7) \$384,000,000 shall be for Science Labora-
4 tories Infrastructure;

5 (8) \$216,223,184 shall be for Science Program
6 Direction;

7 (9) \$136,265,653 shall be for Safeguards and
8 Security; and

9 (10) \$32,658,710 shall be for Workforce Devel-
10 opment for Teachers and Scientists.

11 (g) FISCAL YEAR 2028.—There are authorized to be
12 appropriated to the Secretary for the Office of Science for
13 fiscal year 2028 \$11,942,623,234, of which—

14 (1) \$4,130,800,000 shall be for Basic Energy
15 Sciences;

16 (2) \$1,626,835,112 shall be for High Energy
17 Physics;

18 (3) \$1,171,134,646 shall be for Biological and
19 Environmental Research;

20 (4) \$1,108,922,978 shall be for Nuclear Phys-
21 ics;

22 (5) \$1,867,600,000 shall be for Advanced Sci-
23 entific Computing Research;

24 (6) \$1,236,480,000 shall be for Fusion Energy
25 Sciences;

1 (7) \$408,000,000 shall be for Science Labora-
2 tories Infrastructure;

3 (8) \$220,547,648 shall be for Science Program
4 Direction;

5 (9) \$138,990,966 shall be for Safeguards and
6 Security; and

7 (10) \$33,311,884 shall be for Workforce Devel-
8 opment for Teachers and Scientists.

9 (h) FISCAL YEAR 2029.—There are authorized to be
10 appropriated to the Secretary for the Office of Science for
11 fiscal year 2029 \$12,645,590,635, of which—

12 (1) \$4,400,200,000 shall be for Basic Energy
13 Sciences;

14 (2) \$1,709,811,557 shall be for High Energy
15 Physics;

16 (3) \$1,230,868,167 shall be for Biological and
17 Environmental Research;

18 (4) \$1,165,483,403 shall be for Nuclear Phys-
19 ics;

20 (5) \$1,989,400,000 shall be for Advanced Sci-
21 entific Computing Research;

22 (6) \$1,317,120,000 shall be for Fusion Energy
23 Sciences;

24 (7) \$432,000,000 shall be for Science Labora-
25 tories Infrastructure;

1 (8) \$224,958,601 shall be for Science Program
2 Direction;

3 (9) \$141,770,785 shall be for Safeguards and
4 Security; and

5 (10) \$33,978,122 shall be for Workforce Devel-
6 opment for Teachers and Scientists.

7 (i) FISCAL YEAR 2030.—There are authorized to be
8 appropriated to the Secretary for the Office of Science for
9 fiscal year 2030 \$13,348,715,176, of which—

10 (1) \$4,669,600,000 shall be for Basic Energy
11 Sciences;

12 (2) \$1,792,788,001 shall be for High Energy
13 Physics;

14 (3) \$1,290,601,687 shall be for Biological and
15 Environmental Research;

16 (4) \$1,222,043,829 shall be for Nuclear Phys-
17 ics;

18 (5) \$2,111,200,000 shall be for Advanced Sci-
19 entific Computing Research;

20 (6) \$1,397,760,000 shall be for Fusion Energy
21 Sciences;

22 (7) \$456,000,000 shall be for Science Labora-
23 tories Infrastructure;

24 (8) \$229,457,773 shall be for Science Program
25 Direction;

1 (9) \$144,606,201 shall be for Safeguards and
2 Security; and

3 (10) \$34,657,684 shall be for Workforce Devel-
4 opment for Teachers and Scientists.

5 (j) FISCAL YEAR 2031.—There are authorized to be
6 appropriated to the Secretary for the Office of Science for
7 fiscal year 2031 \$14,052,000,000, of which—

8 (1) \$4,939,000,000 shall be for Basic Energy
9 Sciences;

10 (2) \$1,875,764,446 shall be for High Energy
11 Physics;

12 (3) \$1,350,335,208 shall be for Biological and
13 Environmental Research;

14 (4) \$1,278,604,254 shall be for Nuclear Phys-
15 ics;

16 (5) \$2,233,000,000 shall be for Advanced Sci-
17 entific Computing Research;

18 (6) \$1,478,400,000 shall be for Fusion Energy
19 Sciences;

20 (7) \$480,000,000 shall be for Science Labora-
21 tories Infrastructure;

22 (8) \$234,046,929 shall be for Science Program
23 Direction;

24 (9) \$147,498,325 shall be for Safeguards and
25 Security; and

1 (10) \$35,350,838 shall be for Workforce Devel-
 2 opment for Teachers and Scientists.

3 **Subtitle B—Advanced Research**
 4 **Projects Agency—Energy**

5 **SEC. 411. ADVANCED RESEARCH PROJECTS AGENCY-EN-**
 6 **ERGY UPDATE.**

7 Paragraph (2) of section 5012(o) of the America
 8 COMPETES Act (42 U.S.C. 16538(o)) is amended by
 9 adding at the end the following:

10 “(F) \$800,833,333 for fiscal year 2026;

11 “(G) \$840,666,667 for fiscal year 2027;

12 “(H) \$880,500,000 for fiscal year 2028;

13 “(I) \$920,333,333 for fiscal year 2029;

14 “(J) \$960,166,667 for fiscal year 2030;

15 and

16 “(K) \$1,000,000,000 for fiscal year
 17 2031.”.

18 **Subtitle C—DOE Clean Energy**
 19 **Infrastructure**

20 **SEC. 421. REGIONAL ENERGY INNOVATION CENTERS.**

21 (a) DEFINITIONS.—In this section:

22 (1) ADVANCED ENERGY TECHNOLOGY.—The
 23 term “advanced energy technology” means—

24 (A) an innovative technology—

- 1 (i) that produces energy from solar,
- 2 wind, geothermal, biomass, tidal, wave,
- 3 ocean, or other renewable energy resources;
- 4 (ii) that produces nuclear energy;
- 5 (iii) for carbon capture and sequestra-
- 6 tion;
- 7 (iv) that enables advanced vehicles,
- 8 vehicle components, and related tech-
- 9 nologies that result in significant energy
- 10 savings;
- 11 (v) that generates, transmits, distrib-
- 12 utes, uses, or stores energy more efficiently
- 13 than conventional technologies, including
- 14 through Smart Grid technologies; or
- 15 (vi) that enhances the energy inde-
- 16 pendence and security of the United States
- 17 by enabling improved or expanded supply
- 18 and production of domestic energy re-
- 19 sources, including coal, oil, and natural
- 20 gas;
- 21 (B) a research, development, demonstra-
- 22 tion, or commercial application activity nec-
- 23 essary to ensure the long-term, secure, and sus-
- 24 tainable supply of an energy critical element; or

1 (C) any other innovative energy technology
2 area identified by the Secretary.

3 (2) QUALIFYING ENTITY.—The term “quali-
4 fying entity” means—

5 (A) an institution of higher education;

6 (B) an appropriate State or Federal entity,
7 including a federally funded research and devel-
8 opment center of the Department;

9 (C) a nonprofit research institution;

10 (D) a multi-institutional collaboration; or

11 (E) any other relevant entity the Secretary
12 determines appropriate.

13 (b) AUTHORIZATION OF PROGRAM.—

14 (1) IN GENERAL.—

15 (A) The Secretary shall carry out a pro-
16 gram to enhance the economic, environmental,
17 and energy security of the United States by es-
18 tablishing and operating Regional Energy Inno-
19 vation Centers in diverse regions of the United
20 States, in order to provide, to the maximum ex-
21 tent practicable, one centralized location for
22 multidisciplinary, collaborative research, devel-
23 opment, and demonstration of advanced energy
24 technologies most suited to commercial applica-
25 tion in each region of the United States.

1 (B) In establishing the centers authorized
2 in subparagraph (A), the Secretary shall con-
3 sider the diverse natural resources available
4 throughout the United States, and maximize
5 the opportunities for cooperation between insti-
6 tutes of higher education, industry, State and
7 local governments, and nonprofit research insti-
8 tutions with shared areas of energy expertise.

9 (2) TECHNOLOGY DEVELOPMENT FOCUS.—The
10 Secretary shall designate for each center a unique
11 advanced energy technology or basic research focus.
12 In establishing focus areas for each center, the Sec-
13 retary shall consider the energy needs, resources,
14 and expertise available in each region of the United
15 States.

16 (3) COORDINATION.—The Secretary shall en-
17 sure the coordination of, and avoid unnecessary du-
18 plication of, the activities of each center with the ac-
19 tivities of—

20 (A) other research entities of the Depart-
21 ment, including the National Laboratories, the
22 Advanced Research Projects Agency–Energy,
23 Energy Innovation Hubs, and Energy Frontier
24 Research Centers;

25 (B) institutions of higher education; and

1 (C) industry.

2 (c) APPLICATION PROCESS.—

3 (1) ELIGIBILITY.—To be eligible to receive an
4 award for the establishment and operation of a cen-
5 ter established under subsection (b)(1)(A), a consor-
6 tium shall—

7 (A) be composed of not fewer than two
8 qualifying entities;

9 (B) operate subject to a binding agree-
10 ment, entered into by each member of the con-
11 sortium, that documents—

12 (i) the proposed partnership agree-
13 ment, including the governance and man-
14 agement structure of the center;

15 (ii) measures the consortium will un-
16 dertake to enable cost-effective implemen-
17 tation of activities under the program de-
18 scribed in subsection (b)(1); and

19 (iii) a proposed budget, including fi-
20 nancial contributions from non-Federal
21 sources; and

22 (C) operate as a nonprofit organization.

23 (2) SELECTION.—The Secretary shall consider
24 applications from qualifying entities, and select cen-

1 ters authorized under subsection (b)(1)(A) on a
2 competitive, merit-reviewed basis.

3 (3) DURATION.—A center established under
4 this section shall receive support for a period of not
5 more than 5 years, subject to the availability of ap-
6 propriations.

7 (4) RENEWAL.—Upon the expiration of any pe-
8 riod of support of a center under this section, the
9 Director may renew support for the center, on a
10 merit-reviewed basis, for a period of not more than
11 5 years.

12 (5) TERMINATION.—Consistent with the exist-
13 ing authorities of the Department, the Director may
14 terminate an underperforming center for cause dur-
15 ing the performance period.

16 (d) CENTER OPERATIONS.—

17 (1) IN GENERAL.—Each center shall conduct or
18 provide for multidisciplinary, collaborative research,
19 development, demonstration of advanced energy
20 technologies within the technology development focus
21 designated under subsection (b)(2).

22 (2) ACTIVITIES.—Each center shall—

23 (A) encourage collaboration and commu-
24 nication among the member qualifying entities
25 of the consortium and awardees;

1 (B) develop and make publicly available
2 proposed plans and programs; and

3 (C) submit an annual report to the De-
4 partment summarizing the activities of the cen-
5 ter, including—

6 (i) detailing organizational expendi-
7 tures; and

8 (ii) describing each project under-
9 taken by the center.

10 (3) CONFLICTS OF INTEREST.—Each center
11 shall maintain conflict of interest procedures, con-
12 sistent with the conflict of interest procedures of the
13 Department.

14 (4) PROHIBITION ON CONSTRUCTION.—

15 (A) IN GENERAL.—Except as provided in
16 subparagraph (B)—

17 (i) no funds provided under this sec-
18 tion may be used for construction of new
19 buildings or facilities for centers; and

20 (ii) construction of new buildings or
21 facilities shall not be considered as part of
22 the non-Federal share of a Hub cost-shar-
23 ing agreement.

24 (B) TEST BED AND RENOVATION EXCEP-
25 TION.—Nothing in this paragraph prohibits the

1 use of funds provided under this section or non-
 2 Federal cost share funds for the construction of
 3 a test bed or renovations to existing user facili-
 4 ties if the Secretary determines such facilities
 5 are necessary and applicable to conduct re-
 6 search within the focus areas identified for each
 7 center.

8 **SEC. 422. VERSATILE NEUTRON SOURCE.**

9 Section 955(c) of the Energy Policy Act of 2005
 10 (U.S.C. 16275) is amended—

11 (1) in paragraph (4), by striking “2026” and
 12 inserting “2030”; and

13 (2) in paragraph (7), by adding at the end the
 14 following:

15 “(F) \$639,000,000 for fiscal year 2026;

16 “(G) \$1,005,000,000 for fiscal year 2027;

17 “(H) \$1,081,000,000 for fiscal year 2028;

18 “(I) \$910,000,000 for fiscal year 2029;

19 and

20 “(J) \$654,000,000 for fiscal year 2030.”.

21 **SEC. 423. CARBON SEQUESTRATION RESEARCH AND DE-**
 22 **VELOPMENT PROGRAM.**

23 (a) SENSE OF CONGRESS.—It is the sense of Con-
 24 gress that power produced from fossil fuels is essential for
 25 maintaining the global competitiveness of United States

1 manufacturing and industrial processes, and that these
2 domestic industries are critical to the prosperity and na-
3 tional security of the United States.

4 (b) CARBON SEQUESTRATION RESEARCH INITIA-
5 TIVE.—

6 (1) IN GENERAL.—The Secretary of Energy, in
7 coordination with the Secretary of the Interior, shall
8 establish an initiative focused on the evaluation the
9 sequestration of carbon dioxide in geologic forma-
10 tions in order to—

11 (A) enhance the scientific understanding
12 of, and reduce uncertainties associated with, the
13 effects of carbon dioxide stored in geologic for-
14 mations for long and short term periods; and

15 (B) inform improved risk-assessment
16 methods, risk-management practices, and
17 standards with respect to the storage of carbon
18 dioxide in geologic formations on large and
19 small scale.

20 (2) PROGRAM COMPONENTS.—In carrying out
21 the initiative under subsection (a), the Secretary of
22 Energy shall—

23 (A) identify ongoing scientific challenges
24 for understanding the long and short term ef-
25 fects of sequestered carbon dioxide, especially in

1 shallow geologic formations and sites not used
2 for enhanced oil recovery;

3 (B) develop a long-term strategic and
4 prioritized basic research agenda to address
5 such scientific challenges in coordination with
6 other research efforts;

7 (C) leverage the collective body of knowl-
8 edge from existing carbon utilization and se-
9 questration research, including from the United
10 States Geological Survey and the national Car-
11 bon Utilization Research Center; and

12 (D) engage with other Federal agencies,
13 research communities, and potential users of in-
14 formation produced under this section.

15 (3) COORDINATION.—In carrying out the initia-
16 tive under subsection (a), the Secretary of Energy
17 shall ensure coordination with relevant Federal
18 agencies, including the Department of the Interior,
19 the Environmental Protection Agency, and the De-
20 partment of Agriculture, and prioritize the following
21 objectives:

22 (A) leveraging experience from existing en-
23 tities, demonstrations, and research sponsored
24 by the Department, including Regional Carbon
25 Sequestration Partnerships;

1 (B) increasing the understanding and de-
2 velopment of permanent soil carbon sequestra-
3 tion;

4 (C) providing a coordinated update of car-
5 bon storage potential across the United States
6 by integrating data with DOE's Carbon Storage
7 Atlas; and

8 (D) developing computational tools, in co-
9 ordination with DOE's Office of Advanced Sci-
10 entific Computing Research and the National
11 Risk Assessment Partnership, to assess and
12 manage potential environmental impacts at geo-
13 logic carbon dioxide storage sites.

14 (4) DUPLICATION.—The Secretary shall ensure
15 the coordination of, and avoid unnecessary duplica-
16 tion of, the activities of this initiative with the activi-
17 ties of—

18 (A) other research entities of the Depart-
19 ment, including the National Laboratories, the
20 Advanced Research Projects Agency–Energy;
21 and

22 (B) industry.

23 (5) RESEARCH PLAN.—Not later than 1 year
24 after the date of enactment of this Act, the Sec-
25 retary shall transmit to the Committee on Science,

1 Space, and Technology of the House of Representa-
 2 tives and the Committee on Energy and Natural Re-
 3 sources of the Senate a 4-year research plan that
 4 identifies and prioritizes basic research needs relat-
 5 ing to carbon sequestration in geologic formations.

6 **SEC. 424. FRONTIER OBSERVATORY FOR RESEARCH IN**
 7 **GEO THERMAL ENERGY.**

8 Section 615 (c)(7)(A) of the Energy Independence
 9 and Security Act of 2007 (42 U.S.C. 17194) is amended
 10 by adding at the end the following:

11 “(vi) \$70,000,000 for fiscal year
 12 2026;

13 “(vii) \$70,000,000 for fiscal year
 14 2027;

15 “(viii) \$70,000,000 for fiscal year
 16 2028;

17 “(ix) \$70,000,000 for fiscal year
 18 2029;

19 “(x) \$70,000,000 for fiscal year 2030;
 20 and

21 “(xi) \$70,000,000 for fiscal year
 22 2031.”.

23 **SEC. 425. ENERGY STORAGE GRAND CHALLENGE.**

24 (a) IN GENERAL.—The Secretary shall carry out a
 25 research challenge to be known as the “Energy Storage

1 Grand Challenge” (referred to in this section as the “Chal-
2 lenge”) to support and accelerate the research, develop-
3 ment, and demonstration of advanced energy storage tech-
4 nologies, in order to—

5 (1) support basic research in capabilities that
6 enable temporal flexibility in the conversion of en-
7 ergy resources to useful energy services;

8 (2) inform the development of a broad range of
9 energy storage systems, including batteries, chemical
10 storage, and thermal storage, with emphasis on in-
11 novative materials, manufacturing, and recycling;
12 and

13 (3) facilitate the translation of basic research
14 results in energy storage to industry.

15 (b) LEVERAGING.—In carrying out programs and ac-
16 tivities under the Challenge, the Secretary shall leverage
17 expertise and resources and facilitate collaboration be-
18 tween—

19 (1) the Office of Electricity;

20 (2) the Office of Energy Efficiency and Renew-
21 able Energy;

22 (3) the Office of Fossil Energy;

23 (4) the Office of Nuclear Energy; and

1 (5) the Basic Energy Sciences Program and
2 Advanced Scientific Computing Program of the Of-
3 fice of Science.

4 The Secretary may organize additional activities under
5 this subsection through Energy Frontier Research Cen-
6 ters, Energy Innovation Hubs, or cross-cutting research
7 programs.

8 (c) GRID SCALE ENERGY STORAGE USER FACILI-
9 TIES.—Not later than 180 days after the date of enact-
10 ment of this Act, the Secretary shall transmit to the Com-
11 mittee on Science, Space, and Technology of the House
12 of Representatives and the Committee on Energy and
13 Natural Resources of the Senate a 4-year research plan
14 that identifies and prioritizes basic research needs relating
15 to the development, construction, operation, and mainte-
16 nance of grid scale energy storage technology demonstra-
17 tion projects, which shall operate as national user facili-
18 ties.

19 **SEC. 426. CRITICAL INFRASTRUCTURE RESEARCH AND**
20 **CONSTRUCTION.**

21 (a) IN GENERAL.—The Secretary shall carry out a
22 program of fundamental research, development, and early-
23 stage demonstration of innovative engineered systems and
24 tools to help ensure the resilience and security of critical
25 integrated grid infrastructures.

1 (b) COORDINATION.—In carrying out the program
2 under subsection (a), the Secretary shall leverage expertise
3 and resources and facilitate collaboration and coordination
4 between—

- 5 (1) the Office of Electricity;
- 6 (2) the Office of Cybersecurity, Energy Secu-
7 rity, and Emergency Response;
- 8 (3) the Office of Science;
- 9 (4) the Department of Defense; and
- 10 (5) the Department of Homeland Security.

11 (c) CRITICAL INFRASTRUCTURE TEST RANGE.—In
12 carrying out the program under subsection (a), the Sec-
13 retary shall establish and operate a Critical Infrastructure
14 Test Range (referred to in this section as the “Test
15 Range”) that allows for scalable physical and cyber per-
16 formance testing to be conducted on industry-scale infra-
17 structure systems. This facility shall include a focus on—

- 18 (1) cyber security test beds; and
- 19 (2) electric grid test beds.

20 (d) SELECTION.—The Secretary shall select the Test
21 Range under this section on a competitive, merit-reviewed
22 basis. The Secretary shall consider applications from Na-
23 tional Laboratories, institutions of higher education,
24 multi-institutional collaborations, and other appropriate
25 entities.

1 (e) DURATION.—The Test Range established under
2 this section shall receive support for a period of not more
3 than 5 years, subject to the availability of appropriations.

4 (f) RENEWAL.—Upon the expiration of any period of
5 support of the Test Range, the Secretary may renew sup-
6 port for the Test Range, on a merit-reviewed basis, for
7 a period of not more than 5 years.

8 (g) TERMINATION.—Consistent with the existing au-
9 thorities of the Department, the Secretary may terminate
10 the Test Range for cause during the performance period.

11 **TITLE V—NATIONAL INSTITUTE**
12 **OF STANDARDS AND TECH-**
13 **NOLOGY**

14 **SEC. 501. FINDINGS.**

15 Congress finds the following:

16 (1) The National Institute of Standards and
17 Technology (NIST) promotes United States innova-
18 tion and industrial competitiveness by advancing
19 measurement science, standards and technology in
20 ways that enhance economic security and improve
21 Americans' quality of life.

22 (2) NIST's leadership in a broad range of cut-
23 ting-edge scientific endeavors including but not lim-
24 ited to quantum science and engineering, cybersecu-
25 rity, biologics, artificial intelligence (AI), machine

1 learning, additive manufacturing, disaster resilience,
2 and international standards development is critical
3 to America's leadership in the industries of the fu-
4 ture.

5 (3) NIST's role as the Nation's laboratory for
6 industry is critical to maintaining the economic and
7 national security of the United States.

8 **SEC. 502. AUTHORIZATION OF APPROPRIATIONS.**

9 (a) FISCAL YEAR 2022.—

10 (1) IN GENERAL.—There are authorized to be
11 appropriated to the Secretary of Commerce
12 \$1,244,800,000 for the National Institute of Stand-
13 ards and Technology for fiscal year 2022.

14 (2) SPECIFIC ALLOCATIONS.—Of the amount
15 authorized by paragraph (1)—

16 (A) \$866,800,000 shall be for scientific
17 and technical research and services laboratory
18 activities, of which \$9,900,000 may be trans-
19 ferred to the Working Capital Fund;

20 (B) \$200,000,000 shall be for the con-
21 struction and maintenance of facilities, of which
22 \$120,000,000 shall be for Safety, Capacity,
23 Maintenance, and Major Repairs, including
24 \$20,000,000 for IT infrastructure; and

1 (C) \$178,000,000 shall be for industrial
2 technology services activities, of which
3 \$153,000,000 shall be for the Manufacturing
4 Extension Partnership program under sections
5 25 and 26 of the National Institute of Stand-
6 ards and Technology Act (15 U.S.C. 278k and
7 278l) and \$25,000,000 shall be for the Network
8 for Manufacturing Innovation Program under
9 section 34 of the National Institute of Stand-
10 ards and Technology Act (15 U.S.C. 278s).

11 (b) FISCAL YEAR 2023.—

12 (1) IN GENERAL.—There are authorized to be
13 appropriated to the Secretary of Commerce
14 \$1,326,600,000 for the National Institute of Stand-
15 ards and Technology for fiscal year 2023.

16 (2) SPECIFIC ALLOCATIONS.—Of the amount
17 authorized by paragraph (1)—

18 (A) \$945,600,000 shall be for scientific
19 and technical research and services laboratory
20 activities, of which \$10,800,000 may be trans-
21 ferred to the Working Capital Fund;

22 (B) \$200,000,000 shall be for the con-
23 struction and maintenance of facilities, of which
24 \$120,000,000 shall be for Safety, Capacity,

1 Maintenance, and Major Repairs, including
2 \$20,000,000 for IT infrastructure; and

3 (C) \$181,000,000 shall be for industrial
4 technology services activities, of which
5 \$156,000,000 shall be for the Manufacturing
6 Extension Partnership program under sections
7 25 and 26 of the National Institute of Stand-
8 ards and Technology Act (15 U.S.C. 278k and
9 278I) and \$25,000,000 shall be for the Net-
10 work for Manufacturing Innovation Program
11 under section 34 of the National Institute of
12 Standards and Technology Act (15 U.S.C.
13 278s).

14 (c) FISCAL YEAR 2024.—

15 (1) IN GENERAL.—There are authorized to be
16 appropriated to the Secretary of Commerce
17 \$1,408,400,000 for the National Institute of Stand-
18 ards and Technology for fiscal year 2024.

19 (2) SPECIFIC ALLOCATIONS.—Of the amount
20 authorized by paragraph (1)—

21 (A) \$1,024,000,000 shall be for scientific
22 and technical research and services laboratory
23 activities, of which \$11,700,000 may be trans-
24 ferred to the Working Capital Fund;

1 (B) \$200,000,000 shall be for the con-
2 struction and maintenance of facilities, of which
3 \$120,000,000 shall be for Safety, Capacity,
4 Maintenance, and Major Repairs, including
5 \$10,000,000 for IT infrastructure; and

6 (C) \$184,000,000 shall be for industrial
7 technology services activities, of which
8 \$159,000,000 shall be for the Manufacturing
9 Extension Partnership program under sections
10 25 and 26 of the National Institute of Stand-
11 ards and Technology Act (15 U.S.C. 278k and
12 278I) and \$25,000,000 shall be for the Net-
13 work for Manufacturing Innovation Program
14 under section 34 of the National Institute of
15 Standards and Technology Act (15 U.S.C.
16 278s).

17 (d) FISCAL YEAR 2025.—

18 (1) IN GENERAL.—There are authorized to be
19 appropriated to the Secretary of Commerce
20 \$1,490,200,000 for the National Institute of Stand-
21 ards and Technology for fiscal year 2025.

22 (2) SPECIFIC ALLOCATIONS.—Of the amount
23 authorized by paragraph (1)—

24 (A) \$1,103,200,000 shall be for scientific
25 and technical research and services laboratory

1 activities, of which \$12,600,000 may be trans-
2 ferred to the Working Capital Fund;

3 (B) \$200,000,000 shall be for the con-
4 struction and maintenance of facilities of which
5 \$120,000,000 shall be for Safety, Capacity,
6 Maintenance, and Major Repairs, including
7 \$10,000,000 for IT infrastructure; and

8 (C) \$187,000,000 shall be for industrial
9 technology services activities, of which
10 \$162,000,000 shall be for the Manufacturing
11 Extension Partnership program under sections
12 25 and 26 of the National Institute of Stand-
13 ards and Technology Act (15 U.S.C. 278k and
14 278I) and \$25,000,000 shall be for the Net-
15 work for Manufacturing Innovation Program
16 under section 34 of the National Institute of
17 Standards and Technology Act (15 U.S.C.
18 278s).

19 (e) FISCAL YEAR 2026.—

20 (1) IN GENERAL.—There are authorized to be
21 appropriated to the Secretary of Commerce
22 \$1,572,000,000 for the National Institute of Stand-
23 ards and Technology for fiscal year 2026.

24 (2) SPECIFIC ALLOCATIONS.—Of the amount
25 authorized by paragraph (1)—

1 (A) \$1,182,000,000 shall be for scientific
2 and technical research and services laboratory
3 activities, of which \$13,500,000 may be trans-
4 ferred to the Working Capital Fund;

5 (B) \$200,000,000 shall be for the con-
6 struction and maintenance of facilities, of which
7 \$120,000,000 shall be for Safety, Capacity,
8 Maintenance, and Major Repairs, including
9 \$10,000,000 for IT infrastructure; and

10 (C) \$190,000,000 shall be for industrial
11 technology services activities, of which
12 \$165,000,000 shall be for the Manufacturing
13 Extension Partnership program under sections
14 25 and 26 of the National Institute of Stand-
15 ards and Technology Act (15 U.S.C. 278k and
16 278I) and \$25,000,000 shall be for the Net-
17 work for Manufacturing Innovation Program
18 under section 34 of the National Institute of
19 Standards and Technology Act (15 U.S.C.
20 278s).

21 (f) FISCAL YEAR 2027.—

22 (1) IN GENERAL.—There are authorized to be
23 appropriated to the Secretary of Commerce
24 \$1,653,800,000 for the National Institute of Stand-
25 ards and Technology for fiscal year 2027.

1 (2) SPECIFIC ALLOCATIONS.—Of the amount
2 authorized by paragraph (1)—

3 (A) \$1,260,800,000 shall be for scientific
4 and technical research and services laboratory
5 activities, of which \$14,400,000 may be trans-
6 ferred to the Working Capital Fund;

7 (B) \$200,000,000 shall be for the con-
8 struction and maintenance of facilities, of which
9 \$120,000,000 shall be for Safety, Capacity,
10 Maintenance, and Major Repairs, including
11 \$10,000,000 for IT infrastructure; and

12 (C) \$193,000,000 shall be for industrial
13 technology services activities, of which
14 \$168,000,000 shall be for the Manufacturing
15 Extension Partnership program under sections
16 25 and 26 of the National Institute of Stand-
17 ards and Technology Act (15 U.S.C. 278k and
18 278I) and \$25,000,000 shall be for the Net-
19 work for Manufacturing Innovation Program
20 under section 34 of the National Institute of
21 Standards and Technology Act (15 U.S.C.
22 278s).

23 (g) FISCAL YEAR 2028.—

24 (1) IN GENERAL.—There are authorized to be
25 appropriated to the Secretary of Commerce

1 \$1,735,600,000 for the National Institute of Stand-
2 ards and Technology for fiscal year 2028.

3 (2) SPECIFIC ALLOCATIONS.—Of the amount
4 authorized by paragraph (1)—

5 (A) \$1,339,600,000 shall be for scientific
6 and technical research and services laboratory
7 activities, of which \$15,300,000 may be trans-
8 ferred to the Working Capital Fund;

9 (B) \$200,000,000 shall be for the con-
10 struction and maintenance of facilities, of which
11 \$120,000,000 shall be for Safety, Capacity,
12 Maintenance, and Major Repairs, including
13 \$10,000,000 for IT infrastructure; and

14 (C) \$196,000,000 shall be for industrial
15 technology services activities, of which
16 \$174,000,000 shall be for the Manufacturing
17 Extension Partnership program under sections
18 25 and 26 of the National Institute of Stand-
19 ards and Technology Act (15 U.S.C. 278k and
20 278I) and \$25,000,000 shall be for the Net-
21 work for Manufacturing Innovation Program
22 under section 34 of the National Institute of
23 Standards and Technology Act (15 U.S.C.
24 278s).

25 (h) FISCAL YEAR 2029.—

1 (1) IN GENERAL.—There are authorized to be
2 appropriated to the Secretary of Commerce
3 \$1,817,400,000 for the National Institute of Stand-
4 ards and Technology for fiscal year 2029.

5 (2) SPECIFIC ALLOCATIONS.—Of the amount
6 authorized by paragraph (1)—

7 (A) \$1,418,000,000 shall be for scientific
8 and technical research and services laboratory
9 activities, of which \$16,200,000 may be trans-
10 ferred to the Working Capital Fund;

11 (B) \$200,000,000 shall be for the con-
12 struction and maintenance of facilities, of which
13 \$120,000,000 shall be for Safety, Capacity,
14 Maintenance, and Major Repairs, including
15 \$10,000,000 for IT infrastructure; and

16 (C) \$199,000,000 shall be for industrial
17 technology services activities, of which
18 \$174,000,000 shall be for the Manufacturing
19 Extension Partnership program under sections
20 25 and 26 of the National Institute of Stand-
21 ards and Technology Act (15 U.S.C. 278k and
22 278I) and \$25,000,000 shall be for the Net-
23 work for Manufacturing Innovation Program
24 under section 34 of the National Institute of

1 Standards and Technology Act (15 U.S.C.
2 278s).

3 (i) FISCAL YEAR 2030.—

4 (1) IN GENERAL.—There are authorized to be
5 appropriated to the Secretary of Commerce
6 \$1,899,200,000 for the National Institute of Stand-
7 ards and Technology for fiscal year 2030.

8 (2) SPECIFIC ALLOCATIONS.—Of the amount
9 authorized by paragraph (1)—

10 (A) \$1,497,200,000 shall be for scientific
11 and technical research and services laboratory
12 activities, of which \$17,100,000 may be trans-
13 ferred to the Working Capital Fund;

14 (B) \$200,000,000 shall be for the con-
15 struction and maintenance of facilities, of which
16 \$120,000,000 shall be for Safety, Capacity,
17 Maintenance, and Major Repairs, including
18 \$10,000,000 for IT infrastructure; and

19 (C) \$202,000,000 shall be for industrial
20 technology services activities, of which
21 \$177,000,000 shall be for the Manufacturing
22 Extension Partnership program under sections
23 25 and 26 of the National Institute of Stand-
24 ards and Technology Act (15 U.S.C. 278k and
25 278I) and \$25,000,000 shall be for the Net-

1 work for Manufacturing Innovation Program
2 under section 34 of the National Institute of
3 Standards and Technology Act (15 U.S.C.
4 278s).

5 (j) FISCAL YEAR 2031.—

6 (1) IN GENERAL.—There are authorized to be
7 appropriated to the Secretary of Commerce
8 \$1,981,000,000 for the National Institute of Stand-
9 ards and Technology for fiscal year 2031.

10 (2) SPECIFIC ALLOCATIONS.—Of the amount
11 authorized by paragraph (1)—

12 (A) \$1,576,000,000 shall be for scientific
13 and technical research and services laboratory
14 activities, of which \$18,000,000 may be trans-
15 ferred to the Working Capital Fund;

16 (B) \$200,000,000 shall be for the con-
17 struction and maintenance of facilities, of which
18 \$120,000,000 shall be for Safety, Capacity,
19 Maintenance, and Major Repairs, including
20 \$10,000,000 for IT infrastructure; and

21 (C) \$205,000,000 shall be for industrial
22 technology services activities, of which
23 \$180,000,000 shall be for the Manufacturing
24 Extension Partnership program under sections
25 25 and 26 of the National Institute of Stand-

ards and Technology Act (15 U.S.C. 278k and 278I) and \$25,000,000 shall be for the Network for Manufacturing Innovation Program under section 34 of the National Institute of Standards and Technology Act (15 U.S.C. 278s).

SEC. 503. NIST FACILITIES MODERNIZATION FUND.

(a) ESTABLISHMENT.—There is established in the Treasury of the United States a fund to be known as the “NIST Facilities Modernization Fund” (hereafter in this section referred to as the “Fund”).

(b) USE OF FUNDS.—Amounts in the Fund shall be available to Secretary, acting through the Director, for Capital Projects on the National Institute of Standards and Technology’s campuses for the modernization and construction of research facilities needed to conduct leading edge scientific and technical research.

(c) CONTENTS OF FUND.—The Funds shall consist of the following amounts:

(1) Such amounts as may be appropriated by law.

(2) Interest earned on the balance of the Fund.

(d) AUTHORIZATION OF FUNDS.—Of the funds authorized to be appropriated in section 302 of this Act for the construction and maintenance of facilities,

1 \$80,000,000 for each of the fiscal years 2022 through
2 2031 shall be provided for the Fund established in sub-
3 section (a).

4 (e) CONTINUING AVAILABILITY OF FUNDS.—
5 Amounts in the Fund are available without regard to fiscal
6 year limitation.

7 (f) NOTIFICATION TO COMMITTEES.—Upon making
8 any obligation or expenditure of any amount in the Fund,
9 the Secretary, through the Director, shall notify the House
10 of Representatives Science, Space, and Technology Com-
11 mittee, the Senate Committee on Commerce, Science, and
12 Transportation, the Committee on Appropriations of the
13 House of Representatives and the Committee on Appro-
14 priations of the Senate of the amount and purpose of the
15 obligation or expenditure.

16 (g) NIST FACILITIES MODERNIZATION AND MAIN-
17 TENANCE PLAN.—

18 (1) IN GENERAL.—To carry out the program
19 authorized in subsection (a), the Secretary, acting
20 through the Director, shall develop and submit to
21 Congress a 5-year modernization and maintenance
22 plan for the National Institute of Standards and
23 Technology's campuses.

24 (2) TIMING.—The modernization and mainte-
25 nance plan required in paragraph (1) shall be sub-

mitted to Congress within 30 days of enactment of this Act, and updated on an annual basis.

(3) PLAN ELEMENTS.—The Plan required in paragraph (1) shall include the following:

(A) A list of Capitol Construction Projects expected to be undertaken in the next 5 years, the core capabilities these facilities will provide, anticipated schedule of construction, and anticipated funding requirements.

(B) A list of planned utility infrastructure projects expected to be undertaken in the next 5 years, anticipated schedule of construction, and anticipated funding requirements.

(C) A list of planned IT infrastructure projects expected to be undertaken in the next 5 years, anticipated schedule of construction, and anticipated funding requirements.

(D) A list of the deferred maintenance, a list of deferred maintenance projects expected to be undertaken in the next 5 years, anticipated schedule of construction, anticipated funding requirements, and an evaluation of progress made in reducing the deferred maintenance backlog.

1 **SEC. 504. CYBERSECURITY RESEARCH.**

2 (a) RESEARCH.—The Secretary, acting through the
3 Director, shall expand the fundamental and applied re-
4 search carried out by the Institute to address key ques-
5 tions relating the measurement of privacy, security, and
6 vulnerability of software tools and communications net-
7 works, including through—

8 (1) the development of research and engineering
9 capabilities to provide practical solutions, including
10 measurement techniques and engineering toolkits, to
11 solve cybersecurity challenges such as human fac-
12 tors, identity management, network security, pri-
13 vacy, and software;

14 (2) investment in tools to help private and pub-
15 lic sector organizations, including institutions of
16 higher education and research organizations, meas-
17 ure and manage cybersecurity risks and ensure
18 workforce preparedness for new cybersecurity chal-
19 lenges; and

20 (3) investment in programs to prepare the
21 United States with strong cybersecurity and
22 encryption technologies to apply to emerging tech-
23 nologies such as artificial intelligence, the internet of
24 things, and quantum computing.

25 (b) ASSISTANCE TO FEDERAL AGENCIES.—The Di-
26 rector shall enhance and expand the Institute’s guidance

1 and assistance to Federal agencies to help agencies effec-
2 tively implement the Framework for Improving Critical
3 Infrastructure Cybersecurity, including—

4 (1) technical guidance on the requirements in
5 the Executive order;

6 (2) technical guidance and education and train-
7 ing of agency staff responsible for cyber security,
8 consultative services, and other assistance at indi-
9 vidual Federal agencies; and

10 (3) technical guidance and education and train-
11 ing of individual Federal agency Inspectors General
12 and staff who are responsible for the annual inde-
13 pendent evaluation they are required to perform of
14 the information security program and practices of
15 Federal agencies under section 3555 of title 44,
16 United States Code.

17 (c) REPORT.—The Director shall provide the House
18 Science, Space, and Technology Committee and the Sen-
19 ate Committee on Commerce, Science, and Transportation
20 a report, not later than 12 months after the date of the
21 enactment of this Act, describing how the National Insti-
22 tute of Standards and Technology carried out the activi-
23 ties described in subsection (b) in as much detail as pos-
24 sible, including identification of agencies assisted and the
25 types of consultative services, education, guidance, assist-

1 ance, and training provided to individual agencies and In-
2 spectors General.

3 **SEC. 505. INTERNET OF THINGS.**

4 The Secretary, acting through the Director, shall con-
5 tinue to conduct research with respect to and support the
6 expanded connectivity, interoperability, and security of
7 interconnected systems and other aspects of the internet
8 of things, including through—

9 (1) the development of new tools and meth-
10 odologies for cybersecurity of the internet of things;

11 (2) the development of technologies to address
12 network congestion and device interference, such as
13 the development of testing tools for next generation
14 wireless communications, internet of things proto-
15 cols, coexistence of wireless communications systems,
16 and spectrum sharing;

17 (3) convening experts in the public and private
18 sectors to develop recommendations for accelerating
19 the adoption of sound interoperability standards,
20 guidelines, and best practices for the internet of
21 things; and

22 (4) the development and publication of new cy-
23 bersecurity tools, encryption methods, and best prac-
24 tices for internet of things security.

1 **SEC. 506. COMPOSITES RESEARCH.**

2 (a) RESEARCH.—The Secretary, acting through the
3 Director, shall implement the recommendations contained
4 in the December 2017 report entitled “Road Mapping
5 Workshop Report on Overcoming Barriers to Adoption of
6 Composites in Sustainable Infrastructure”, as appro-
7 priate, to help facilitate the adoption of composite tech-
8 nology in infrastructure in the United States. In imple-
9 menting such recommendations, the Secretary, acting
10 through the Director shall, with respect to the use of com-
11 posite technology in infrastructure—

12 (1) not later than 6 months after the date of
13 enactment of this Act, initiate the establishment of
14 a design data clearinghouse to identify, gather, vali-
15 date, and disseminate existing design criteria, tools,
16 guidelines, and standards; and

17 (2) develop methods and resources required for
18 testing an evaluation of safe and appropriate uses of
19 composite materials for infrastructure, including—

20 (A) conditioning protocols, procedures and
21 models;

22 (B) screening and acceptance tools; and

23 (C) minimum allowable design data sets
24 that can be converted into design tools.

25 (b) STANDARDS COORDINATION.—The Secretary,
26 acting through the Director, shall assure that the appro-

1 p r i a t e I n s t i t u t e s t a f f c o n s u l t r e g u l a r l y w i t h s t a n d a r d s d e -
2 v e l o p e r s , m e m b e r s o f t h e c o m p o s i t e s i n d u s t r y , i n s t i t u t i o n s
3 o f h i g h e r e d u c a t i o n , a n d o t h e r s t a k e h o l d e r s i n o r d e r t o f a -
4 c i l i t a t e t h e a d o p t i o n o f s t a n d a r d s f o r u s e o f c o m p o s i t e m a -
5 t e r i a l s i n i n f r a s t r u c t u r e t h a t a r e b a s e d o n t h e r e s e a r c h a n d
6 t e s t i n g r e s u l t s a n d o t h e r i n f o r m a t i o n d e v e l o p e d b y t h e I n -
7 s t i t u t e .

8 **SEC. 507. ENABLING THE FUTURE BIOECONOMY.**

9 The Secretary, acting through the Director, shall con-
10 t i n u e t o s u p p o r t 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 o f e n g i -
11 n e e r i n g b i o l o g y , i n c l u d i n g t h r o u g h —

12 (1) building up NIST's core capabilities in
13 measurement science supporting synthetic biology by
14 investing in foundational measurement tools;

15 (2) delivering the necessary measurement meth-
16 ods, standards and related services required to im-
17 part confidence in emerging engineering biology ca-
18 pabilities; and

19 (3) developing and evaluating computation tools
20 in order to develop and deploy predictive models that
21 will ink biological blueprints with biological out-
22 comes.

23 **SEC. 508. INTERNATIONAL STANDARDS DEVELOPMENT.**

24 (a) FINDINGS.—Congress finds the following:

1 (1) Widespread use of standards facilitates
2 technology advancement by defining and establishing
3 common foundations for product differentiation,
4 technological innovation, and other value-added serv-
5 ices.

6 (2) Standards also promote an expanded, more
7 interoperable, and efficient marketplace.

8 (3) Global cooperation and coordination on
9 standards for emerging technologies will be critical
10 for having a consistent set of rules to enable market
11 competition, preclude barriers to trade, and allow in-
12 novation to flourish.

13 (4) China’s “Standardization Reform Plan”
14 and “Five-Year Plan for Standardization” highlight
15 its high-level goals to establish China as a “stand-
16 ards power” by 2020, participate in at least half of
17 all standards drafting and revision efforts in recog-
18 nized international standards setting organizations,
19 and to strengthen China’s participation in the gov-
20 ernance of international standards setting organiza-
21 tions.

22 (5) As emerging technologies develop for global
23 deployment, it is critical that the United States and
24 its allies continue to shape standards that underpin

1 the technologies themselves, and the future inter-
2 national governance of these technologies.

3 (6) United States position on standardization in
4 emerging technologies will be critical to United
5 States economic competitiveness.

6 (7) NIST is in a unique position to strengthen
7 United States leadership in standards development,
8 particularly for emerging technologies, to ensure
9 continuing United States economic competitiveness
10 and national security.

11 (b) SENSE OF CONGRESS.—It is the sense of Con-
12 gress that—

13 (1) while United States experts have historically
14 been leaders in international standards development
15 activities, there is concern that the United States is
16 losing its edge;

17 (2) strengthening the unique United States
18 public-private partnerships approach to standards
19 development is critical to United States economic
20 competitiveness; and

21 (3) the United States Government should en-
22 sure cooperation and coordination across Federal
23 agencies to partner with and support private sector
24 stakeholders to continue to shape international dia-

1 logues in regard to standards development for
2 emerging technologies.

3 (c) RESEARCH ACTIVITIES AND ENGAGEMENT.—The
4 Secretary, acting through the Director, shall—

5 (1) build capacity and training opportunities to
6 help create a pipeline of talent and leadership in key
7 standards development positions, including stand-
8 ards education and training related activities tar-
9 geted at integrating standards content into under-
10 graduate and graduate curricula in science, engi-
11 neering, business, public policy, and law;

12 (2) partner with private sector entities to sup-
13 port strategically increased engagement and leader-
14 ship in the development of international standards
15 for digital economy technologies, including
16 partnering with industry to incentivize private sector
17 partners to develop standards strategies and support
18 engagement and participation in the relevant stand-
19 ards activities; and

20 (3) develop approaches to prioritize standard-
21 ization for emerging technologies, identify organiza-
22 tion in which to develop these standards, identify
23 leadership positions of interest to the United States,
24 and identify key contributors for technical and lead-
25 ership expertise in these areas.

1 **SEC. 509. REVIEW OF THE CENTER FOR NEUTRON RE-**
2 **SEARCH.**

3 Not later than 1 year after the date of enactment
4 of this Act, the Comptroller of the United States shall con-
5 duct an evaluation of NIST's Center for Neutron Re-
6 search, including the following:

7 (1) An assessment of what progress NIST has
8 made in planning for the future of the Center for
9 Neutron Research's nuclear reactor since the release
10 of the 2018 National Academies report, and what
11 steps NIST has taken to implement the Academies
12 report.

13 (2) An analysis of the extent to which NIST's
14 planning efforts align with leading practices.

15 (3) An assessment of the extent to which NIST
16 has worked with the Department of Energy to iden-
17 tify the scientific community's long-term needs for
18 neutron research facilities and discuss the coordina-
19 tion of future facilities, and how these agencies are
20 factoring these needs into their decision-making
21 process.

22 (4) Recommendations for NIST and the De-
23 partment of Energy on how best to continue to sup-
24 port civilian nuclear research reactors.

1 **SEC. 510. HIRING AND MANAGEMENT.**

2 (a) **DIRECT HIRE AUTHORITY.**—The Secretary, act-
3 ing through the Director, may—

4 (1) appoint, without regard to the provisions of
5 subchapter I of chapter 33 of title 5, United States
6 Code (other than sections 3303, 3328, and 3330e of
7 such chapter), qualified candidates to scientific, en-
8 gineering, and professional positions for carrying out
9 research and development functions which require
10 the services of specially qualified personnel relating
11 to cybersecurity and quantum information science
12 and technology and such other areas of national re-
13 search priorities as the Secretary, acting through the
14 Director, may determine; and

15 (2) fix the rate of basic pay of any individual
16 appointed under paragraph (1), at a rate not in ex-
17 cess of the basic rate of pay of the Vice President
18 under section 104 of title 3, United States Code,
19 without regard to title 5, United States Code.

20 (b) **LIMITATION.**—The Director may appoint not
21 more than 10 individuals under subsection (a).

22 (c) **SUNSET.**—The authority under subsection (a)
23 shall expire on the date that is 10 years after the date
24 of enactment of this Act.

25 (d) **OTHER TRANSACTION AUTHORITY.**—Section
26 2(b)(4) of the National Institute of Standards and Tech-

1 nology Act (15 U.S.C. 272(b)(4)) is amended to read as
2 follows:

3 “(4) to enter into and perform such contracts,
4 including cooperative research and development ar-
5 rangements and grants and cooperative agreements
6 or other transactions, as may be necessary in the
7 conduct of its work and on such terms as it may
8 deem appropriate, in furtherance of the purposes of
9 this Act;”.

10 **SEC. 511. NATIONAL INSTITUTE OF STANDARDS AND TECH-**
11 **NOLOGY FOUNDATION.**

12 (a) IN GENERAL.—The Secretary of Commerce, act-
13 ing through the Director, may establish or enter into an
14 agreement with a nonprofit organization to establish a Na-
15 tional Institute of Standards and Technology Foundation.
16 The Foundation shall not be an agency or instrumentality
17 of the United States Government.

18 (b) PURPOSE.—The purpose of the Foundation shall
19 be to support the National Institute of Standards and
20 Technology in its mission.

21 (c) ACTIVITIES.—Activities of the Foundation may
22 include the solicitation and acceptance of funds—

23 (1) to support international metrology and
24 standards engagement activities;

1 (2) to conduct education and outreach activi-
2 ties; and

3 (3) to offer direct support to NIST associates,
4 including through activities such as the provision of
5 fellowships, grants, and occupational safety and
6 awareness training.

7 (d) **TRANSFER OF FUNDS.**—The Director may au-
8 thorize, under the agreement under subsection (a), the
9 transfer of funds from the National Institute of Standards
10 and Technology to the nonprofit organization to offset any
11 administrative costs of the Foundation.

12 (e) **LIABILITY.**—The United States shall not be liable
13 for any debts, defaults, acts, or omissions of the Founda-
14 tion. The full faith and credit of the United States shall
15 not extend to any obligations of the Foundation.

16 **SEC. 512. MEP OUTREACH.**

17 Section 25 of the National Institute of Standards and
18 Technology Act (15 U.S.C. 278k) is amended—

19 (1) in subsection (c)—

20 (A) in paragraph (6), by striking “commu-
21 nity colleges and area career and technical edu-
22 cation schools” and inserting the following:
23 “secondary schools (as defined in section 8101
24 of the Elementary and Secondary Education
25 Act of 1965 (20 U.S.C. 7801)), community col-

leges, and area career and technical education schools, including those in underserved and rural communities,”; and

(B) in paragraph (7)—

(i) by striking “and local colleges” and inserting the following: “local high schools and local colleges, including those in underserved and rural communities,”; and

(ii) by inserting “or other applied learning opportunities” after “apprenticeships”; and

(2) in subsection (d)(3), by striking “, community colleges, and area career and technical education schools,” and inserting the following: “and local high schools, community colleges, and area career and technical education schools, including those in underserved and rural communities,”.

SEC. 513. DEFINITIONS.

In this title:

(1) **DIRECTOR.**—The term “Director” means the Director of the National Institute of Standards and Technology.

(2) **FRAMEWORK.**—The term “Framework” means the Framework for Improving Critical Infra-

1 structure Cybersecurity developed by the National
2 Institute of Standards and Technology and referred
3 to in Executive Order 13800 issued on May 11,
4 2017 (82 Fed. Reg. 22391 et seq.).

5 (3) INSTITUTE.—The term “Institute” means
6 the National Institute of Standards and Technology.

7 (4) INSTITUTION OF HIGHER EDUCATION.—The
8 term “institution of higher education” has the
9 meaning given such term in section 101 of the High-
10 er Education Act of 1965 (20 U.S.C. 1001).

11 (5) NIST ASSOCIATE.—The term “NIST asso-
12 ciate” means any guest researcher, research asso-
13 ciate, facility user, or volunteer who conducts re-
14 search at a National Institute of Standards and
15 Technology facility, but is not an employee of the
16 National Institute of Standards and Technology or
17 of another Federal department or agency.

18 (6) SECRETARY.—The term “Secretary” means
19 the Secretary of Commerce.

1 **TITLE VI—NATIONAL OCEANIC**
2 **AND ATMOSPHERIC ADMINIS-**
3 **TRATION**

4 **SEC. 601. ESTABLISHMENT OF A TECHNOLOGY TRANSFER**
5 **OFFICE.**

6 (a) TECHNOLOGY TRANSFER OFFICE.—The Under
7 Secretary shall establish a technology transfer office at the
8 corporate agency level.

9 (b) TECHNOLOGY TRANSFER COORDINATOR.—The
10 Under Secretary shall appoint a Technology Transfer Co-
11 ordinator to be the principal advisor to the Under Sec-
12 retary on all matters relating to technology transfer and
13 commercialization and will serve as director of the tech-
14 nology transfer office.

15 (c) QUALIFICATIONS.—The Coordinator shall be an
16 individual who, by reason of professional background and
17 experience, is specially qualified to advise the Under Sec-
18 retary on matters pertaining to technology transfer at the
19 Agency.

20 (d) DUTIES OF THE COORDINATOR.—The Coordi-
21 nator shall oversee—

22 (1) the expenditure of funds allocated for tech-
23 nology transfer within the Agency;

1 (2) efforts to improve research to operations
2 within the Office of Oceanic and Atmospheric Re-
3 search and other Agency line offices;

4 (3) efforts to engage private sector entities, in-
5 cluding venture capital companies;

6 (4) efforts to engage State and local govern-
7 ments;

8 (5) coordinate efforts across the Agency; and

9 (6) facilitate knowledge transfer from the Agen-
10 cy on Federal standards to commercial, State, and
11 local governments.

12 (e) TECHNOLOGY TRANSFER RESPONSIBILITY.—
13 Nothing in this section affects the technology transfer re-
14 sponsibilities of Federal employees under the Stevenson-
15 Wylder Technology Innovation Act of 1980 (15 U.S.C.
16 3701 et seq.).

17 (f) PLANNING AND REPORTING.—

18 (1) IN GENERAL.—Not later than 180 days
19 after the date of enactment of this Act, the Under
20 Secretary shall submit to Congress a technology
21 transfer execution plan.

22 (2) UPDATES.—Each year after the submission
23 of the plan under paragraph (1), the Under Sec-
24 retary shall submit to Congress an updated execu-
25 tion plan and reports that describe progress toward

1 meeting goals set forth in the execution plan and the
2 funds expended under subsection (e).

3 **SEC. 602. TECHNOLOGY TRANSFER AND TRANSITIONS AS-**
4 **SESSMENT.**

5 Not later than 1 year after the date of enactment
6 of this Act, and annually thereafter, the Under Secretary
7 shall transmit to the Committee on Science, Space, and
8 Technology of the House of Representatives and the Com-
9 mittee on Commerce, Science, and Transportation of the
10 Senate a report which shall include—

11 (1) report on the Agency's research to oper-
12 ations activities during the previous fiscal year; and

13 (2) recommended agency policy changes to in-
14 crease research to operations activities in the coming
15 fiscal year.

16 **SEC. 603. NATIONAL MESONET PROGRAM.**

17 (a) FINDINGS.—Congress finds that—

18 (1) since the initial establishment of a private-
19 public partnership demonstration program, the Na-
20 tional Mesonet Program has leveraged data collected
21 by existing weather station networks to—

22 (A) provide accurate, real-time observation
23 for weather forecasters and emergency response
24 personnel in metropolitan areas across the
25 United States;

1 (B) address persistent impediments, identi-
2 fied in a National Academy of Sciences Report
3 released in 2009, to fulfill the need for broader
4 and denser weather observation networks to im-
5 prove severe weather lead-times;

6 (C) achieve major improvements for the
7 National Oceanic and Atmospheric Administra-
8 tion and the broader American Weather Enter-
9 prise, despite some significant development
10 issues and cost overruns, according to a Na-
11 tional Academy of Sciences Report released in
12 2011;

13 (D) increase the amount of non-Federal
14 weather data available to government by orders
15 of magnitude; and

16 (E) improve understanding of the impact,
17 the size and duration of mesoscale weather
18 events; and

19 (2) the National Mesonet Program is a critical
20 component of agency operations and provides reli-
21 able, real-time prediction and observation capabili-
22 ties for the physical environment that enhances re-
23 sponse and prevention strategies to severe weather
24 events.

1 (b) PROGRAM.—The National Weather Service shall
2 carry out the National Mesonet Program under law to im-
3 prove understanding of and forecast capabilities for at-
4 mospheric events, placing priority on leveraging available
5 commercial and other non-Federal weather data to en-
6 hance coordination across the private, public, and aca-
7 demic sectors of the American weather enterprise.

8 (c) PROGRAM ELEMENTS.—The program described
9 in subsection (b) shall focus on the following activities:

10 (1) Improving the National Oceanic and Atmos-
11 pheric Administration and the National Weather
12 Service’s ability to provide the baseline forecasts and
13 warnings that protect the Nation’s citizens, busi-
14 nesses, military, and government agencies and en-
15 able them to operate and perform in safe, efficient,
16 and orderly manners.

17 (2) Yielding significant amounts of boundary-
18 layer data to result in dramatic improvements in nu-
19 merical weather prediction performance.

20 (3) Providing the critical technical and adminis-
21 trative infrastructure needed to facilitate rapid inte-
22 gration of new and emerging surface, boundary
23 layer, and space-based networks anticipated in com-
24 ing years.

1 (4) Utilizing and integrating existing National
2 Oceanic and Atmospheric Administration data, in-
3 cluding, but not limited to, National Ocean Service
4 water level stations into existing forecasts.

5 (5) Leveraging existing networks of environ-
6 mental monitoring stations to dramatically increase
7 the quantity and density of weather observations
8 available to the National Weather Service at a highly
9 cost-effective price.

10 (6) Supporting the National Weather Service in
11 reaching its target of a 30-minute warning time for
12 severe weather through better predictive algorithms
13 driven by increasingly effective observations.

14 (d) AUTHORIZATION OF APPROPRIATIONS.—Of
15 amounts otherwise made available to the National Weath-
16 er Service, there are authorized to carry out this section
17 \$25,000,000 for fiscal year 2022, \$26,000,000 for fiscal
18 year 2023, \$27,000,000 for fiscal year 2024, \$28,000,000
19 for fiscal year 2025, \$29,000,000 for fiscal year 2026, and
20 \$30,000,000 for fiscal year 2027.

21 **SEC. 604. SEVERE WEATHER EXTRAMURAL TESTBEDS.**

22 (a) FINDINGS.—Congress finds the following:

23 (1) The Weather Research and Forecasting In-
24 novation Act of 2017 instructs NOAA to prioritize
25 improving weather data, modeling, computing, fore-

1 casting and warnings for the protection of life and
2 property and for the enhancement of the national
3 economy.

4 (2) The Weather Research and Forecasting In-
5 novation Act of 2017 has also mandated that the
6 NOAA Office of Oceanic and Atmospheric Research
7 prioritize involving extramural partners to leverage
8 existing public and private resources to expand and
9 improve weather forecasting and modeling as quickly
10 and efficiently as possible.

11 (3) There is a need for additional weather re-
12 search and forecasting innovation given the increas-
13 ing number of severe weather events and their in-
14 creasing effect on public health, safety, and national
15 and regional economic well-being.

16 (b) PROGRAM.—Not later than 180 days after the en-
17 actment of this Act, the Assistant Administrator for the
18 Office of Oceanic and Atmospheric Research shall estab-
19 lish a program to create one or more weather research
20 testbeds, hosted by extramural university based partners,
21 to develop improved understanding of and forecast capa-
22 bilities for atmospheric events and their impacts. Re-
23 sources for such testbeds shall not be taken from the exist-
24 ing NOAA cooperative institutes.

1 (c) PROGRAM ELEMENTS.—The program described
2 in subsection (b) shall focus on the following activities:

3 (1) Improving the fundamental understanding
4 of weather, including the boundary layer and other
5 processes affecting high impact weather events.

6 (2) Improving the understanding of how the
7 public receives, interprets, and responds to warnings
8 and forecasts of high impact weather events that en-
9 danger life and property.

10 (3) Research and development, and transfer of
11 knowledge, technologies, and applications to the Na-
12 tional Weather Service and other appropriate agen-
13 cies and entities, including the United States weath-
14 er industry and academic partners.

15 (d) EXTRAMURAL RESEARCH.—

16 (1) IN GENERAL.—In carrying out the program
17 under this section, the Assistant Administrator for
18 Oceanic and Atmospheric Research shall collaborate
19 with and support the non-Federal weather research
20 community, which includes institutions of higher
21 education, private entities, and nongovernmental or-
22 ganizations, by making funds available through com-
23 petitive grants, contracts, and cooperative agree-
24 ments. Preference shall be given to applicants with
25 significant expertise in severe weather research that

1 are co-located with existing NOAA intramural
2 weather related laboratories.

3 (2) EXTRAMURAL ACADEMIC PARTNERS.—Of
4 the funds authorized in subsection (e), not less than
5 80 percent shall be dedicated to research of extra-
6 mural academic partners.

7 (e) AUTHORIZATION OF APPROPRIATIONS.—For each
8 of fiscal years 2022 and 2023, there are authorized out
9 of funds appropriated to the National Oceanic and Atmos-
10 pheric Administration, \$10,000,000 to carry out the ac-
11 tivities of this section.

12 **SEC. 605. NEXT GENERATION DIGITAL RADAR.**

13 (a) FINDINGS.—Congress finds that—

14 (1) the national weather radar network is
15 aging, and procurement and replacement must begin
16 by early in the decade commencing with the year
17 2030;

18 (2) research by the National Oceanic and At-
19 mospheric Administration on next generation radar
20 systems has largely focused on the development of a
21 phased array radar for severe weather forecasting;

22 (3) a phased array radar system can achieve
23 precise measurements of precipitation rates and con-
24 ditions through a rapid scan of the atmosphere to

1 reveal critical weather thumbprints that point to the
2 potential of severe weather;

3 (4) though initially established through the
4 joint collaboration between the Federal Aviation Ad-
5 ministration and the National Oceanic and Atmos-
6 pheric Administration, the potential for use of the
7 phased array radar for severe weather observations
8 has emerged as the focus;

9 (5) lifetime operations and maintenance costs
10 will be significantly reduced due to the simple, dig-
11 ital process for updating the digital array radar sys-
12 tem; and

13 (6) the National Oceanic and Atmospheric Ad-
14 ministration must continue to conduct crucial tech-
15 nical risk reduction research to be ready for the next
16 generation of radar networks.

17 (b) PROGRAM.—The Under Secretary shall develop,
18 in collaboration with the Assistant Administrators for
19 Weather Services and Oceanic and Atmospheric Research,
20 and utilizing NOAA’s existing academic partners for im-
21 plementation, a technical risk reduction program, that will
22 lead to the baseline requirements to procure an all-digital
23 ground based phased array radar system for initial deploy-
24 ment by no later than 2032. At a minimum, such a pro-
25 gram must demonstrate the ability to significantly im-

1 prove the accuracy of severe weather forecasts while low-
2 ering long term Federal operating costs.

3 (c) PROGRAM ELEMENTS.—The program described
4 in subsection (b) shall focus on the following activities:

5 (1) Definition of key system requirements need-
6 ed to cost effectively lead to significantly improve
7 weather forecasting accuracy and precision through
8 a nationwide all-digital ground based phased array
9 weather radar system.

10 (2) Identification of critical technologies and
11 subsystems on the critical path to the development
12 of an all-digital phased array system, and an invest-
13 ment schedule to reduce risk in each designated
14 area.

15 (3) Development of a full-scale digital phased
16 array radar demonstrator that will meet require-
17 ments set in paragraph (1).

18 (4) Development of a multi-year effort to
19 strengthen ties between NOAA and its public univer-
20 sity based academic partners so as to maintain an
21 ongoing reservoir of science and technology talent to
22 help to guide and advise Federal program managers
23 on the implementation and use of an all-digital
24 phased array radar system.

1 (d) AUTHORIZATION OF APPROPRIATIONS.—Of the
2 amounts otherwise made available to the National Oceanic
3 and Atmospheric Administration’s Operations, Research,
4 and Facilities Action, there are authorized to carry out
5 this section \$20,000,000 for each of fiscal years 2022 and
6 2023.

7 **SEC. 606. FELLOWSHIPS.**

8 (a) IN GENERAL.—To carry out the educational and
9 training objectives of this Act, the Under Secretary shall
10 support a program of weather fellowships for qualified in-
11 dividuals at the graduate and postgraduate level. The fel-
12 lowships shall be related to meteorology, atmospheric
13 science, space weather, and climatology and awarded pur-
14 suant to guidelines established by the Under Secretary.

15 (b) WEATHER FELLOWSHIP.—The Under Secretary
16 may award weather fellowships to support the placement
17 of individuals at the graduate level of education in fields
18 related to meteorology, atmospheric science, space weath-
19 er, and climatology within NOAA. A fellowship awarded
20 under this subsection shall be for a period of not more
21 than 1 year.

22 **SEC. 607. COMMERCIAL DATA REPORT UPDATE.**

23 Section 302(d)(4) of the Weather Research and Fore-
24 casting Innovation Act of 2017 (15 U.S.C. 8532(d)(4))

1 is amended by striking the period and inserting: “, includ-
2 ing—

3 “(A) if the Under Secretary determines
4 that existing commercial data does not meet
5 National Oceanic and Atmospheric Administra-
6 tion needs, an explanation of why the commer-
7 cial data was not sufficient; and

8 “(B) if the Under Secretary determines
9 that no commercial data will be purchased in a
10 fiscal year, guidance to Congress about poten-
11 tial uses of commercial data.”.

12 **SEC. 608. REPORT ON NATIONAL WEATHER SERVICE**
13 **INTERNET BANDWIDTH SHORTAGE.**

14 (a) IN GENERAL.—Not later than six months after
15 the date of enactment of this Act, the Under Secretary
16 shall issue a report to the Committee on Commerce,
17 Science, and Transportation of the Senate, and the Com-
18 mittee on Science, Space, and Technology of the House,
19 a report on internet bandwidth issues at the National Cen-
20 ter for Environmental Prediction.

21 (b) CONTENTS.—The report required under sub-
22 section (a) shall include—

23 (1) an assessment of the cause of any internet
24 bandwidth issues experienced by the National
25 Weather Service;

- 1 (2) recommended solutions to mitigate ongoing
2 bandwidth issues;
3 (3) potential impacts on commercial data users;
4 and
5 (4) estimated costs of recommended solutions.

6 **SEC. 609. NAPA STUDY.**

7 (a) IN GENERAL.—The Under Secretary shall con-
8 tract with the National Academy of Public Administration
9 to conduct a study examining the feasibility of transfer-
10 ring Marine Protection services to the Department of the
11 Interior.

12 (b) REPORT.—Not later than 180 days after the date
13 of enactment of this Act, the Under Secretary shall submit
14 to Congress a report on the results of the study conducted
15 under subsection (a).

16 **SEC. 610. AUTHORIZATION OF APPROPRIATIONS.**

17 (a) FINDINGS.—Congress finds the following:

18 (1) The National Oceanic and Atmospheric Ad-
19 ministration promotes United States science and in-
20 novation by providing weather forecasts, severe
21 storm warnings, and climate monitoring that sup-
22 port and affect more than one-third of the national
23 gross domestic product.

24 (2) The Office of Oceanic and Atmospheric Re-
25 search provides science that enables better forecasts,

1 earlier warnings for natural disasters, and a greater
2 understanding of the Earth.

3 (3) The cutting-edge research conducted at
4 OAR provides citizens, planners, and emergency
5 managers reliable information that is critical to daily
6 life.

7 (b) AUTHORIZATION OF APPROPRIATIONS.—Of
8 amounts otherwise available to the National Oceanic and
9 Atmospheric Administration, there are authorized to be
10 appropriated for the Office of Oceanic and Atmospheric
11 Research—

12 (1) \$614,000,000 for fiscal year 2022;

13 (2) \$665,000,000 for fiscal year 2023;

14 (3) \$720,000,000 for fiscal year 2024;

15 (4) \$780,000,000 for fiscal year 2025;

16 (5) \$845,000,000 for fiscal year 2026;

17 (6) \$915,000,000 for fiscal year 2027;

18 (7) \$990,000,000 for fiscal year 2028;

19 (8) \$1,072,000,000 for fiscal year 2029;

20 (9) \$1,146,000,000 for fiscal year 2030; and

21 (10) \$1,228,000,000 for fiscal year 2031.

22 **SEC. 611. DEFINITIONS.**

23 In this title:

24 (1) AGENCY.—The term “Agency” means the
25 National Oceanic and Atmospheric Administration.

1 (2) NOAA.—The term “NOAA” means the Na-
2 tional Oceanic and Atmospheric Administration.

3 (3) UNDER SECRETARY.—The term “Under
4 Secretary” means the Under Secretary of Commerce
5 for Oceans and Atmosphere.

6 **TITLE VII—NATIONAL SCIENCE** 7 **FOUNDATION**

8 **SEC. 701. AUTHORIZATION OF APPROPRIATIONS.**

9 (a) FISCAL YEAR 2022.—

10 (1) IN GENERAL.—There are authorized to be
11 appropriated to the Foundation \$9,288,351,900 for
12 fiscal year 2022.

13 (2) SPECIFIC ALLOCATION.—Of the amount au-
14 thorized by paragraph (1)—

15 (A) \$7,600,745,900 shall be made avail-
16 able for research and related activities;

17 (B) \$1,057,950,000 shall be made avail-
18 able for education and human resources includ-
19 ing—

20 (i) \$85,800,000 for the Advanced
21 Technical Education Program;

22 (ii) \$315,000,000 for the Graduate
23 Research Fellowship Program;

24 (iii) \$83,250,000 for the Robert
25 Noyce Teacher Scholarship Program;

1 (iv) \$82,500,000 for the CyberCorps
2 Scholarship for Service Program; and

3 (v) \$64,000,000 for the NSF Re-
4 search Traineeship Program;

5 (C) \$255,000,000 shall be made available
6 for major research equipment and facilities con-
7 struction, of which \$90,000,000 shall be for
8 mid-scale projects;

9 (D) \$352,000,000 shall be made available
10 for agency operations and award management;

11 (E) \$4,500,000 shall be made available for
12 the Office of the National Science Board; and

13 (F) \$18,156,000 shall be made available
14 for the Office of the Inspector General.

15 (b) FISCAL YEAR 2023.—

16 (1) IN GENERAL.—There are authorized to be
17 appropriated to the Foundation \$10,058,692,800 for
18 fiscal year 2023.

19 (2) SPECIFIC ALLOCATION.—Of the amount au-
20 thorized by paragraph (1)—

21 (A) \$8,291,722,800 shall be made avail-
22 able for research and related activities;

23 (B) \$1,129,950,000 shall be made avail-
24 able for education and human resources includ-
25 ing—

1 (i) \$92,400,000 for the Advanced
2 Technical Education Program;

3 (ii) \$342,000,000 for the Graduate
4 Research Fellowship Program;

5 (iii) \$97,500,000 for the Robert
6 Noyce Teacher Scholarship Program;

7 (iv) \$96,250,000 for the CyberCorps
8 Scholarship for Service Program; and

9 (v) \$66,000,000 for the NSF Re-
10 search Traineeship Program;

11 (C) \$255,000,000 shall be made available
12 for major research equipment and facilities con-
13 struction, of which \$90,000,000 shall be for
14 mid-scale projects;

15 (D) \$359,000,000 shall be made available
16 for agency operations and award management;

17 (E) \$4,500,000 shall be made available for
18 the Office of the National Science Board; and

19 (F) \$18,520,000 shall be made available
20 for the Office of the Inspector General.

21 (c) FISCAL YEAR 2024.—

22 (1) IN GENERAL.—There are authorized to be
23 appropriated to the Foundation \$10,862,529,700 for
24 fiscal year 2024.

1 (2) SPECIFIC ALLOCATION.—Of the amount au-
2 thorized by paragraph (1)—

3 (A) \$8,982,699,700 shall be made avail-
4 able for research and related activities;

5 (B) \$1,205,450,000 shall be made avail-
6 able for education and human resources includ-
7 ing—

8 (i) \$99,000,000 for the Advanced
9 Technical Education Program;

10 (ii) \$370,500,000 for the Graduate
11 Research Fellowship Program;

12 (iii) \$113,750,000 for the Robert
13 Noyce Teacher Scholarship Program;

14 (iv) \$110,000,000 for the CyberCorps
15 Scholarship for Service Program; and

16 (v) \$68,000,000 for the NSF Re-
17 search Traineeship Program;

18 (C) \$285,000,000 shall be made available
19 for major research equipment and facilities con-
20 struction, of which \$105,000,000 shall be for
21 mid-scale projects;

22 (D) \$366,000,000 shall be made available
23 for agency operations and award management;

24 (E) \$4,500,000 shall be made available for
25 the Office of the National Science Board; and

1 (F) \$18,880,000 shall be made available
2 for the Office of the Inspector General.

3 (d) FISCAL YEAR 2025.—

4 (1) IN GENERAL.—There are authorized to be
5 appropriated to the Foundation \$11,624,846,600 for
6 fiscal year 2025.

7 (2) SPECIFIC ALLOCATION.—Of the amount au-
8 thorized by paragraph (1)—

9 (A) \$9,673,676,600 shall be made avail-
10 able for research and related activities;

11 (B) \$1,269,400,000 shall be made avail-
12 able for education and human resources includ-
13 ing—

14 (i) \$105,600,000 for the Advanced
15 Technical Education Program;

16 (ii) \$399,000,000 for the Graduate
17 Research Fellowship Program;

18 (iii) \$130,000,000 for the Robert
19 Noyce Teacher Scholarship Program;

20 (iv) \$112,200,000 for the CyberCorps
21 Scholarship for Service Program; and

22 (v) \$70,000,000 for the NSF Re-
23 search Traineeship Program;

24 (C) \$285,000,000 shall be made available
25 for major research equipment and facilities con-

1 struction, of which \$120,000,000 shall be for
2 mid-scale projects;

3 (D) \$373,000,000 shall be made available
4 for agency operations and award management;

5 (E) \$4,500,000 shall be made available for
6 the Office of the National Science Board; and

7 (F) \$19,270,000 shall be made available
8 for the Office of the Inspector General.

9 (e) FISCAL YEAR 2026.—

10 (1) IN GENERAL.—There are authorized to be
11 appropriated to the Foundation \$12,403,503,500 for
12 fiscal year 2026.

13 (2) SPECIFIC ALLOCATION.—Of the amount au-
14 thorized by paragraph (1)—

15 (A) \$10,364,653,500 shall be made avail-
16 able for research and related activities;

17 (B) \$1,319,700,000 shall be made avail-
18 able for education and human resources includ-
19 ing—

20 (i) \$112,200,000 for the Advanced
21 Technical Education Program;

22 (ii) \$427,500,000 for the Graduate
23 Research Fellowship Program;

24 (iii) \$132,600,000 for the Robert
25 Noyce Teacher Scholarship Program;

1 (iv) \$114,400,000 for the CyberCorps
2 Scholarship for Service Program; and

3 (v) \$72,000,000 for the NSF Re-
4 search Traineeship Program;

5 (C) \$315,000,000 shall be made available
6 for major research equipment and facilities con-
7 struction, of which \$180,000,000 shall be for
8 mid-scale projects;

9 (D) \$380,000,000 shall be made available
10 for agency operations and award management;

11 (E) \$4,500,000 shall be made available for
12 the Office of the National Science Board; and

13 (F) \$19,650,000 shall be made available
14 for the Office of the Inspector General.

15 (f) FISCAL YEAR 2027.—

16 (1) IN GENERAL.—There are authorized to be
17 appropriated to the Foundation \$13,152,330,400 for
18 fiscal year 2027.

19 (2) SPECIFIC ALLOCATION.—Of the amount au-
20 thorized by paragraph (1)—

21 (A) \$11,055,630,400 shall be made avail-
22 able for research and related activities;

23 (B) \$1,370,200,000 shall be made avail-
24 able for education and human resources includ-
25 ing—

1 (i) \$118,800,000 for the Advanced
2 Technical Education Program;

3 (ii) \$456,000,000 for the Graduate
4 Research Fellowship Program;

5 (iii) \$135,300,000 for the Robert
6 Noyce Teacher Scholarship Program;

7 (iv) \$116,700,000 for the CyberCorps
8 Scholarship for Service Program; and

9 (v) \$74,000,000 for the NSF Re-
10 search Traineeship Program;

11 (C) \$315,000,000 shall be made available
12 for major research equipment and facilities con-
13 struction, of which \$205,000,000 shall be for
14 mid-scale projects;

15 (D) \$382,000,000 shall be made available
16 for agency operations and award management;

17 (E) \$4,500,000 shall be made available for
18 the Office of the National Science Board; and

19 (F) \$20,000,000 shall be made available
20 for the Office of the Inspector General.

21 (g) FISCAL YEAR 2028.—

22 (1) IN GENERAL.—There are authorized to be
23 appropriated to the Foundation \$13,931,257,300 for
24 fiscal year 2028.

1 (2) SPECIFIC ALLOCATION.—Of the amount au-
2 thorized by paragraph (1)—

3 (A) \$11,746,607,300 shall be made avail-
4 able for research and related activities;

5 (B) \$1,420,700,000 shall be made avail-
6 able for education and human resources includ-
7 ing—

8 (i) \$125,400,000 for the Advanced
9 Technical Education Program;

10 (ii) \$484,500,000 for the Graduate
11 Research Fellowship Program;

12 (iii) \$138,000,000 for the Robert
13 Noyce Teacher Scholarship Program;

14 (iv) \$119,000,000 for the CyberCorps
15 Scholarship for Service Program; and

16 (v) \$76,000,000 for the NSF Re-
17 search Traineeship Program;

18 (C) \$345,000,000 shall be made available
19 for major research equipment and facilities con-
20 struction, of which \$215,000,000 shall be for
21 mid-scale projects;

22 (D) \$394,000,000 shall be made available
23 for agency operations and award management;

24 (E) \$4,500,000 shall be made available for
25 the Office of the National Science Board; and

1 (F) \$20,450,000 shall be made available
2 for the Office of the Inspector General.

3 (h) FISCAL YEAR 2029.—

4 (1) IN GENERAL.—There are authorized to be
5 appropriated to the Foundation \$14,680,234,200 for
6 fiscal year 2029.

7 (2) SPECIFIC ALLOCATION.—Of the amount au-
8 thorized by paragraph (1)—

9 (A) \$12,437,584,200 shall be made avail-
10 able for research and related activities;

11 (B) \$1,471,300,000 shall be made avail-
12 able for education and human resources includ-
13 ing—

14 (i) \$132,000,000 for the Advanced
15 Technical Education Program;

16 (ii) \$513,000,000 for the Graduate
17 Research Fellowship Program;

18 (iii) \$140,700,000 for the Robert
19 Noyce Teacher Scholarship Program;

20 (iv) \$121,400,000 for the CyberCorps
21 Scholarship for Service Program; and

22 (v) \$78,000,000 for the NSF Re-
23 search Traineeship Program;

24 (C) \$345,000,000 shall be made available
25 for major research equipment and facilities con-

1 struction, of which \$225,000,000 shall be for
2 mid-scale projects;

3 (D) \$401,000,000 shall be made available
4 for agency operations and award management;

5 (E) \$4,500,000 shall be made available for
6 the Office of the National Science Board; and

7 (F) \$20,850,000 shall be made available
8 for the Office of the Inspector General.

9 (i) FISCAL YEAR 2030.—

10 (1) IN GENERAL.—There are authorized to be
11 appropriated to the Foundation \$15,460,331,100 for
12 fiscal year 2030.

13 (2) SPECIFIC ALLOCATION.—Of the amount au-
14 thorized by paragraph (1)—

15 (A) \$13,128,561,100 shall be made avail-
16 able for research and related activities;

17 (B) \$1,523,000,000 shall be made avail-
18 able for education and human resources includ-
19 ing—

20 (i) \$139,600,000 for the Advanced
21 Technical Education Program;

22 (ii) \$541,500,000 for the Graduate
23 Research Fellowship Program;

24 (iii) \$143,500,000 for the Robert
25 Noyce Teacher Scholarship Program;

1 (iv) \$123,800,000 for the CyberCorps
2 Scholarship for Service Program; and

3 (v) \$80,000,000 for the NSF Re-
4 search Traineeship Program;

5 (C) \$375,000,000 shall be made available
6 for major research equipment and facilities con-
7 struction, of which \$225,000,000 shall be for
8 mid-scale projects;

9 (D) \$408,000,000 shall be made available
10 for agency operations and award management;

11 (E) \$4,500,000 shall be made available for
12 the Office of the National Science Board; and

13 (F) \$21,270,000 shall be made available
14 for the Office of the Inspector General.

15 (j) FISCAL YEAR 2031.—

16 (1) IN GENERAL.—There are authorized to be
17 appropriated to the Foundation \$16,245,538,000 for
18 fiscal year 2031.

19 (2) SPECIFIC ALLOCATION.—Of the amount au-
20 thorized by paragraph (1)—

21 (A) \$13,819,538,000 shall be made avail-
22 able for research and related activities;

23 (B) \$1,609,800,000 shall be made avail-
24 able for education and human resources includ-
25 ing—

- 1 (i) \$146,200,000 for the Advanced
2 Technical Education Program;
- 3 (ii) \$570,000,000 for the Graduate
4 Research Fellowship Program;
- 5 (iii) \$146,400,000 for the Robert
6 Noyce Teacher Scholarship Program;
- 7 (iv) \$162,200,000 for the CyberCorps
8 Scholarship for Service Program;
- 9 (v) \$82,000,000 for the NSF Re-
10 search Traineeship Program; and
- 11 (C) \$375,000,000 shall be made available
12 for major research equipment and facilities con-
13 struction, of which \$225,000,000 shall be for
14 mid-scale projects;
- 15 (D) \$415,000,000 shall be made available
16 for agency operations and award management;
- 17 (E) \$4,500,000 shall be made available for
18 the Office of the National Science Board; and
- 19 (F) \$21,700,000 shall be made available
20 for the Office of the Inspector General.

21 **SEC. 702. NSF ORGANIZATIONAL REVIEW.**

- 22 (a) SENSE OF CONGRESS.—It is the sense of Con-
23 gress that—
- 24 (1) since its establishment in 1950, the Na-
25 tional Science Foundation has been the gold stand-

1 ard for the world in funding basic science and engi-
2 neering research;

3 (2) the National Science Foundation should
4 continue to fund competitive, merit-reviewed basic
5 research across all fields of science and engineering
6 to achieve its statutory mission;

7 (3) scientific research has become increasingly
8 interdisciplinary, crossing the boundaries of indi-
9 vidual fields and the divisions and directorates of the
10 National Science Foundation that support research
11 grants; and

12 (4) as the nature of scientific research changes,
13 it is important for the institutions that support
14 science like the National Science Foundation, to pe-
15 riodically evaluate whether the organization needs to
16 evolve to continue to fund the best science, the best
17 scientists, and the most groundbreaking research.

18 (b) STUDY.—Not later than 60 days after the date
19 of enactment of this Act, the Director shall contract with
20 the National Academy of Public Administration (referred
21 to in this section as the “National Academy”) to conduct
22 a study on the organizational and management structure
23 of the Foundation, to—

24 (1) evaluate and make recommendations for the
25 structure of the Foundation’s directorates, divisions,

1 and offices of the Foundation to efficiently and ef-
2 fectively fund and oversee research grants and edu-
3 cation and training programs;

4 (2) evaluate and make recommendations for
5 any structural changes needed to improve the sup-
6 port for cross-disciplinary and trans-disciplinary re-
7 search;

8 (3) evaluate and make recommendations for the
9 long-term planning and development of research in-
10 frastructure projects; and

11 (4) make recommendations for the management
12 of the Foundation's business practices, including
13 personnel and financial management.

14 (c) REPORT TO CONGRESS.—Upon completion of the
15 study under subsection (b), the Director shall transmit the
16 study to Congress along with a summary of the Director's
17 plans, if any, to implement the recommendations of the
18 National Academy.

19 **SEC. 703. ETHICS AND SECURITY PLANS.**

20 (a) DEVELOPMENT OF ETHICS AND SECURITY POLI-
21 CIES.—Not later than 6 months after the date of enact-
22 ment of this Act, the Director shall develop and implement
23 a policy requiring that all proposals for research funding
24 from the Foundation include, if applicable, a plan for

1 managing the risk of any potential ethical or security im-
2 plications resulting from such research.

3 (b) REQUIREMENTS.—The policy shall—

4 (1) include clear guidance of what constitutes
5 ethical and security risks;

6 (2) include field specific guidance as appro-
7 priate, which may include biology, artificial intel-
8 ligence, or cybersecurity;

9 (3) include mechanisms to ensure appropriate
10 evaluation of the submitted ethical and security
11 plans required under this section;

12 (4) include mechanisms to ensure that research-
13 ers comply with approved ethical and security plans;
14 and

15 (5) to the extent practical be harmonized with
16 existing ethical and security policies or requirements,
17 including the Common Rule (Federal Policy for the
18 Protection of Human Subjects, 45 C.F.R. 690).

19 (c) LIMITATION.—The policy developed under sub-
20 section (a) shall not factor into award decisions unless
21 deemed necessary by the merit review panel for each pro-
22 gram.

23 **SEC. 704. MAJOR RESEARCH INSTRUMENTATION UPDATE.**

24 Section 7036(a) of the America COMPETES Act (42
25 U.S.C. 1862o–14(a)) is amended by striking “The max-

1 imum amount of an award under the program shall be
2 \$4,000,000 except if the total amount appropriated for the
3 program for a fiscal year exceeds \$125,000,000, in which
4 case the maximum amount of an award shall be
5 \$6,000,000” and inserting “The maximum amount of an
6 award under the program shall be \$6,000,000”.

7 **SEC. 705. NSF RESEARCH SECURITY.**

8 (a) OFFICE OF RESEARCH SECURITY AND POLICY.—
9 The Director shall maintain a Research Security and Pol-
10 icy office within the Office of the Director. The functions
11 of the Research Security and Policy office shall be to co-
12 ordinate all research security policy issues across the
13 Foundation and coordinate with the NSF Office of Inspec-
14 tor General, including by—

15 (1) serving as the Foundation’s primary re-
16 source for all policy issues related to the security
17 and integrity of the conduct of Foundation sup-
18 ported research;

19 (2) conducting outreach and education activities
20 for awardees on research policies and potential secu-
21 rity risks;

22 (3) educating NSF program managers and
23 other directorate staff on evaluating NSF awards
24 and awardees for potential security risks;

1 (4) communicating reporting and disclosure re-
2 quirements to awardees and applicants for funding;
3 and

4 (5) coordinating with other Federal science
5 agencies as appropriate and through the National
6 Science and Technology Council in accordance with
7 the authority provided under section 1746 of the na-
8 tional Defense Authorization Act for Fiscal Year
9 2020 (Public Law 116–92; 42 U.S.C. 6601 note).

10 (b) CHIEF OF RESEARCH SECURITY.—The Director
11 shall appoint a senior agency official within the Office of
12 the Director as a Chief of Research Security, whose pri-
13 mary responsibility is to manage the office created in sub-
14 section (a).

15 (c) REPORT TO CONGRESS.—No later than 180 days
16 after the date of enactment of this Act, the Director shall
17 provide a report to the Science, Space, and Technology
18 Committee of the House of Representatives, the Com-
19 mittee on Commerce, Science, and Transportation of the
20 Senate, the Committee on Appropriations of the House of
21 Representatives, and the Committee on Appropriations of
22 the Senate on the resources and the number of full time
23 employees needed to carry out the functions of the Office
24 established in subsection (a).

1 **SEC. 706. REPRODUCIBILITY IN SCIENCE.**

2 (a) IN GENERAL.—The Director shall award grants,
3 on a competitive basis, to institutions of higher education
4 or nonprofit organizations (or a consortia thereof) to—

5 (1) support research and development of open
6 source, usable tools and infrastructure that support
7 reproducibility for a broad range of studies across
8 different disciplines;

9 (2) support research on computational repro-
10 ducibility, including the limits of reproducibility and
11 the consistency of computational results in the devel-
12 opment of new computation hardware, tools, and
13 methods;

14 (3) support the education and training of stu-
15 dents, faculty, and researchers on computational
16 methods and tools to improve the quality of data
17 and code to produce reproducible research; and

18 (4) support the education and training of stu-
19 dents, faculty, and researchers on the knowledge,
20 skills, and tools needed to conduct research that ad-
21 heres to the highest scientific standard and to be
22 able to clearly communicate methods and results ac-
23 curately and appropriately to reflect the uncertainty
24 involved in the research.

25 (b) DATA REPOSITORIES.—Not later than 12 months
26 after the date of enactment of this Act, the Director of

1 the National Science Foundation shall coordinate with the
2 heads of other Federal science agencies to develop a set
3 of criteria for trusted open repositories to be used by the
4 scientific community in order to facilitate the transparent
5 sharing and availability of data and code for federally
6 funded research studies.

7 (c) DEFINITION OF REPRODUCIBILITY.—For the
8 purposes of this section, the term “reproducibility” means
9 obtaining consistent results using the same input data,
10 computational steps, methods and code, and conditions of
11 analysis.

12 **SEC. 707. PUBLIC-PRIVATE PARTNERSHIPS.**

13 (a) IN GENERAL.—The Director shall pursue part-
14 nerships with private industry, private foundations, and/
15 or other appropriate private entities to—

16 (1) enhance the impact of the Foundation’s in-
17 vestments and contributions to American economic
18 competitiveness and security; and

19 (2) make available infrastructure, expertise, and
20 financial resources to the United States scientific
21 and engineering research and education enterprise.

22 (b) MERIT-REVIEW.—Nothing in this section shall be
23 construed as altering any intellectual or broader impacts
24 criteria at the Foundation for evaluating grant applica-
25 tions.

1 **SEC. 708. EPSCOR.**

2 (a) SENSE OF CONGRESS.—

3 (1) IN GENERAL.—It is the sense of Congress
4 that—

5 (A) since maintaining the Nation’s sci-
6 entific and economic leadership requires the
7 participation of talented individuals nationwide,
8 EPSCoR investments into State research and
9 education capacities that are in the Federal in-
10 terest and should be sustained; and

11 (B) EPSCoR should maintain its experi-
12 mental component by supporting innovative
13 methods for improving research capacity and
14 competitiveness.

15 (2) DEFINITION OF EPSCOR.—In this sub-
16 section, the term “EPSCoR” has the meaning given
17 the term in section 502 of the America COMPETES
18 Reauthorization Act of 2010 (42 U.S.C. 1862p
19 note).

20 (b) UPDATE OF EPSCoR.—Section 517(f)(2) of the
21 America COMPETES Reauthorization Act of 2010 (42
22 U.S.C. 1862p–9(f)(2)) is amended—

23 (1) in subparagraph (A), by striking “and” at
24 the end; and

25 (2) by adding at the end the following:

1 “(C) to increase the capacity of rural com-
2 munities to provide quality STEM education
3 and STEM workforce development program-
4 ming to students, and teachers; and”.

5 **SEC. 709. DEFINITIONS.**

6 In this title, unless expressly provided otherwise:

7 (1) DIRECTOR.—The term “Director” means
8 the Director of the National Science Foundation.

9 (2) FEDERAL SCIENCE AGENCY.—The term
10 “Federal science agency” has the meaning given the
11 term in section 103 of the America COMPETES
12 Reauthorization Act of 2010 (42 U.S.C. 6623).

13 (3) FOUNDATION.—The term “Foundation”
14 means the National Science Foundation.

15 (4) INSTITUTION OF HIGHER EDUCATION.—The
16 term “institution of higher education” has the
17 meaning given the term in section 101(a) of the
18 Higher Education Act of 1965 (20 U.S.C. 1001(a)).

19 **TITLE VIII—STEM WORKFORCE**
20 **FOR THE 21ST CENTURY**

21 **SEC. 801. FINDINGS; SENSE OF CONGRESS.**

22 (a) FINDINGS.—Congress finds the following:

23 (1) Many reports over the past decade have
24 found that it is critical to our Nation’s economic
25 leadership and global competitiveness that the

1 United States educates and trains more scientists
2 and engineers.

3 (2) Worldwide demand for STEM-capable
4 workers keeps growing, driven by international op-
5 portunities and competition, and by the rapid in-
6 creases in the number of jobs that require STEM
7 skills, including in lines of work that historically did
8 not require STEM knowledge.

9 (3) By 2026 science and engineering jobs are
10 predicted to grow by 13 percent compared with 7
11 percent growth in the overall United States work-
12 force.

13 (4) A recent report by ACT, the scholastic test-
14 ing service, found that only 20 percent of United
15 States students in the 2016 ACT-tested high school
16 graduating class were ready for first-year STEM
17 college courses.

18 (5) Out of the 79 countries that participate in
19 the Organisation for Economic Co-operation and De-
20 velopment's Programme for International Student
21 Assessment, the United States ranks 18th in science
22 and 37th in mathematics.

23 (6) The Federal Government spends over \$3
24 billion annually on STEM education related re-
25 search, programs and activities, but encouraging

1 STEM education activities beyond the scope of the
2 Federal Government is crucial to the future tech-
3 nical and economic competitiveness of the United
4 States.

5 (b) SENSE OF CONGRESS.—It is the sense of Con-
6 gress that—

7 (1) the Nation’s future economic and national
8 security relies on building a STEM-capable work-
9 force in order to remain competitive in the global
10 economy, foster greater innovation, and provide a
11 foundation for shared prosperity;

12 (2) the Federal Government plays a key role in
13 developing and sustaining a STEM-capable work-
14 force by working with stakeholders at all levels, in-
15 cluding researchers, practitioners, industry, and
16 State and local governments to support and promote
17 evidence-based approaches to modernize elementary,
18 secondary, and post-secondary STEM education, and
19 support the reskilling and upskilling that workers
20 will need throughout their careers;

21 (3) applying a more holistic view of the STEM
22 workforce that moves beyond academic degrees and
23 occupations will highlight the contributions and op-
24 portunities for workers at all education levels;

1 (4) increasing the diversity and inclusion in the
2 STEM workforce is needed to help address the
3 STEM skills shortage;

4 (5) supporting an interdisciplinary approach to
5 STEM learning, where academic concepts are cou-
6 pled with real-world applications and students use
7 STEM in contexts that make connections between
8 school, community, work, and the wider world will
9 improve outcomes for students in elementary, sec-
10 ondary and post-secondary education and for skilled
11 technical workers in different career stages;

12 (6) leveraging private and nonprofit invest-
13 ments in STEM education will be essential to
14 strengthening the Federal STEM portfolio;

15 (7) deepening partnerships between educational
16 institutions and the business sector will be critical in
17 preparing Americans for the industries of the future
18 and support reskilling and upskilling of incumbent
19 workers so that they can better navigate rapid
20 changes in the world of work; and

21 (8) coordinating STEM programs and activities
22 across the Federal Government in order to limit du-
23 plication and engage stakeholders in STEM pro-
24 grams and related activities for which objective out-
25 comes can be measured will bolster results of Fed-

1 eral STEM education programs, improve the return
2 on taxpayers' investments in STEM education pro-
3 grams, and in turn strengthen the United States
4 economy.

5 **SEC. 802. ADVANCED TECHNICAL EDUCATION AND**
6 **SKILLED TECHNICAL WORKFORCE.**

7 (a) FINDINGS.—Congress finds the following:

8 (1) A National Academies of Science, Engineer-
9 ing, and Medicine report predicts a shortfall of near-
10 ly 3,400,000 skilled technical workers by 2022.

11 (2) The National Science Foundation's Ad-
12 vanced Technical Education program is critical to
13 helping improve the training of the skilled technical
14 workforce, with an emphasis on two-year Institutions
15 of Higher Education (IHEs) and educating techni-
16 cians for the high-technology fields that drive our
17 nation's economy.

18 (3) The National Science Board's 2019 report
19 on the skilled technical workforce called for
20 strengthening partnerships between skilled technical
21 workforce programs and business and industry.

22 (b) ADVANCED TECHNICAL EDUCATION PROGRAM
23 UPDATE.—Section 3(b) of the Scientific and Advanced-
24 Technology Act of 1992 (42 U.S.C. 1862i(b)) is amended
25 to read as follows:

1 “(b) NATIONAL COORDINATION NETWORK FOR
2 SCIENCE AND TECHNICAL EDUCATION.—The Director
3 shall award grants to institutions of higher education,
4 nonprofit institutions, associate-degree granting colleges
5 (or consortia thereof) to establish a network of centers for
6 science and technical education. The centers shall—

7 “(1) coordinate research, training and edu-
8 cation activities funded by awards under subsection
9 (a) and share information and best practices across
10 the network of awardees;

11 “(2) serve as national and regional clearing-
12 house and resource to communicate and coordinate
13 research, training and educational activities across
14 disciplinary, organizational, geographic and inter-
15 national boundaries and disseminate best practices;
16 and

17 “(3) develop national and regional partnerships
18 between K–12 schools, two-year colleges, institutions
19 of higher education, workforce development pro-
20 grams, and industry to meet workforce needs.”.

21 (c) NSF PORTFOLIO REVIEW AND COORDINATION
22 PLAN.—

23 (1) IN GENERAL.—Not later than 1 year after
24 the date of enactment of this Act, the Director of
25 the National Science Foundation shall conduct a full

1 portfolio analysis of the Foundation’s skilled tech-
2 nical workforce investments and develop a plan to
3 improve coordination and collaboration of research
4 and education investments and the communication
5 of those funding opportunities to the research and
6 education community.

7 (2) SUBMISSION TO CONGRESS.—Not later than
8 180 days after the date of the review and develop-
9 ment of the plan under paragraph (1) is complete,
10 the Director of the National Science Foundation
11 shall submit to Congress and make widely available
12 to the public a summary of the portfolio review and
13 plan.

14 **SEC. 803. GRADUATE RESEARCH FELLOWSHIP PROGRAM**

15 **UPDATE.**

16 (a) FINDINGS.—Congress finds the following:

17 (1) The National Science Foundation Graduate
18 Research Fellowship Program is the nation’s oldest
19 fellowship program that directly supports American
20 graduate students in various STEM fields and is a
21 model for training the best innovators in the United
22 States.

23 (2) Since 1952, NSF has funded over 50,000
24 Graduate Research Fellowships out of more than
25 500,000 applicants, 42 Fellows have gone on to be-

1 come Nobel laureates, and more than 450 have be-
2 come members of the National Academy of Sciences.

3 (3) Foreign nations are increasingly investing
4 in foreign talent programs to compete with the
5 United States.

6 (b) SENSE OF CONGRESS.—It is the sense of Con-
7 gress that the National Science Foundation should grow
8 the number of new graduate research fellows supported
9 annually over the next 10 years to no less than 3,000 fel-
10 lows.

11 (c) PROGRAM UPDATE.—Section 10 of the National
12 Science Foundation Act of 1950 (42 U.S.C. 1869) is
13 amended—

14 (1) in subsection (a), by inserting “and as will
15 address national workforce demand in critical STEM
16 fields” after “throughout the United States”;

17 (2) in subsection (b), by striking “of \$12,000”
18 and inserting “\$16,000”; and

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

20 “(c) OUTREACH.—The Director shall ensure program
21 outreach to recruit fellowship applicants from fields of
22 study that are in areas of critical national need, from all
23 regions of the country, and from historically underrep-
24 resented populations in STEM.”.

1 **SEC. 804. ROBERT NOYCE TEACHER SCHOLARSHIP PRO-**
2 **GRAM SENSE OF CONGRESS.**

3 It is the sense of Congress that—

4 (1) the Robert Noyce Teacher Scholarship Pro-
5 gram plays an important role in supporting the de-
6 velopment and dissemination of evidence-based
7 teacher preparation models and the recruitment,
8 preparation, and retention of STEM educators;

9 (2) the Robert Noyce Teacher Scholarship Pro-
10 gram improves recruitment of underrepresented and
11 STEM-trained students into teaching, encourages
12 teachers to work in high-need areas, and can im-
13 prove relationships between teacher preparation pro-
14 grams and industry; and

15 (3) the Robert Noyce Teacher Scholarship Pro-
16 gram which currently supports between 1,000 to
17 1,500 new math and science teachers a year, includ-
18 ing in high-need districts should be doubled over the
19 next ten years to meet the growing demand for
20 STEM capable educators.

21 **SEC. 805. INNOVATIONS IN INFORMAL STEM LEARNING.**

22 (a) **PERMISSIBLE SUPPORT.**—Section 3(b) of the
23 STEM Education Act of 2015 (42 U.S.C. 1862q(b)) is
24 amended—

25 (1) in paragraph (3), by striking “; and” at the
26 end and inserting a semicolon;

1 (2) in paragraph (4), by striking the period at
2 the end and inserting “; and”; and

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

4 “(5) supporting the participation of students in
5 nonprofit competitions, out-of-school activities, and
6 field experiences related to STEM subjects (such as
7 robotics, science research, invention, mathematics,
8 and technology competitions), which may include—

9 “(A) the purchase of parts and supplies
10 needed to participate in such competitions;

11 “(B) incentives and stipends for teachers
12 and instructional leaders who are involved in
13 assisting students and preparing students for
14 such competitions, if such activities fall outside
15 the regular duties and responsibilities of such
16 teachers and instructional leaders; or

17 “(C) incentivizes and stipends for profes-
18 sional training for teachers and instructional
19 leaders of before-school, after-school, out-of-
20 school or summer STEM programs; and

21 “(6) broadening secondary school students’ ac-
22 cess to, and interest in, careers that require aca-
23 demic preparation in STEM subjects.”.

24 (b) SUPPORTING PRE-K–8 INFORMAL STEM OPPOR-
25 TUNITIES.—Section 3 of the STEM Education Act of

1 2015 (42 U.S.C. 1862q) is amended by adding at the end
2 the following:

3 “(c) PRE-K–8 INFORMAL STEM PROGRAM.—

4 “(1) IN GENERAL.—The Director of the Na-
5 tional Science Foundation shall provide grants on a
6 merit-reviewed, competitive basis for research on
7 programming that engages students in grades pre-
8 kindergarten through 8, including underrepresented
9 and rural students, in STEM in order to prepare
10 such students to pursue degrees or careers in
11 STEM.

12 “(2) USE OF FUNDS.—

13 “(A) IN GENERAL.—Grants awarded under
14 this section shall be used toward research to ad-
15 vance the engagement of students in grades
16 pre-kindergarten through 8 in STEM through
17 providing before-school, after-school, out-of-
18 school, or summer activities that are designed
19 to encourage interest, engagement, and skills
20 development for students in STEM.

21 “(B) PERMITTED ACTIVITIES.—The activi-
22 ties described in subparagraph (A) may in-
23 clude—

24 “(i) the provision of programming de-
25 scribed in such subparagraph for the pur-

pose of research described in such subparagraph;

“(ii) the use of a variety of engagement methods, including cooperative and hands-on learning;

“(iii) exposure of students to role models in the fields of STEM and near-peer mentors;

“(iv) training of informal learning educators, youth-serving professionals, and volunteers who lead informal STEM programs in using evidence-based methods consistent with the target student population being served;

“(v) education of students on the relevance and significance of STEM careers, provision of academic advice and assistance, and activities designed to help students make real-world connections to STEM content;

“(vi) the attendance of students at events, competitions, and academic programs to provide content expertise and encourage career exposure in STEM;

1 “(vii) activities designed to engage
2 parents and families of students in grades
3 pre-kindergarten through 8 in STEM;

4 “(viii) innovative strategies to engage
5 students, such as using leadership skills
6 and outcome measures to impart youth
7 with the confidence to pursue STEM
8 coursework and academic study;

9 “(ix) coordination with STEM-rich
10 environments, including other nonprofit,
11 nongovernmental organizations, out-of-
12 classroom settings, single-gender environ-
13 ments, institutions of higher education, vo-
14 cational facilities, corporations, museums,
15 or science centers; and

16 “(x) the acquisition of instructional
17 materials or technology-based tools to con-
18 duct applicable grant activity.

19 “(3) APPLICATION.—An applicant seeking
20 funding under the section shall submit an applica-
21 tion at such time, in such manner, and containing
22 such information as may be required. Applications
23 that include or partner with a nonprofit, nongovern-
24 mental organization that has extensive experience
25 and expertise in increasing the participation of stu-

1 dents in pre-kindergarten through grade 8 in STEM
2 are encouraged. The application may include the fol-
3 lowing:

4 “(A) A description of the target audience
5 to be served by the research activity or activi-
6 ties for which such funding is sought.

7 “(B) A description of the process for re-
8 cruitment and selection of students to partici-
9 pate in such activities.

10 “(C) A description of how such activity or
11 activities may inform programming that en-
12 gages students in grades pre-kindergarten
13 through 8 in STEM.

14 “(D) A description of how such activity or
15 activities may inform programming that pro-
16 motes student academic achievement in STEM.

17 “(E) An evaluation plan that includes, at
18 a minimum, the use of outcome-oriented meas-
19 ures to determine the impact and efficacy of
20 programming being researched.

21 “(4) EVALUATIONS.—Each recipient of a grant
22 under this section shall provide, at the conclusion of
23 every year during which the grant funds are re-
24 ceived, an evaluation in a form prescribed by the Di-
25 rector.

1 “(5) ACCOUNTABILITY AND DISSEMINATION.—

2 “(A) EVALUATION REQUIRED.—The Direc-
3 tor shall evaluate the activities established
4 under this section. Such evaluation shall—

5 “(i) use a common set of benchmarks
6 and tools to assess the results of research
7 conducted under such grants; and

8 “(ii) to the extent practicable, inte-
9 grate the findings of the research resulting
10 from the activity or activities funded
11 through the grant with the current re-
12 search on serving students with respect to
13 the pursuit of degrees or careers in STEM,
14 including underrepresented and rural stu-
15 dents, in grades pre-kindergarten through
16 8.

17 “(B) REPORT ON EVALUATIONS.—Not
18 later than 180 days after the completion of the
19 evaluation under subparagraph (A), the Direc-
20 tor shall submit to Congress and make widely
21 available to the public a report that includes—

22 “(i) the results of the evaluation; and

23 “(ii) any recommendations for admin-
24 istrative and legislative action that could

1 optimize the effectiveness of the program
2 under this section.

3 “(6) COORDINATION.—In carrying out this sec-
4 tion, the Director shall, for purposes of enhancing
5 program effectiveness and avoiding duplication of ac-
6 tivities, consult, cooperate, and coordinate with the
7 programs and policies of other relevant Federal
8 agencies.”.

9 **SEC. 806. AI TRAINEESHIPS AND FELLOWSHIPS.**

10 (a) ARTIFICIAL INTELLIGENCE TRAINEESHIPS.—

11 (1) IN GENERAL.—The Director of the National
12 Science Foundation shall award grants to institu-
13 tions of higher education to establish traineeship
14 programs for graduate students who pursue artificial
15 intelligence-related research leading to a masters or
16 doctorate degree by providing funding and other as-
17 sistance, and by providing graduate students oppor-
18 tunities for research experiences in government or
19 industry related to the students’ artificial intel-
20 ligence studies.

21 (2) USE OF FUNDS.—An institution of higher
22 education shall use grant funds provided under para-
23 graph (1) for the purposes of—

1 (A) providing traineeships to students who
2 are pursuing research in artificial intelligence
3 leading to a masters or doctorate degree;

4 (B) paying tuition and fees for students
5 receiving traineeships who are citizens, nation-
6 als, or lawfully admitted permanent resident
7 aliens of the United States;

8 (C) creating and requiring courses or
9 training programs in technology ethics for stu-
10 dents receiving traineeships;

11 (D) creating opportunities for research in
12 technology ethics for students receiving
13 traineeships;

14 (E) establishing scientific internship pro-
15 grams for students receiving traineeships in ar-
16 tificial intelligence at for-profit institutions,
17 nonprofit research institutions, or government
18 laboratories; and

19 (F) other costs associated with the admin-
20 istration of the program.

21 (b) ARTIFICIAL INTELLIGENCE FELLOWSHIPS.—The
22 Director of the National Science Foundation shall award
23 fellowships to masters and doctoral students and
24 postdoctoral researchers at institutions of higher edu-
25 cation who are pursuing degrees or research in artificial

1 intelligence and related fields, including in the field of
2 technology ethics. In making such awards, the Director
3 shall—

4 (1) ensure recipients of artificial intelligence fel-
5 lowships are citizens, nationals, or lawfully admitted
6 permanent resident aliens of the United States; and

7 (2) conduct outreach, including through formal
8 solicitations, to solicit proposals from students and
9 postdoctoral researchers seeking to carry out re-
10 search in aspects of technology ethics with relevance
11 to artificial intelligence systems.

12 **SEC. 807. CYBERSECURITY WORKFORCE DEVELOPMENT AT**
13 **FEDERAL SCIENCE AGENCIES.**

14 (a) CYBERSECURITY WORKFORCE DEVELOPMENT AT
15 THE DEPARTMENT OF ENERGY.—

16 (1) IN GENERAL.—The Secretary of Energy
17 shall support the development of a cybersecurity
18 workforce through a program that—

19 (A) facilitates collaboration between under-
20 graduate and graduate students, researchers at
21 the National Laboratories (as defined in section
22 2 of the Energy Policy Act of 2005), and the
23 private sector;

24 (B) prioritizes science and technology in
25 areas relevant to the mission of the Department

1 of Energy through the design and application of
2 cybersecurity technologies;

3 (C) develops, or facilitates private sector
4 development of, voluntary cybersecurity training
5 and retraining standards, lessons, and rec-
6 ommendations for the energy sector that mini-
7 mize duplication of cybersecurity compliance
8 training programs; and

9 (D) maintains a public database of cyber-
10 security education, training, and certification
11 programs.

12 (2) COLLABORATION.—In carrying out the pro-
13 gram authorized in paragraph (1), the Secretary of
14 Energy shall leverage programs and activities car-
15 ried out across the Department of Energy, other rel-
16 evant Federal agencies, institutions of higher edu-
17 cation, and other appropriate entities best suited to
18 provide national leadership on cybersecurity related
19 issues.

20 (b) CYBERSECURITY IN DEPARTMENT OF TRANSPOR-
21 TATION PROGRAMS.—

22 (1) UNIVERSITY TRANSPORTATION CENTERS
23 PROGRAM.—Section 5505 of title 49, United States
24 Code, is amended—

1 (A) in subsection (a)(2)(C), by inserting
2 “in the matters described in subparagraphs (A)
3 through (G) of section 6503(c)(1)” after
4 “transportation leaders”; and

5 (B) in subsection (c)(3)(E)—

6 (i) by inserting “, including the cyber-
7 security implications of technologies relat-
8 ing to connected vehicles, connected infra-
9 structure, and autonomous vehicles” after
10 “autonomous vehicles”; and

11 (ii) by striking “The Secretary” and
12 inserting the following:

13 “(1) IN GENERAL.—A regional university trans-
14 portation center receiving a grant under this para-
15 graph shall carry out research focusing on 1 or more
16 of the matters described in subparagraphs (A)
17 through (G) of section 6503(c)(1).

18 “(2) FOCUSED OBJECTIVES.—The Secretary”.

19 (2) TRANSPORTATION RESEARCH AND DEVEL-
20 OPMENT 5-YEAR STRATEGIC PLAN.—Section
21 6503(c)(1) of title 49, United States Code, is
22 amended—

23 (A) in subparagraph (E), by striking
24 “and” at the end;

1 (B) in subparagraph (F), by inserting
2 “and” after the semicolon at the end; and
3 (C) by adding at the end the following:
4 “(G) reducing transportation cybersecurity
5 risks;”.

6 **SEC. 808. BROADENING PARTICIPATION.**

7 (a) PRESIDENTIAL AWARDS FOR EXCELLENCE IN
8 MATHEMATICS AND SCIENCE TEACHING.—Section
9 117(a)(1) of the National Science Foundation Authoriza-
10 tion Act of 1988 (42 U.S.C. 1881b(a)(1)) is amended—

11 (1) in subparagraph (B)—

12 (A) by striking “108” and inserting
13 “110”;

14 (B) by striking clause (iv);

15 (C) in clause (v), by striking the period at
16 the end and inserting “; and”;

17 (D) by redesignating clauses (i), (ii), (iii),
18 and (v) as subclauses (I), (II), (III), and (IV),
19 respectively, and moving the margins of such
20 subclauses (as so redesignated) two ems to the
21 right; and

22 (E) by striking “In selecting teachers” and
23 all that follows through “two teachers—” and
24 inserting the following:

1 “(C) In selecting teachers for an award au-
 2 thorized by this subsection, the President shall
 3 select—

4 “(i) at least two teachers—;”; and
 5 (2) in subparagraph (C), as designated by para-
 6 graph (1)(E), by adding at the end the following:

7 “(ii) at least one teacher—

8 “(I) from the Commonwealth of
 9 the Northern Mariana Islands;

10 “(II) from American Samoa;

11 “(III) from the Virgin Islands of
 12 the United States; and

13 “(IV) from Guam.”.

14 (b) EFFECTIVE DATE.—The amendments made by
 15 subsection (a) shall apply with respect to awards made on
 16 or after the date of the enactment of this Act.

17 **TITLE IX—TECHNOLOGY** 18 **TRANSFER AND INNOVATION**

19 **SEC. 901. FEDERAL LABORATORY COMPUTER PROGRAMS** 20 **UPDATE.**

21 (a) UTILIZATION OF FEDERAL TECHNOLOGY UP-
 22 DATE.—Section 11 of the Stevenson-Wydler Technology
 23 Innovation Act of 1980 (15 U.S.C. 3710) is amended by
 24 adding at the end the following:

1 “(j)(1) COPYRIGHT PROTECTION.—Pursuant to sec-
2 tion 105(b)(1) of title 17, United States Code, and subject
3 to the requirements therein, the director of any Govern-
4 ment-operated Federal laboratory may seek copyright pro-
5 tection on behalf of the United States in a work described
6 in that section.

7 “(2) GUIDELINES.—The Secretary is authorized to
8 provide guidelines to implement paragraph (1) of this sec-
9 tion and to provide guidance for the management of works
10 in which copyright protection is obtained.”.

11 (b) GOVERNMENT WORKS COPYRIGHT UPDATE.—
12 Section 105 of title 17, United States Code, is amended—

13 (1) by striking “Copyright protection” and in-
14 serting “(a) Copyright protection”; and

15 (2) by adding at the end the following:

16 “(b) Notwithstanding subsection (a), copyright pro-
17 tection under this title is available for—

18 “(1) a computer program that is a work of the
19 United States Government and is created at a Fed-
20 eral laboratory, as defined in section 4 of the Ste-
21 venson-Wydler Technology Innovation Act of 1980
22 (15 U.S.C. 3703), and which is a result of research,
23 development, or engineering at the Federal labora-
24 tory, provided that the United States Government
25 makes application for copyright registration under

1 section 409 pursuant to the authority granted under
 2 section 11(k) of such Act within 6 months from em-
 3 ployee disclosure of the work to the Federal labora-
 4 tory, and provided further that a certificate of reg-
 5 istration is issued pursuant to section 410 of this
 6 title or following judicial review pursuant to chapter
 7 7 of title 5; and

8 “(2) standard reference data prepared or made
 9 available by the Department of Commerce, provided
 10 the copyright is secured by the Secretary of Com-
 11 merce in the manner set forth in section 6 of the
 12 Standard Reference Data Act (15 U.S.C. 290e).”.

13 **SEC. 902. EXTEND CRADA INFORMATION PROTECTION PE-**
 14 **RIOD.**

15 Section 12(c)(7)(B) of the Stevenson-Wydler Tech-
 16 nology Innovation Act of 1980 (15 U.S.C.
 17 3710a(c)(7)(B)) is amended by striking “5” and inserting
 18 “12”.

19 **SEC. 903. STEVENSON-WYDLER ACT AUTHORITY UPDATE.**

20 Section 11 of the Stevenson-Wydler Technology Inno-
 21 vation Act of 1980 (15 U.S.C. 3710(g)) is amended to
 22 read as follows:

23 “(g) FUNCTIONS OF SECRETARY.—The Secretary
 24 shall convene an Interagency Working Group for Tech-

1 nology Transfer comprising those agencies with at least
2 one Federal laboratory to—

3 “(1) share best practices for realizing the com-
4 mercial potential of inventions and methods and op-
5 tions for commercialization which are available to
6 the Federal laboratories, including research and de-
7 velopment limited partnerships and cooperative re-
8 search and development agreements; and

9 “(2) issue such guidelines as may be necessary
10 to carry out this chapter, acting through the Direc-
11 tor of the National Institute of Standards and Tech-
12 nology and with the concurrence of the Interagency
13 Working Group for Technology Transfer.”.

14 **SEC. 904. ROYALTY PAYMENTS TO FEDERAL EMPLOYEES**

15 **UPDATE.**

16 Section 14 of the Stevenson-Wydler Technology Inno-
17 vation Act of 1980 (15 U.S.C. 3710c) is amended—

18 (1) by striking “inventions” each place the term
19 appears and inserting “inventions or works”;

20 (2) by striking “invention” each place the term
21 appears and inserting “invention or work”;

22 (3) by striking “inventors” each place the term
23 appears and inserting “inventors or contributors”;

24 (4) in subsection (a)(1) after “shall be” insert-
25 ing “non-appropriated funds and shall be”;

1 (5) in subsection (a)(1)(A)(i) inserting at the
2 end “, or to the contributor or co-contributors if a
3 certificate of copyright registration is issued to the
4 United States”;

5 (6) in subsection (a)(1)(A)(ii) after “inventor
6 of” inserting “or contributor to”;

7 (7) in subsection (a)(3) by striking “inventor”
8 each place the term appears and inserting “inventor
9 or contributor”;

10 (8) in subsection (a)(3) by striking “\$150,000”
11 each place the term appears and inserting
12 “500,000”;

13 (9) at the end of subsection (a) by inserting the
14 following new paragraph:

15 “(5) Any royalties or other payments received by a
16 Federal agency from the licensing and assignment of
17 works under agreements entered into by Federal labora-
18 tories under section 12 of this Act, and from the licensing
19 of works by Federal laboratories under any provision of
20 law shall be retained by the agency licensing or assigning
21 the work on behalf of the United States Government and
22 shall be disposed of after payment of any copyright reg-
23 istration costs. The head of the agency is authorized to dis-
24 pose of such royalties or other payments through transfer
25 by the agency to its bureaus or laboratories, with the ma-

1 jority share of the royalties or other payments from any
2 copyright going to the bureau or laboratory where or for
3 which the copyrighted work was made.

4 “(A) The royalties or other payments so trans-
5 ferred to any bureau or laboratory may be used or
6 obligated by that bureau or laboratory during the
7 fiscal year in which they are received or during the
8 2 succeeding fiscal years—

9 “(i) to reward contributors of copyrighted
10 computer programs;

11 “(ii) to further information exchange
12 among bureaus and laboratories of the agency
13 or with another agency;

14 “(iii) for education and training of employ-
15 ees consistent with the missions and objectives
16 of the agency, bureau, or laboratory;

17 “(iv) for payment of expenses incidental to
18 the administration and licensing of intellectual
19 property by the agency or laboratory with re-
20 spect to copyrighted computer programs made
21 at that bureau or laboratory, including the fees
22 or other costs for the services of other agencies,
23 persons, or organizations for intellectual prop-
24 erty management and licensing services; or

1 “(v) for scientific research and develop-
2 ment consistent with the research and develop-
3 ment missions and objectives of the bureau or
4 laboratory.

5 “(B) All royalties or other payments retained
6 by the agency, bureau, or laboratory after payments
7 have been made pursuant to subparagraph (A) that
8 is unobligated and unexpended at the end of the sec-
9 ond fiscal year succeeding the fiscal year in which
10 the royalties and other payments were received shall
11 be paid into the Treasury.

12 “(C) As used in the section, the term ‘contrib-
13 utor’ means a laboratory employee who is a creator
14 of an original expression in a copyrighted computer
15 program.”; and

16 (10) in subsection (a)(1)(B)—

17 (A) by striking “; or” at the end of clause
18 (iv) and inserting a semicolon;

19 (B) by striking the period at the end of
20 clause (v) and inserting “; or”; and

21 (C) by inserting at the end the following:

22 “(vi) for the acquisition, administra-
23 tion and licensing of intellectual prop-
24 erty.”.

1 **SEC. 905. GOVERNMENT INTELLECTUAL PROPERTY CLARI-**
2 **FICATION.**

3 Section 15 of the Stevenson-Wydler Technology Inno-
4 vation Act of 1980 (15 U.S.C. 3710d) is amended in sub-
5 section (a) to read as follows:

6 “(a) IN GENERAL.—

7 “(1) INVENTION RIGHTS.—The Government
8 shall obtain the entire right, title and interest in and
9 to all inventions made by any Federal employee—

10 “(A) during working hours;

11 “(B) with a contribution by the Govern-
12 ment of facilities, equipment, materials, funds,
13 or information, or of time or services of other
14 Federal employees on official duty; or

15 “(C) within his or her field of research or
16 within his or her official employment responsi-
17 bility and activity.

18 “(2) DISCLOSURE.—Any invention made by a
19 Federal employee as described in paragraph (1) shall
20 be disclosed by the Federal employee to the agency
21 that employs the Federal employee within 10 months
22 of the earlier of the date of conception or actual re-
23 duction to practice of the invention. The Govern-
24 ment shall obtain the entire right, title, and interest
25 in and to any invention conceived or actually re-
26 duced to practice by a Federal employee that is not

1 disclosed to the Government within 10 months or
2 shorter disclosure period required by agency regula-
3 tion, from the earlier of the date of conception or ac-
4 tual reduction to practice of the invention.

5 “(3) PRESUMPTION.—Any invention made by a
6 Federal employee as described in paragraph (1) shall
7 be presumed to be owned by the Government, and
8 the Federal employee shall assign the entire right,
9 title, and interest in and to the invention to the Gov-
10 ernment. A Federal employee that disagrees with the
11 presumption of ownership and obligation of assign-
12 ment may request, from the agency employing the
13 Federal employee, a determination of rights in and
14 to the invention and shall do so within 30 days of
15 the disclosure pursuant to paragraph (2), which may
16 be extended by the head of an agency for good cause
17 shown. The request shall provide all grounds and
18 justification for leaving rights with the Federal em-
19 ployee. If the request is not made by the employee
20 within the 30-day or extended period, the Govern-
21 ment shall retain all right, title, and interest to the
22 invention, and the Federal employee shall assign the
23 entire right, title, and interest in and to the inven-
24 tion to the Government.

1 “(4) PATENT RIGHTS.—If a Federal agency
2 which has ownership of or the right of ownership to
3 an invention made by a Federal employee does not
4 intend to file for a patent application or otherwise
5 promote commercialization of such invention, the
6 agency shall (upon request) allow the inventor, if the
7 inventor is a Federal employee or former employee
8 who made the invention during the course of employ-
9 ment with the Government, to obtain or retain title
10 to the invention (subject to reservation by the Gov-
11 ernment of a nonexclusive, nontransferable, irrev-
12 ocable, paid-up license to practice the invention or
13 have the invention practiced throughout the world by
14 or on behalf of the Government). In addition, the
15 agency may condition the inventor’s right to title on
16 the timely filing of a patent application.

17 “(5) COMPUTER PROGRAM DISCLOSURE.—Any
18 computer program that is a work of the United
19 States Government and is created at a Federal lab-
20 oratory within section 105(b)(1) of title 17, United
21 States Code, shall be disclosed by the Federal em-
22 ployee who created such program to the Federal lab-
23 oratory that employs the Federal employee.

24 “(6) AUTHOR RIGHTS.—Any program described
25 in paragraph (5) prepared by a Federal employee

1 within the scope of his or her employment shall be
2 considered a work made for hire and the Govern-
3 ment shall be the author. A Federal employee who
4 discloses as required under paragraph (5) but who
5 contests that the Government is the author may re-
6 quest, from the agency employing the Federal em-
7 ployee, a determination of rights in and to the pro-
8 gram and shall do so within 30 days of the disclo-
9 sure pursuant to paragraph (5), which may be ex-
10 tended by the head of an agency for good cause
11 shown. The request shall provide all grounds and
12 justification for leaving rights with the Federal em-
13 ployee. If the request is not made by the Federal
14 employee within the 30-day period, the Government
15 shall remain and shall be the author of such pro-
16 gram.

17 “(7) REPORTING EXEMPTION.—Such reporting
18 requirements shall not apply to Federal employees
19 who are otherwise prohibited from applying for or
20 obtaining a patent. The Secretary may issue guide-
21 lines to implement this section.”.

22 **SEC. 906. CLARIFYING CRADA AUTHORITY.**

23 Section 12 of the Stevenson-Wydler Technology Inno-
24 vation Act of 1980 (15 U.S.C. 3710a) is amended—

1 (1) by inserting at the end of the section the
2 following new subsection:

3 “(h) PATENT OBLIGATION.—Under an agreement
4 entered into pursuant to this section, there is an obligation
5 on the part of the collaborating party, in the event a
6 United States patent application is filed by or on behalf
7 of the collaborating party or by any assignee of the col-
8 laborating party, to include within the specification of
9 such application and any patent issuing thereon, a state-
10 ment specifying that the invention was made with Govern-
11 ment support and that the Government has certain rights
12 in the invention.”; and

13 (2) by striking subsection (d).

14 **SEC. 907. EXPANSION OF AGREEMENTS FOR COMMER-**
15 **CIALIZING TECHNOLOGY AUTHORITY.**

16 The Stevenson-Wydler Technology Innovation Act of
17 1980 (15 U.S.C. 3701 et seq.) is amended by inserting
18 after section 14 the following:

19 **“SEC. 14A. AGREEMENTS FOR COMMERCIALIZING TECH-**
20 **NOLOGY.**

21 “(a) AGREEMENTS WITH NON-FEDERAL ENTI-
22 TIES.—The head of each Federal agency may permit the
23 director of any of its Government-owned, contractor-oper-
24 ated laboratories to perform work for non-Federal entities
25 (sponsors) on a fully reimbursable basis and to execute

1 agreements with a non-Federal entity, including a non-
2 Federal entity already receiving Federal funding that will
3 be used to support activities under the agreements, pro-
4 vided that such funding is solely used to carry out the
5 purposes of the Federal award.

6 “(b) RESTRICTION.—The requirements of chapter 18
7 of title 35, United States Code (commonly known as the
8 ‘Bayh-Dole Act’), shall apply if—

9 “(1) the agreement is a funding agreement (as
10 that term is defined in section 201 of such title);
11 and

12 “(2) at least one of the parties to the funding
13 agreement is eligible to receive rights under that
14 chapter.

15 “(c) SUBMISSION TO AGENCY.—Each affected direc-
16 tor of a Government-owned, contractor-operated labora-
17 tory shall submit to the head of the Federal agency, with
18 respect to each agreement entered into under this sec-
19 tion—

20 “(1) a summary of information relating to the
21 relevant project;

22 “(2) the total estimated costs of the project;

23 “(3) estimated commencement and completion
24 dates of the project; and

1 “(4) other documentation determined to be ap-
2 propriate by the head of the Federal agency.

3 “(d) CERTIFICATION.—The head of the Federal
4 agency shall require the contractor of the affected Govern-
5 ment-owned, contractor-operated laboratory to certify that
6 each activity carried out under a project for which an
7 agreement is entered into under this section—

8 “(1) is not in direct competition with the pri-
9 vate sector; and

10 “(2) does not present, or minimizes, any appar-
11 ent conflict of interest, and avoids or neutralizes any
12 actual conflict of interest, as a result of the agree-
13 ment under this section.

14 “(e) LIMITATION.—This authority only pertains to
15 Federal agencies that do not have agency-specific authori-
16 ties for Agreements for Commercializing Technology else-
17 where in statute.”.

18 **SEC. 908. OTHER TRANSACTION AUTHORITY.**

19 The Stevenson-Wydler Technology Innovation Act of
20 1980 (15 U.S.C. 3701 et seq.) is amended by inserting
21 after section 15 the following:

22 **“SEC. 15A. OTHER TRANSACTIONS.**

23 “(a) GENERAL AUTHORITY.—

24 “(1) PERMISSION.—Each Federal agency may
25 permit the director of any of its Government-oper-

1 ated Federal laboratories to enter into such other
2 transactions as may be necessary in the conduct of
3 the work of the Federal laboratory and on such
4 terms as the director of the Federal laboratory con-
5 siders appropriate, in furtherance of the purposes of
6 this Act.

7 “(2) DISCLOSURE.—The Federal agency may
8 protect from disclosure, for up to 12 years after the
9 date on which the information is developed, any in-
10 formation developed pursuant to a transaction under
11 this section that would be protected from disclosure
12 under section 552(b)(4) of title 5, United States
13 Code, if obtained from a person other than a Fed-
14 eral agency.

15 “(3) AUTHORITY LIMITATION.—This authority
16 only pertains to Federal agencies that do not have
17 agency-specific authorities for other transactions
18 elsewhere in statute.

19 “(b) LIMITATIONS.—A Federal laboratory using the
20 authorities granted in subsection (a) may only enter into
21 such other transactions when—

22 “(1) a warranted contracting officer determines
23 that use of other authority of the Federal agency
24 would be insufficient to achieve the purposes of this
25 Act; and

1 “(2) use of such other transaction is approved
2 by the Federal agency.”.

3 **SEC. 909. NONPROFIT FOUNDATIONS.**

4 The Stevenson-Wydler Technology Innovation Act of
5 1980 (15 U.S.C. 3701 et seq.) is amended by adding after
6 section 28 the following:

7 **“SEC. 29. FOUNDATIONS.**

8 “(a) IN GENERAL.—A Government-owned Federal
9 laboratory may establish or enter into an agreement with
10 a nonprofit organization to establish a Federal laboratory
11 Foundation in support of its mission. Such a Foundation
12 shall not be an agency or instrumentality of the United
13 States Government, and the United States shall not be
14 liable for any debts, defaults, acts, or omissions of the
15 Foundation.

16 “(b) PURPOSE.—The purpose of a Foundation estab-
17 lished under this section shall be to support the Govern-
18 ment-owned Federal laboratory in its mission.

19 “(c) ACTIVITIES.—Activities of the Foundation may
20 include the following:

21 “(1) The receipt, administration, solicitation,
22 acceptance and use of funds, gifts, devises, or be-
23 quests, either absolutely or in trust of real or per-
24 sonal property or any income therefrom or other in-
25 terest or equity therein for the benefit of, or in con-

1 nection with, the mission of the Government-owned
2 Federal laboratory. A gift, devise, or bequest may be
3 accepted by the Foundation even though it is encum-
4 bered, restricted, or subject to beneficial interests of
5 private persons if any current or future interest
6 therein is for the benefit of the Federal laboratory
7 in its research and development activities. Contribu-
8 tions, gifts, and other transfers made to or for the
9 use of a Foundation established under this section
10 shall be regarded as contributions, gifts, or transfers
11 to or for the use of the United States.

12 “(2) The conduct of support studies, competi-
13 tions, projects, research and other activities that fur-
14 ther the purposes of the Foundation.

15 “(3) Programs for fostering collaboration and
16 partnerships with researches from the Federal and
17 State governments, institutions of higher education,
18 federally funded research and development centers,
19 industry and nonprofit organizations for the re-
20 search, development or commercialization of feder-
21 ally supported technologies.

22 “(4) Programs for leveraging technologies to
23 support new product development that supports re-
24 gional economic development.

1 “(5) Administering prize competitions to accel-
2 erate private sector competition and investment.

3 “(6) Provision of fellowships and grants to re-
4 search and development personnel at, or affiliated
5 with, federally funded centers. Such fellowships and
6 grants may include stipends, travel, health insurance
7 benefits and other appropriate expenses. The recipi-
8 ents of fellowships shall be selected by the donors
9 and the Foundation upon the recommendation of the
10 employees in the Federal laboratory where the fellow
11 would serve, and shall be subject to agreement of the
12 head of the agency whose mission is supported by
13 the Foundation.

14 “(7) Supplementary programs to provide for—

15 “(A) scientists of other countries to serve
16 in research capacities in the United States in
17 association with the Federal laboratory whose
18 mission the Foundation supports, or elsewhere,
19 or opportunities for employees of the Federal
20 laboratory whose mission the Foundation sup-
21 ports to serve in such capacities in other coun-
22 tries, or both;

23 “(B) the conduct and support of studies,
24 projects, and research, that may include sti-
25 pends, travel and other support for personnel in

1 collaboration with national and international
2 nonprofit and for-profit organizations;

3 “(C) the conduct and support of forums,
4 meetings, conferences, courses, and training
5 workshops that may include undergraduate,
6 graduate, post-graduate, and post-doctoral ac-
7 credited courses and the maintenance of accred-
8 itation of such courses by the Foundation at
9 the State and national level for college or con-
10 tinuing education credits or for degrees;

11 “(D) programs to support and encourage
12 teachers and students of science at all levels of
13 education and programs for the general public
14 which promote the understanding of science;

15 “(E) programs for writing, editing, print-
16 ing, publishing, and vending of books and other
17 materials; and

18 “(F) the conduct of other activities to
19 carry out and support the purpose described in
20 subsection (b).

21 “(d) TRANSFER OF FUNDS.—Notwithstanding any
22 other provision of law, a Foundation established under
23 this section may transfer funds to the Government-owned
24 Federal laboratory and the Government-owned Federal

1 laboratory may accept transfers of funds from the Foun-
2 dation.”.

3 **SEC. 910. IMPROVING REPORTING AND METRICS.**

4 Section 11 of the Stevenson-Wydler Technology Inno-
5 vation Act of 1980 (15 U.S.C. 3710) is amended by strik-
6 ing subsections (f) and (g) and inserting the following:

7 “(f) AGENCY REPORTS ON UTILIZATION.—

8 “(1) IN GENERAL.—Each Federal agency which
9 operates or directs one or more Federal laboratories
10 or which conducts activities under subsection (k) of
11 this section or sections 207 and 209 of title 35,
12 United States Code, shall report annually to the Of-
13 fice of Management and Budget, on the activities
14 performed by that agency and its Federal labora-
15 tories under the provisions of this section and of sec-
16 tions 207 and 209 of such title 35.

17 “(2) CONTENTS.—The report shall include—

18 “(A) an explanation of the agency’s tech-
19 nology transfer activities for the preceding fis-
20 cal year and the agency’s plans to manage inno-
21 vations with commercial promise consistent with
22 the agency’s mission and benefitting the com-
23 petitiveness of United States industry; and

1 “(B) information on technology transfer
2 activities for the preceding fiscal year, includ-
3 ing—

4 “(i) the number of patent applications
5 filed;

6 “(ii) the number of patents received;

7 “(iii) the number of works registered
8 for copyright protection in the United
9 States on behalf of the United States, pur-
10 suant to section 105(b) of title 17, United
11 States Code;

12 “(iv) the number of fully-executed li-
13 censes which received income from licens-
14 ing in the preceding fiscal year;

15 “(v) the total income from licensing;

16 “(vi) the number of licenses termi-
17 nated for cause;

18 “(vii) the number of collaborative re-
19 search and development relationships; and

20 “(viii) any other parameters or discus-
21 sion that the agency deems relevant or
22 unique to its practice of technology trans-
23 fer.

24 “(3) COPY TO SECRETARY.—The agency shall
25 transmit a copy of the report to the Secretary of

1 Commerce for inclusion in the annual summary re-
2 quired by subsection (g)(2).

3 “(4) PUBLIC AVAILABILITY.—Each Federal
4 agency reporting under this subsection shall make
5 available to the public through internet sites, up-
6 dated at least annually—

7 “(A) the information contained in such re-
8 port;

9 “(B) information on intellectual property
10 which is available for licensing from the Federal
11 agency; and

12 “(C) information on Federal research and
13 development programs, facilities, equipment and
14 tools, expertise, services, and other relevant as-
15 sets which are made available to the public by
16 the Federal agency.

17 “(5) PUBLICATION BY NIST.—The Director of
18 the National Institute of Standards and Technology
19 is authorized to provide the summary required by
20 subsection (g)(2) to the public through internet
21 sites.”.

22 **SEC. 911. INNOVATIVE APPROACHES TO TECHNOLOGY**
23 **TRANSFER.**

24 Section 9(jj) of the Small Business Act (15 U.S.C.
25 638(jj)) is amended to read as follows:

1 “(jj) INNOVATIVE APPROACHES TO TECHNOLOGY
2 TRANSFER.—

3 “(1) GRANT PROGRAM.—

4 “(A) IN GENERAL.—Each Federal agency
5 required by subsection (n) to establish an
6 STTR program shall carry out a grant program
7 to support innovative approaches to technology
8 transfer at institutions of higher education (as
9 defined in section 101(a) of the Higher Edu-
10 cation Act of 1965 (20 U.S.C. 1001(a))), non-
11 profit research institutions and Federal labora-
12 tories in order to accelerate the commercializa-
13 tion of federally funded research and technology
14 by small business concerns, including new busi-
15 nesses.

16 “(B) AWARDING OF GRANTS AND
17 AWARDS.—

18 “(i) IN GENERAL.—Each Federal
19 agency required by subparagraph (A) to
20 participate in this program, shall award,
21 through a competitive, merit-based process,
22 grants, in the amounts listed in subpara-
23 graph (C) to institutions of higher edu-
24 cation, technology transfer organizations
25 that facilitate the commercialization of

1 technologies developed by one or more such
2 institutions of higher education, Federal
3 laboratories, other public and private non-
4 profit entities, and consortia thereof, for
5 initiatives that help identify high-quality,
6 commercially viable federally funded re-
7 search and technologies and to facilitate
8 and accelerate their transfer into the mar-
9 ketplace.

10 “(ii) USE OF FUNDS.—Activities sup-
11 ported by grants under this subsection
12 may include—

13 “(I) providing early-stage proof
14 of concept funding for translational
15 research;

16 “(II) identifying research and
17 technologies at recipient institutions
18 that have the potential for accelerated
19 commercialization;

20 “(III) technology maturation
21 funding to support activities such as
22 prototype construction, experiment
23 analysis, product comparison, and col-
24 lecting performance data;

1 “(IV) technical validations, mar-
2 ket research, clarifying intellectual
3 property rights position and strategy,
4 and investigating commercial and
5 business opportunities; and

6 “(V) programs to provide advice,
7 mentoring, entrepreneurial education,
8 project management, and technology
9 and business development expertise to
10 innovators and recipients of tech-
11 nology transfer licenses to maximize
12 commercialization potential.

13 “(iii) SELECTION PROCESS AND AP-
14 PPLICATIONS.—Qualifying institutions seek-
15 ing a grant under this subsection shall
16 submit an application to a Federal agency
17 required by subparagraph (A) to partici-
18 pate in this program at such time, in such
19 manner, and containing such information
20 as the agency may require. The application
21 shall include, at a minimum—

22 “(I) a description of innovative
23 approaches to technology transfer,
24 technology development, and commer-
25 cial readiness that have the potential

1 to increase or accelerate technology
2 transfer outcomes and can be adopted
3 by other qualifying institutions, or a
4 demonstration of proven technology
5 transfer and commercialization strate-
6 gies, or a plan to implement proven
7 technology transfer and commer-
8 cialization strategies, that can achieve
9 greater commercialization of federally
10 funded research and technologies with
11 program funding;

12 “(II) a description of how the
13 qualifying institution will contribute
14 to local and regional economic devel-
15 opment efforts; and

16 “(III) a plan for sustainability
17 beyond the duration of the funding
18 award.

19 “(iv) PROGRAM OVERSIGHT
20 BOARDS.—

21 “(I) IN GENERAL.—Successful
22 proposals shall include a plan to as-
23 semble a Program Oversight Board,
24 the members of which shall have tech-
25 nical, scientific, or business expertise

1 and shall be drawn from industry,
2 start-up companies, venture capital,
3 technical enterprises, financial institu-
4 tions, and business development orga-
5 nizations.

6 “(II) PROGRAM OVERSIGHT
7 BOARDS RESPONSIBILITIES.—Pro-
8 gram Oversight Boards shall—

9 “(aa) establish award pro-
10 grams for individual projects;

11 “(bb) provide rigorous eval-
12 uation of project applications;

13 “(cc) determine which
14 projects should receive awards, in
15 accordance with guidelines estab-
16 lished under subparagraph
17 (C)(ii);

18 “(dd) establish milestones
19 and associated award amounts
20 for projects that reach mile-
21 stones;

22 “(ee) determine whether
23 awarded projects are reaching
24 milestones; and

1 “(ff) develop a process to re-
2 allocate outstanding award
3 amounts from projects that are
4 not reaching milestones to other
5 projects with more potential.

6 “(C) GRANT AND AWARD AMOUNTS.—

7 “(i) GRANT AMOUNTS.—Each Federal
8 agency required by subparagraph (A) to
9 carry out a grant program may make
10 grants to a qualifying institution for up to
11 \$1,000,000 per year for up to 3 years.

12 “(ii) AWARD AMOUNTS.—Each quali-
13 fying institution that receives a grant
14 under subparagraph (B) shall provide
15 awards for individual projects of not more
16 than \$150,000, to be provided in phased
17 amounts, based on reaching the milestones
18 established by the qualifying institution’s
19 Program Oversight Board.

20 “(D) AUTHORIZED EXPENDITURES FOR
21 INNOVATIVE APPROACHES TO TECHNOLOGY
22 TRANSFER GRANT PROGRAM.—

23 “(i) PERCENTAGE.—The percentage
24 of the extramural budget each Federal
25 agency required by subsection (n) to estab-

1 lish an STTR program shall expend on the
2 Innovative Approaches to Technology
3 Transfer Grant Program shall be—

4 “(I) 0.05 percent for each of fis-
5 cal years 2012 and 2013; and

6 “(II) 0.1 percent for each of fis-
7 cal years 2014 and 2015.

8 “(ii) TREATMENT OF EXPENDI-
9 TURES.—Any portion of the extramural
10 budget expended by a Federal agency on
11 the Innovative Approaches to Technology
12 Transfer Grant Program shall apply to-
13 wards the agency’s expenditure require-
14 ments under subsection (n).

15 “(2) PROGRAM EVALUATION AND DATA COL-
16 LECTION AND DISSEMINATION.—

17 “(A) EVALUATION PLAN AND DATA COL-
18 LECTION.—Each Federal agency required by
19 paragraph (1)(A) to establish an Innovative Ap-
20 proaches to Technology Transfer Grant Pro-
21 gram shall develop a program evaluation plan
22 and collect annually such information from
23 grantees as is necessary to assess the Program.
24 Program evaluation plans shall require the col-
25 lection of data aimed at identifying outcomes

1 resulting from the transfer of technology with
2 assistance from the Innovative Approaches to
3 Technology Transfer Grant Program, such as—

4 “(i) specific follow-on funding identi-
5 fied or obtained, including follow-on fund-
6 ing sources, such as Federal sources or
7 private sources;

8 “(ii) number of projects which result
9 in a license to a start-up company or an
10 established company with sufficient re-
11 sources for effective commercialization
12 within 5 years of receiving an award under
13 paragraph (1);

14 “(iii) invention disclosures and pat-
15 ents;

16 “(iv) number of projects supported by
17 qualifying institutions receiving a grant
18 under paragraph (1) that secure Phase I
19 or Phase II SBIR or STTR awards;

20 “(v) available information on revenue,
21 sales or other measures of products that
22 have been commercialized as a result of
23 projects awarded under paragraph (1);

1 “(vi) number and location of jobs cre-
2 ated resulting from projects awarded under
3 paragraph (1); and

4 “(vii) other data as deemed appro-
5 priate by a Federal agency required by this
6 subparagraph to develop a program evalua-
7 tion plan.

8 “(B) EVALUATIVE REPORT TO CON-
9 GRESS.—The head of each Federal agency that
10 participates in the Innovative Approaches to
11 Technology Transfer Grant Program shall sub-
12 mit to the Committee on Science, Space, and
13 Technology and the Committee on Small Busi-
14 ness of the House of Representatives and the
15 Committee on Small Business and Entrepre-
16 neurship of the Senate an evaluative report re-
17 garding the activities of the program. The re-
18 port shall include—

19 “(i) a detailed description of the im-
20 plementation of the program;

21 “(ii) a detailed description of the
22 grantee selection process;

23 “(iii) an accounting of the funds used
24 in the program; and

1 “(iv) a summary of the data collected
2 under subparagraph (A).

3 “(C) DATA DISSEMINATION.—For the pur-
4 poses of program transparency and dissemina-
5 tion of best practices, the Administrator shall
6 include on the public database under subsection
7 (k)(1) information on the Innovative Ap-
8 proaches to Technology Transfer Grant Pro-
9 gram, including—

10 “(i) the program evaluation plan re-
11 quired under subparagraph (A);

12 “(ii) a list of recipients of awards
13 under paragraph (1); and

14 “(iii) information on the use of grants
15 under paragraph (1) by recipient institu-
16 tions.”.

17 **SEC. 912. DOE PUBLIC-PRIVATE PARTNERSHIPS FOR COM-**
18 **MERCIALIZATION.**

19 (a) IN GENERAL.—Subject to subsections (b) and (c),
20 the Secretary of Energy shall delegate to directors of the
21 National Laboratories signature authority with respect to
22 any agreement described in subsection (b) the total cost
23 of which (including the National Laboratory contributions
24 and project recipient cost share) is less than \$1,000,000,
25 if such an agreement falls within the scope of—

1 (1) a strategic plan for the National Laboratory
2 that has been approved by the Department of En-
3 ergy; or

4 (2) the most recent congressionally approved
5 budget for Department of Energy activities to be
6 carried out by the National Laboratory.

7 (b) AGREEMENTS.—Subsection (a) applies to—

8 (1) a cooperative research and development
9 agreement;

10 (2) a non-Federal work-for-others agreement;
11 and

12 (3) any other agreement determined to be ap-
13 propriate by the Secretary of Energy, in collabora-
14 tion with the directors of the National Laboratories.

15 (c) ADMINISTRATION.—

16 (1) ACCOUNTABILITY.—The director of the af-
17 fected National Laboratory and the affected con-
18 tractor shall carry out an agreement under this sec-
19 tion in accordance with applicable policies of the De-
20 partment of Energy, including by ensuring that the
21 agreement does not compromise any national secu-
22 rity, economic, or environmental interest of the
23 United States.

24 (2) CERTIFICATION.—The director of the af-
25 fected National Laboratory and the affected con-

1 tractor shall certify that each activity carried out
2 under a project for which an agreement is entered
3 into under this section does not present, or mini-
4 mizes, any apparent conflict of interest, and avoids
5 or neutralizes any actual conflict of interest, as a re-
6 sult of the agreement under this section.

7 (3) AVAILABILITY OF RECORDS.—Within 30
8 days of entering an agreement under this section,
9 the director of a National Laboratory shall submit
10 to the Secretary of Energy for monitoring and re-
11 view all records of the National Laboratory relating
12 to the agreement.

13 (4) RATES.—The director of a National Lab-
14 oratory may charge higher rates for services per-
15 formed under a partnership agreement entered into
16 pursuant to this section, regardless of the full cost
17 of recovery, if such funds are used exclusively to
18 support further research and development activities
19 at the respective National Laboratory.

20 (d) EXCEPTION.—This section does not apply to any
21 agreement with a majority foreign-owned company.

22 (e) CONFORMING AMENDMENT.—Section 12 of the
23 Stevenson-Wydler Technology Innovation Act of 1980 (15
24 U.S.C. 3710a) is amended—

25 (1) in subsection (a)—

1 (A) by redesignating paragraphs (1) and
2 (2) as subparagraphs (A) and (B), respectively;
3 (B) by striking “Each Federal agency”
4 and inserting the following:

5 “(1) IN GENERAL.—Except as provided in para-
6 graph (2), each Federal agency”; and

7 (C) by adding at the end the following:

8 “(2) EXCEPTION.—Notwithstanding paragraph
9 (1), in accordance with section 813(a) of the Secur-
10 ing American Leadership in Science and Technology
11 Act of 2021, approval by the Secretary of Energy
12 shall not be required for any technology transfer
13 agreement proposed to be entered into by a National
14 Laboratory of the Department of Energy, the total
15 cost of which (including the National Laboratory
16 contributions and project recipient cost share) is less
17 than \$1,000,000.”; and

18 (2) in subsection (b), by striking “subsection
19 (a)(1)” each place it appears and inserting “sub-
20 section (a)(1)(A)”.

21 (f) SAVINGS CLAUSE.—Nothing in this section or an
22 amendment made by this section abrogates or otherwise
23 affects the primary responsibilities of any National Lab-
24 oratory to the Department of Energy.

1 **SEC. 913. DEPARTMENT OF ENERGY FOUNDATION.**

2 (a) DEFINITIONS.—In this section:

3 (1) BOARD.—The term “Board” means the
4 Board of Directors for the Foundation described in
5 section 3(c).

6 (2) CHAIR.—The term “Chair” means the
7 Chair of the Board described in section 3(c)(2).

8 (3) EXECUTIVE DIRECTOR.—The term “Execu-
9 tive Director” means the Executive Director of the
10 Board described in section 3(f)(2).

11 (4) FOUNDATION.—The term “Foundation”
12 means the Energy Foundation established under sec-
13 tion 3(a).

14 (5) SECRETARY.—The term “Secretary” means
15 the Secretary of Energy.

16 (b) ESTABLISHMENT OF ENERGY FOUNDATION.—

17 (1) IN GENERAL.—Not later than December 31,
18 2021, the Secretary shall establish a nonprofit cor-
19 poration to be known as the Energy Foundation re-
20 ferred to in this section as “the Foundation”.

21 (2) LIMITATION.—The Foundation shall not be
22 an agency or instrumentality of the Federal Govern-
23 ment.

24 (3) NONAPPLICABILITY OF FACA.—The Federal
25 Advisory Committee Act (5 U.S.C. App.) shall not
26 apply to the Foundation.

1 (4) NONPROFIT STATUS.—The Foundation
2 shall be an organization described in section 501(c)
3 of the Internal Revenue Code of 1986 and exempt
4 from taxation under section 501(a) of that Code.

5 (5) BOARD OF DIRECTORS.—

6 (A) IN GENERAL.—The Foundation shall
7 operate under a board of directors.

8 (B) INITIAL APPOINTMENT.—The initial
9 appointment of the board of directors shall be
10 facilitated by the Secretary.

11 (C) COMPOSITION.—To the maximum ex-
12 tent practicable, the board of directors shall in-
13 clude representatives from a diverse range of
14 communities, including—

15 (i) the academic community;
16 (ii) the business community;
17 (iii) nonprofit organizations;
18 (iv) the communities surrounding the
19 laboratories and facilities of the Depart-
20 ment; and

21 (v) the technology transfer and com-
22 mercialization community.

23 (D) RESTRICTION ON MEMBERSHIP.—No
24 employee of the Department shall be appointed
25 as a member of the board of directors.

1 (6) PURPOSE AND ACTIVITIES OF FOUNDA-
2 TION.—The purpose of the Foundation is to channel
3 private sector investments that support efforts to
4 create, develop, and commercialize innovative tech-
5 nologies that address diverse energy challenges, by
6 methods that may include—

7 (A) fostering collaboration and partner-
8 ships between the Federal Government, State
9 governments, institutions of higher education,
10 federally funded research and development cen-
11 ters, industry, and nonprofit organizations for
12 the research, development, or commercialization
13 of next-generation energy technologies;

14 (B) leveraging technologies to support new
15 product development that supports regional in-
16 novation and economic development; and

17 (C) administering prize competitions to ac-
18 celerate private sector competition and invest-
19 ment.

20 (7) ACTIVITIES.—

21 (A) IN GENERAL.—The Foundation may
22 solicit and accept gifts, grants, and other dona-
23 tions, establish accounts, and invest and expend
24 funds in support of the programs and activities
25 described in subparagraphs (B) through (D).

1 (B) STUDIES, COMPETITIONS, AND
2 PROJECTS.—The Foundation may conduct and
3 support studies, competitions, projects, re-
4 search, development, commercialization, and
5 other activities that further the purpose of the
6 Foundation described in paragraph (1).

7 (C) FELLOWSHIPS AND GRANTS.—The
8 Foundation may award fellowships and grants
9 to recipients selected under clause (iii) for ac-
10 tivities relating to research, development, proto-
11 typing, maturing, or commercializing of energy
12 technologies.

13 (i) USES OF FELLOWSHIPS AND
14 GRANTS.—A fellowship or grant under
15 clause (i) may include stipends, travel,
16 health insurance benefits, and other appro-
17 priate expenses.

18 (ii) SELECTION.—

19 (I) IN GENERAL.—The Founda-
20 tion shall award a fellowship or grant
21 under clause (i) based on the technical
22 and commercialization merits of the
23 proposed project.

24 (II) INPUT.—In selecting recipi-
25 ents of a fellowship or grant under

1 clause (i), the Foundation may con-
2 sult with potential recipients regard-
3 ing the ability to carry out various
4 projects that would further the pur-
5 pose of the Foundation described in
6 paragraph (1).

7 (iii) FEDERAL LABORATORIES.—

8 (I) IN GENERAL.—Federal Lab-
9 oratories, including laboratories of the
10 Department of Energy, may apply for
11 and accept grants under clause (i).

12 (II) EFFECT.—A Federal labora-
13 tory that applies for or accepts a
14 grant under subclause (I) shall not be
15 considered to be engaging in a com-
16 petitive procedure.

17 (D) SUPPLEMENTARY PROGRAMS.—The
18 Foundation may carry out supplementary pro-
19 grams—

20 (i) to conduct and support forums,
21 meetings, conferences, courses, and train-
22 ing workshops consistent with the purpose
23 of the Foundation described in paragraph
24 (1);

1 (ii) to support and encourage the un-
2 derstanding and development of—

3 (I) data reporting models that
4 promote the translation of tech-
5 nologies from the research stage,
6 through development and maturation,
7 and to the market; and

8 (II) policies that make regulation
9 more effective and efficient by
10 leveraging the technology translation
11 data described in subclause (I) for the
12 regulation of relevant technology sec-
13 tors;

14 (iii) for writing, editing, printing, pub-
15 lishing, and vending books and other mate-
16 rials relating to research carried out under
17 the Foundation; and

18 (iv) to conduct other activities to
19 carry out and support the purpose de-
20 scribed in paragraph (1).

21 (E) AUTHORITY OF FOUNDATION.—The
22 Foundation shall be the sole entity responsible
23 for carrying out the activities described in this
24 paragraph.

1 (F) ADMINISTRATIVE CONTROL.—No par-
2 ticipant in a program under this paragraph or
3 employee of the Foundation shall exercise any
4 administrative control over any Federal em-
5 ployee.

6 (G) SUPPORT SERVICES.—The Secretary
7 may provide facilities, utilities, and support
8 services to the Foundation if it is determined by
9 the Secretary to be advantageous to the re-
10 search programs of the Department.

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