

114TH CONGRESS  
1ST SESSION

# H. R. 1898

To provide for investment in innovation through research and development and STEM education, to improve the competitiveness of the United States, and for other purposes.

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## IN THE HOUSE OF REPRESENTATIVES

APRIL 21, 2015

Ms. EDDIE BERNICE JOHNSON of Texas (for herself, Ms. LOFGREN, Mr. LIPINSKI, Ms. EDWARDS, Ms. BONAMICI, Mr. SWALWELL of California, Mr. GRAYSON, Mr. BERA, Ms. ESTY, Mr. VEASEY, Ms. CLARK of Massachusetts, Mr. BEYER, Mr. PERLMUTTER, Mr. TONKO, Mr. TAKANO, and Mr. FOSTER) introduced the following bill; which was referred to the Committee on Science, Space, and Technology, and in addition to the Committee on Education and the Workforce, 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

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## A BILL

To provide for investment in innovation through research and development and STEM education, to improve the competitiveness 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; TABLE OF CONTENTS.**

4 (a) SHORT TITLE.—This Act may be cited as the  
5 “America Competes Reauthorization Act of 2015”.

1 (b) TABLE OF CONTENTS.—The table of contents for  
 2 this Act is as follows:

Sec. 1. Short title; table of contents.

TITLE I—OSTP; GOVERNMENTWIDE SCIENCE

Subtitle A—General Provisions

- Sec. 101. Federal research and development funding.
- Sec. 102. National Science and Technology Council amendments.
- Sec. 103. Review of Federal regulations and reporting requirements.
- Sec. 104. Amendments to prize competitions.
- Sec. 105. Coordination of international science and technology partnerships.
- Sec. 106. Scientific and technical conferences.

Subtitle B—Reauthorization of the National Nanotechnology Initiative

- Sec. 111. Short title.
- Sec. 112. National Nanotechnology Program amendments.
- Sec. 113. Societal dimensions of nanotechnology.
- Sec. 114. Nanotechnology education.
- Sec. 115. Technology transfer.
- Sec. 116. Signature initiatives in areas of national importance.
- Sec. 117. Nanomanufacturing research.
- Sec. 118. Definitions.

Subtitle C—Engineering Biology

- Sec. 121. Short title.
- Sec. 122. Findings.
- Sec. 123. Definitions.
- Sec. 124. National Engineering Biology Research and Development Program.
- Sec. 125. Advisory Committee.
- Sec. 126. External review of ethical, legal, environmental, and societal issues.
- Sec. 127. Agency activities.

TITLE II—STEM EDUCATION AND DIVERSITY

Subtitle A—STEM Education and Workforce

- Sec. 201. Sense of Congress.
- Sec. 202. Coordination of Federal STEM education.
- Sec. 203. Grand challenges in education research.
- Sec. 204. National Research Council report on STEAM education.
- Sec. 205. Engaging Federal scientists and engineers in STEM education.

Subtitle B—Broadening Participation in STEM

- Sec. 211. Short title.
- Sec. 212. Purpose.
- Sec. 213. Federal science agency policies for caregivers.
- Sec. 214. Collection and reporting of data on Federal research grants.
- Sec. 215. Policies for review of Federal research grants.
- Sec. 216. Collection of data on demographics of faculty.

- Sec. 217. Cultural and institutional barriers to expanding the academic and Federal STEM workforce.
- Sec. 218. Research and dissemination at the National Science Foundation.
- Sec. 219. Report to Congress.
- Sec. 220. National Science Foundation support for increasing diversity among STEM faculty at institutions of higher education.
- Sec. 221. National Science Foundation support for broadening participation in undergraduate STEM education.
- Sec. 222. Definitions.

### TITLE III—NATIONAL SCIENCE FOUNDATION

#### Subtitle A—General Provisions

- Sec. 301. Authorization of appropriations.
- Sec. 302. Findings and sense of Congress on support for all fields of science and engineering.
- Sec. 303. National Science Foundation merit review.
- Sec. 304. Management and oversight of large facilities.
- Sec. 305. Support for potentially transformative research.
- Sec. 306. Strengthening institutional research partnerships.
- Sec. 307. Innovation Corps.
- Sec. 308. Definitions.

#### Subtitle B—STEM Education

- Sec. 321. National Science Board report on consolidation of STEM education activities at the Foundation.
- Sec. 322. Models for graduate student support.
- Sec. 323. Undergraduate STEM education reform.
- Sec. 324. Advanced manufacturing education.
- Sec. 325. STEM education partnerships.
- Sec. 326. Noyce scholarship program amendments.
- Sec. 327. Informal STEM education.
- Sec. 328. Research and development to support improved K–12 learning.

### TITLE IV—NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY

- Sec. 401. Short title.
- Sec. 402. Authorization of appropriations.
- Sec. 403. Hollings Manufacturing Extension Partnership.
- Sec. 404. National Academies review.
- Sec. 405. Improving NIST collaboration with other agencies.
- Sec. 406. Miscellaneous provisions.

### TITLE V—INNOVATION

- Sec. 501. Office of Innovation and Entrepreneurship.
- Sec. 502. Federal loan guarantees for innovative technologies in manufacturing.
- Sec. 503. Innovation voucher pilot program.
- Sec. 504. Federal Acceleration of State Technology Commercialization Pilot Program.

### TITLE VI—DEPARTMENT OF ENERGY

#### Subtitle A—Office of Science

Sec. 601. Short title.  
 Sec. 602. Definitions.  
 Sec. 603. Mission of the Office of Science.  
 Sec. 604. Basic energy sciences program.  
 Sec. 605. Biological and environmental research.  
 Sec. 606. Advanced scientific computing research program.  
 Sec. 607. Fusion energy research.  
 Sec. 608. High energy physics program.  
 Sec. 609. Nuclear physics program.  
 Sec. 610. Science laboratories infrastructure program.  
 Sec. 611. Authorization of appropriations.

#### Subtitle B—ARPA–E

Sec. 621. Short title.  
 Sec. 622. ARPA–E amendments.

#### Subtitle C—Energy Innovation

Sec. 641. Energy Innovation Hubs.  
 Sec. 642. Participation in the Innovation Corps program.  
 Sec. 643. Technology transfer.  
 Sec. 644. Funding competitiveness for institutions of higher education and other nonprofit institutions.  
 Sec. 645. Under Secretary for Science and Energy.  
 Sec. 646. Special hiring authority for scientific, engineering, and project management personnel.

1 **TITLE I—OSTP;**  
 2 **GOVERNMENTWIDE SCIENCE**  
 3 **Subtitle A—General Provisions**  
 4 **SEC. 101. FEDERAL RESEARCH AND DEVELOPMENT FUND-**  
 5 **ING.**

6 Congress finds the following:

- 7 (1) The predominant driver of gross domestic  
 8 product growth over the past half century has been  
 9 scientific and technological advancement.
- 10 (2) Investments in research and development  
 11 have also delivered significant benefits for national  
 12 security, health, energy security, education, and the  
 13 personal well-being of all Americans.

1           (3) Virtually every new technological product is  
2           traceable to a research discovery, often one pursued  
3           with no application in mind.

4           (4) Nondefense Federal research and develop-  
5           ment accounts for only 1.7 percent of the Federal  
6           budget. Federal basic research accounts for only 1  
7           percent of the budget.

8           (5) There is a deficit between what America is  
9           investing and what it should be investing to remain  
10          competitive, not only in research but in technology  
11          transfer, innovation, and job creation, thereby caus-  
12          ing America's highly successful science and tech-  
13          nology enterprise to atrophy.

14          (6) Many research and development initiatives,  
15          due to the long time periods required to achieve  
16          completion, have benefited from stable and predict-  
17          able investments and from multiyear financial plan-  
18          ning.

19          (7) The Federal science agencies should receive  
20          sustained and steady growth in funding for research  
21          and development activities, including basic research,  
22          across a wide range of disciplines, including physical,  
23          geological, and life sciences, mathematics, engineer-  
24          ing, and social, behavioral, and economic sciences.

1 **SEC. 102. NATIONAL SCIENCE AND TECHNOLOGY COUNCIL**  
2 **AMENDMENTS.**

3 Section 401 of the National Science and Technology  
4 Policy, Organization, and Priorities Act of 1977 (42  
5 U.S.C. 6651) is amended—

6 (1) in subsection (a), by striking “Federal Co-  
7 ordinating Council for Science, Engineering, and  
8 Technology” and inserting “National Science and  
9 Technology Council”;

10 (2) in subsection (b), by striking “and Energy  
11 Research and Development Administration” and in-  
12 serting “Department of Energy, and any other agen-  
13 cy designated by the President”; and

14 (3) in subsection (e)—

15 (A) by striking “engineering, and tech-  
16 nology” and inserting “engineering, technology,  
17 innovation, and STEM education”;

18 (B) in paragraph (1), by striking “engi-  
19 neering, and technological” and inserting “engi-  
20 neering, technological, innovation, and STEM  
21 education”;

22 (C) by redesignating paragraphs (3) and  
23 (4) as paragraphs (4) and (5), respectively; and

24 (D) by inserting after paragraph (2) the  
25 following new paragraph:

1           “(3) address research needs identified under  
2           paragraph (2) through appropriate funding mecha-  
3           nisms, which may include solicitations involving 2 or  
4           more agencies and public-private partnerships;”.

5   **SEC. 103. REVIEW OF FEDERAL REGULATIONS AND RE-**  
6           **PORTING REQUIREMENTS.**

7           (a) ESTABLISHMENT.—The Director of the Office of  
8   Science and Technology Policy shall establish or designate  
9   a working group under the National Science and Tech-  
10   nology Council with the responsibility of reviewing Federal  
11   regulatory and reporting requirements across Federal  
12   agencies that affect the conduct of United States research  
13   in an effort to reduce regulatory burdens and to eliminate  
14   and harmonize duplicative regulatory and reporting re-  
15   quirements.

16          (b) RESPONSIBILITIES.—The working group estab-  
17   lished or designated under subsection (a) shall—

18               (1) periodically review all Federal regulations  
19               and reporting requirements that affect the conduct  
20               of United States research to—

21                       (A) identify ways to harmonize overlapping  
22                       or duplicative research regulations and report-  
23                       ing requirements across Federal agencies;

24                       (B) evaluate such regulations and report-  
25                       ing requirements in relationship to the risks the

1 requirements seek to address to determine if  
2 the benefits of the requirements are commensu-  
3 rate with the costs to the progress of science or  
4 to the taxpayer;

5 (C) identify any regulations that are ap-  
6 plied to scientific researchers or to research-per-  
7 forming institutions for which exemptions could  
8 be reasonably applied or for which adjustments  
9 could be made to better fit those regulations to  
10 diverse research environments; and

11 (D) identify any specific regulations which  
12 could be refocused on performance-based goals  
13 rather than on process while still meeting the  
14 desired outcome;

15 (2) examine the extent to which agencies' guid-  
16 ance documents adhere with the most recently up-  
17 dated version of the Office of Management and  
18 Budget's Agency Good Guidance Practices bulletin;  
19 and

20 (3) develop and update at least once every 3  
21 years a strategic plan for streamlining Federal regu-  
22 lations and reporting requirements that affect the  
23 conduct of United States research that contains, at  
24 a minimum—



1 (A) a priority list of research-related regu-  
2 lations, reporting requirements, and agency  
3 guidance to be harmonized, streamlined, up-  
4 dated, or eliminated; and

5 (B) a plan, including a timeline, for imple-  
6 menting the regulatory and reporting reforms  
7 identified in subparagraph (A).

8 (c) STAKEHOLDER INPUT.—In carrying out the re-  
9 sponsibilities under subsection (b), including the develop-  
10 ment of the strategic plan under subsection (b)(3), the  
11 working group established or designated under subsection  
12 (a) shall take into account input and recommendations  
13 from non-Federal stakeholders, including federally funded  
14 and nonfederally funded researchers, institutions of higher  
15 education, scientific disciplinary societies and associations,  
16 nonprofit research institutions, industry, including small  
17 businesses, federally funded research and development  
18 centers, and others with a stake in ensuring effectiveness,  
19 efficiency, and accountability in the performance of sci-  
20 entific research.

21 (d) RESPONSIBILITIES OF OSTP.—The Director of  
22 the Office of Science and Technology Policy, in collabora-  
23 tion with the Office of Management and Budget Office  
24 of Information and Regulatory Affairs, shall encourage  
25 and monitor the efforts of the participating agencies to

1 ensure that the strategic plan is developed under sub-  
 2 section (b)(3) and that appropriate steps are taken by the  
 3 agencies to effectively implement the recommendations,  
 4 achieve the objectives, and to adhere to the timeline in  
 5 the strategic plan.

6 (e) REPORT.—Not later than 1 year after the date  
 7 of enactment of this Act, the Director of the Office of  
 8 Science and Technology Policy shall transmit the priority  
 9 list and strategic plan developed under subsection (b)(3)  
 10 to the Congress. The Director shall further provide a re-  
 11 port annually to the Congress, to be submitted not later  
 12 than 60 days after the submission of the President’s an-  
 13 nual budget request, on the progress toward implementa-  
 14 tion of the regulatory reforms outlined in the strategic  
 15 plan.

16 **SEC. 104. AMENDMENTS TO PRIZE COMPETITIONS.**

17 Section 24 of the Stevenson-Wydler Technology Inno-  
 18 vation Act of 1980 (15 U.S.C. 3719) is amended—

19 (1) in subsection (c)—

20 (A) by inserting “competition” after “sec-  
 21 tion, a prize”;

22 (B) by inserting “types” after “following”;  
 23 and

24 (C) in paragraph (4), by striking “prizes”  
 25 and inserting “prize competitions”;

1 (2) in subsection (f)—

2 (A) by striking “in the Federal Register”  
3 and inserting “on a publicly accessible Govern-  
4 ment website, such as [www.challenge.gov](http://www.challenge.gov),”; and

5 (B) in paragraph (4), by striking “prize”  
6 and inserting “cash prize purse”;

7 (3) in subsection (g), by striking “prize” and  
8 inserting “cash prize purse”;

9 (4) in subsection (h), by inserting “prize” be-  
10 fore “competition” both places it appears;

11 (5) in subsection (i)—

12 (A) in paragraph (1)(B), by inserting  
13 “prize” before “competition”;

14 (B) in paragraph (2)(A), by inserting  
15 “prize” before “competition” both places it ap-  
16 pears;

17 (C) by redesignating paragraph (3) as  
18 paragraph (4); and

19 (D) by inserting after paragraph (2) the  
20 following new paragraph:

21 “(3) WAIVER.—An agency may waive the re-  
22 quirement under paragraph (2). The annual report  
23 under subsection (p) shall include a list of such  
24 waivers granted during the preceding fiscal year,

1 along with an explanation of the reasons for grant-  
2 ing the waivers.”;

3 (6) in subsection (j) by amending paragraph (2)  
4 to read as follows:

5 “(2) INTELLECTUAL PROPERTY.—

6 “(A) LICENSES.—The Federal Government  
7 may negotiate a license for the use of intellec-  
8 tual property developed by a participant for a  
9 prize competition.

10 “(B) OTHER CONDITIONS.—A Federal  
11 agency or agencies in cooperation may require  
12 participants to agree in advance to a specific  
13 approach to intellectual property as a condition  
14 for eligibility to participate in a prize competi-  
15 tion.”;

16 (7) in subsection (k)—

17 (A) in paragraph (2)(A), by inserting  
18 “prize” before “competition”; and

19 (B) in paragraph (3), by inserting “prize”  
20 before “competitions” both places it appears;

21 (8) in subsection (l), by striking all after “may  
22 enter into” and inserting “a grant, contract, cooper-  
23 ative agreement, or other agreement with a private  
24 sector for-profit or nonprofit entity to administer the

1 prize competition, subject to the provisions of this  
2 section.”;

3 (9) in subsection (m)—

4 (A) by amending paragraph (1) to read as  
5 follows:

6 “(1) IN GENERAL.—Support for a prize com-  
7 petition under this section, including financial sup-  
8 port for the design and administration of a prize  
9 competition or funds for a cash prize purse, may  
10 consist of Federal appropriated funds and funds  
11 provided by private sector for-profit and nonprofit  
12 entities. The head of an agency may accept funds  
13 from other Federal agencies, private sector for-profit  
14 entities, and nonprofit entities to support such prize  
15 competitions. The head of an agency may not give  
16 any special consideration to any private sector for-  
17 profit or nonprofit entity in return for a donation.”;

18 (B) in paragraph (2), by striking “prize  
19 awards” and inserting “cash prize purses”;

20 (C) in paragraph (3)(A)—

21 (i) by striking “No prize” and insert-  
22 ing “No prize competition”; and

23 (ii) by striking “the prize” and insert-  
24 ing “the cash prize purse”;

1 (D) in paragraph (3)(B), by striking “a  
2 prize” and inserting “a cash prize purse”;

3 (E) in paragraph (3)(B)(i), by inserting  
4 “competition” after “prize”;

5 (F) in paragraph (4)(A), by striking “a  
6 prize” and inserting “a cash prize purse”; and

7 (G) in paragraph (4)(B), by striking “cash  
8 prizes” and inserting “cash prize purses”;

9 (10) in subsection (n), by inserting “for both  
10 for-profit and nonprofit entities,” after “contract ve-  
11 hicle”;

12 (11) in subsection (o)(1), by striking “or pro-  
13 viding a prize” and insert “a prize competition or  
14 providing a cash prize purse”; and

15 (12) in subsection (p)—

16 (A) in the heading, by striking “ANNUAL  
17 REPORT” and inserting “BIENNIAL REPORT”;

18 (B) in paragraph (1)—

19 (i) by striking “of each year” and in-  
20 serting “of each odd-numbered year”; and

21 (ii) by striking “preceding fiscal year”  
22 and inserting “preceding 2 fiscal years”;

23 and

24 (C) in paragraph (2)—

1 (i) in subparagraph (C), by striking  
2 “cash prizes” both places it occurs and in-  
3 serting “cash prize purses”; and

4 (ii) by adding at the end the following  
5 new subparagraph:

6 “(G) PLAN.—A description of crosscutting  
7 topical areas and agency-specific mission needs  
8 that may be the strongest opportunities for  
9 prize competitions during the upcoming 2 fiscal  
10 years.”.

11 **SEC. 105. COORDINATION OF INTERNATIONAL SCIENCE**  
12 **AND TECHNOLOGY PARTNERSHIPS.**

13 (a) **SHORT TITLE.**—This section may be cited as the  
14 “International Science and Technology Cooperation Act of  
15 2015”.

16 (b) **ESTABLISHMENT.**—The Director of the Office of  
17 Science and Technology Policy shall establish a body  
18 under the National Science and Technology Council  
19 (NSTC) with the responsibility to identify and coordinate  
20 international science and technology cooperation that can  
21 strengthen the United States science and technology en-  
22 terprise, improve economic and national security, and sup-  
23 port United States foreign policy goals.

24 (c) **NSTC BODY LEADERSHIP.**—The body estab-  
25 lished under subsection (b) shall be co-chaired by senior

1 level officials from the Office of Science and Technology  
2 Policy and the Department of State.

3 (d) RESPONSIBILITIES.—The body established under  
4 subsection (b) shall—

5 (1) plan and coordinate interagency inter-  
6 national science and technology cooperative research  
7 and training activities and partnerships supported or  
8 managed by Federal agencies and work with other  
9 National Science and Technology Council commit-  
10 tees to help plan and coordinate the international  
11 component of national science and technology prior-  
12 ities;

13 (2) establish Federal priorities and policies for  
14 aligning, as appropriate, international science and  
15 technology cooperative research and training activi-  
16 ties and partnerships supported or managed by Fed-  
17 eral agencies with the foreign policy goals of the  
18 United States;

19 (3) identify opportunities for new international  
20 science and technology cooperative research and  
21 training partnerships that advance both the science  
22 and technology and the foreign policy priorities of  
23 the United States;

24 (4) in carrying out paragraph (3), solicit input  
25 and recommendations from non-Federal science and



1 technology stakeholders, including universities, sci-  
2 entific and professional societies, industry, and rel-  
3 evant organizations and institutions; and

4 (5) identify broad issues that influence the abil-  
5 ity of United States scientists and engineers to col-  
6 laborate with foreign counterparts, including bar-  
7 riers to collaboration and access to scientific infor-  
8 mation.

9 (e) REPORT TO CONGRESS.—The Director of the Of-  
10 fice of Science and Technology Policy shall transmit a re-  
11 port, to be updated annually, to the Committee on Science,  
12 Space, and Technology and the Committee on Foreign Af-  
13 fairs of the House of Representatives, and to the Com-  
14 mittee on Commerce, Science, and Transportation and the  
15 Committee on Foreign Relations of the Senate. The report  
16 shall also be made available to the public on the reporting  
17 agency's website. The report shall contain a description  
18 of—

19 (1) the priorities and policies established under  
20 subsection (d)(2);

21 (2) the ongoing and new partnerships estab-  
22 lished since the last update to the report;

23 (3) the means by which stakeholder input was  
24 received, as well as summary views of stakeholder  
25 input; and

1           (4) the issues influencing the ability of United  
2       States scientists and engineers to collaborate with  
3       foreign counterparts.

4   **SEC. 106. SCIENTIFIC AND TECHNICAL CONFERENCES.**

5       (a) FINDINGS.—Congress finds the following:

6           (1) Cooperative research and development ac-  
7       tivities, including collaboration between domestic and  
8       international government, industry, and academic  
9       science and engineering organizations, are important  
10      to promoting innovation and knowledge creation.

11          (2) Scientific and technical conferences and  
12      trade events support the sharing of information,  
13      processes, and data within the scientific and engi-  
14      neering communities.

15          (3) In hosting and attending scientific and tech-  
16      nical conferences and trade events, Federal agen-  
17      cies—

18              (A) gain greater access to top researchers  
19              and to new and potentially transformative  
20              ideas;

21              (B) keep abreast of developments relevant  
22              to their respective missions, as is relevant for  
23              future program planning;

24              (C) help disseminate Federal research re-  
25              sults;

1           (D) provide opportunities both for em-  
2           ployee professional development and for recruit-  
3           ing new employees;

4           (E) participate in scientific peer review;  
5           and

6           (F) support the reputation, visibility, and  
7           leadership both of the specific agency and of  
8           the United States.

9           (4) For those Federal agencies that provide fi-  
10          nancial support for external research and develop-  
11          ment activities, participation in scientific and tech-  
12          nical conferences can help ensure that funds are di-  
13          rected toward the most promising ideas, thereby  
14          maximizing the Federal investment.

15          (b) POLICY.—To the extent practicable given budget,  
16          security, and other constraints, the National Science  
17          Foundation, the National Institute of Standards and  
18          Technology, and the Department of Energy, in addition  
19          to the National Aeronautics and Space Administration,  
20          should support Federal employee and contractor attend-  
21          ance at scientific and technical conferences and trade  
22          events as relevant both to employee and contractor duties  
23          and to the agency’s mission.

24          (c) OVERSIGHT.—Consistent with other relevant law,  
25          the Federal agencies, through appropriate oversight, shall

1 aim to minimize the costs to the Federal Government re-  
2 lated to conference and trade event attendance, through  
3 methods such as—

4 (1) ensuring that related fees collected by the  
5 Federal agency help offset total costs to the Federal  
6 Government;

7 (2) developing or maintaining procedures for in-  
8 vestigating unexpected increases in related costs;  
9 and

10 (3) strengthening policies and training relevant  
11 to conference and trade event planning and partici-  
12 pation.

13 **Subtitle B—Reauthorization of the**  
14 **National Nanotechnology Initiative**

15 **SEC. 111. SHORT TITLE.**

16 This subtitle may be cited as the “National Nano-  
17 technology Initiative Amendments Act of 2015”.

18 **SEC. 112. NATIONAL NANOTECHNOLOGY PROGRAM AMEND-**  
19 **MENTS.**

20 The 21st Century Nanotechnology Research and De-  
21 velopment Act (15 U.S.C. 7501 et seq.) is amended—

22 (1) in section 2—

23 (A) in subsection (c), by amending para-  
24 graph (4) to read as follows:

1 “(4) develop, and update every 3 years there-  
2 after, a strategic plan to guide the activities de-  
3 scribed under subsection (b) that specifies near-term  
4 and long-term objectives for the Program, the antici-  
5 pated timeframe for achieving the near-term objec-  
6 tives, and the metrics to be used for assessing  
7 progress toward the objectives, and that describes—

8 “(A) how the Program will move results  
9 out of the laboratory and into applications for  
10 the benefit of society, including through co-  
11 operation and collaborations with nanotechnol-  
12 ogy research, development, and technology tran-  
13 sition initiatives supported by the States; and

14 “(B) proposed research in areas of na-  
15 tional importance in accordance with the re-  
16 quirements of section 116 of the National  
17 Nanotechnology Initiative Amendments Act of  
18 2015;”;

19 (B) in subsection (d)—

20 (i) by redesignating paragraphs (1)  
21 through (5) as paragraphs (2) through (6),  
22 respectively;

23 (ii) by inserting before paragraph (2),  
24 as redesignated by clause (i), the following:

1 “(1) the Program budget, for the previous fiscal  
2 year, for each agency that participates in the Pro-  
3 gram, and for each program component area;”; and

4 (iii) by amending paragraph (6), as  
5 redesignated by clause (i), to read as fol-  
6 lows:

7 “(6) an assessment of how Federal agencies are  
8 implementing the plan described in subsection (c)(7)  
9 and a description of the amount of Small Business  
10 Innovative Research and Small Business Technology  
11 Transfer Research funds supporting the plan.”; and

12 (C) by adding at the end the following new  
13 subsection:

14 “(e) STANDARDS SETTING.—The agencies partici-  
15 pating in the Program shall support the activities of com-  
16 mittees involved in the development of standards for nano-  
17 technology and may reimburse the travel costs of scientists  
18 and engineers who participate in activities of such commit-  
19 tees.”;

20 (2) in section 3—

21 (A) by amending subsection (b)(1) to read  
22 as follows:

23 “(b) FUNDING.—

24 “(1) IN GENERAL.—The operation of the Na-  
25 tional Nanotechnology Coordination Office shall be

1 supported by funds from each agency participating  
2 in the Program.

3 “(2) PROPORTION.—The portion of such Of-  
4 fice’s total budget provided by each agency for each  
5 fiscal year shall be in the same proportion as the  
6 agency’s share of the total budget for the Program  
7 for the previous fiscal year, as specified in the report  
8 required under section 2(d)(1).

9 “(3) EXCEPTION.—The Director of the Na-  
10 tional Nanotechnology Coordination Office may es-  
11 tablish a minimum contribution or other exception to  
12 the requirement in paragraph (2) for participating  
13 agencies whose share of the total budget for the Pro-  
14 gram is below a threshold level, to be set by the Di-  
15 rector.”; and

16 (B) by adding at the end the following new  
17 subsection:

18 “(d) PUBLIC INFORMATION.—

19 “(1) DATABASE.—

20 “(A) IN GENERAL.—The National Nano-  
21 technology Coordination Office shall develop  
22 and maintain a database accessible by the pub-  
23 lic of projects funded under at least the Envi-  
24 ronmental, Health, and Safety program compo-  
25 nent area, or any successor program component

1 area, including, to the extent practicable, a de-  
2 scription of each project, its source of funding  
3 by agency, and its funding history.

4 “(B) ORGANIZATION.—Projects shall be  
5 grouped by major objective as defined by the re-  
6 search plan required under section 113(b) of  
7 the National Nanotechnology Initiative Amend-  
8 ments Act of 2015.

9 “(2) ACCESSIBLE FACILITIES.—

10 “(A) IN GENERAL.—The National Nano-  
11 technology Coordination Office shall develop,  
12 maintain, and publicize information on nano-  
13 technology facilities supported under the Pro-  
14 gram, and may include information on nano-  
15 technology facilities supported by the States,  
16 that are accessible for use by individuals from  
17 academic institutions and from industry.

18 “(B) WEBSITES.—The National Nanotech-  
19 nology Coordination Office shall maintain active  
20 web links to the websites for each of these fa-  
21 cilities and shall work with each facility sup-  
22 ported under the Program to ensure that each  
23 facility publishes on its respective website up-  
24 dated information on the terms and conditions  
25 for the use of the facility, a description of the



1 capabilities of the instruments and equipment  
2 available for use at the facility, and a descrip-  
3 tion of the technical support available to assist  
4 users of the facility.”;

5 (3) in section 4—

6 (A) in subsection (a), by adding at the end  
7 the following: “The co-chairs of the Advisory  
8 Panel shall meet the qualifications of Panel  
9 membership required in subsection (b) and may  
10 be members of the President’s Council of Advi-  
11 sors on Science and Technology. The Advisory  
12 Panel shall include members having specific  
13 qualifications tailored to enable it to carry out  
14 the requirements of subsection (c)(6).”;

15 (B) in subsection (c)—

16 (i) by striking paragraph (1); and

17 (ii) by redesignating paragraphs (2)  
18 through (7) as paragraphs (1) through (6),  
19 respectively; and

20 (C) by amending subsection (d) to read as

21 follows:

22 “(d) REPORTS.—The Advisory Panel shall report not

23 less frequently than every 3 years, and, to the extent prac-

24 ticable, 1 year following each of the National Research

25 Council triennial reviews required under section 5, to the

1 President on its assessments under subsection (c) and its  
 2 recommendations for ways to improve the Program. The  
 3 Director of the Office of Science and Technology Policy  
 4 shall transmit a copy of each report under this subsection  
 5 to the Committee on Commerce, Science, and Transpor-  
 6 tation of the Senate, the Committee on Science, Space,  
 7 and Technology of the House of Representatives, and  
 8 other appropriate committees of the Congress.”;

9 (4) by amending section 5 to read as follows:

10 **“SEC. 5. TRIENNIAL EXTERNAL REVIEW OF THE NATIONAL**  
 11 **NANOTECHNOLOGY PROGRAM.**

12 “(a) IN GENERAL.—The Director of the National  
 13 Nanotechnology Coordination Office shall enter into an ar-  
 14 rangement with the National Research Council of the Na-  
 15 tional Academy of Sciences to conduct a triennial review  
 16 of the Program. The Director shall ensure that the ar-  
 17 rangement with the National Research Council is con-  
 18 cluded in order to allow sufficient time for the reporting  
 19 requirements of subsection (b) to be satisfied. Each tri-  
 20 ennial review shall include an evaluation of the—

21 “(1) research priorities and technical content of  
 22 the Program, including whether the balance of fund-  
 23 ing among program component areas, as designated  
 24 according to section 2(c)(2), is appropriate;

1           “(2) Program’s scientific and technological ac-  
2           complishments and its success in transferring tech-  
3           nology to the private sector; and

4           “(3) adequacy of the Program’s activities ad-  
5           dressing ethical, legal, environmental, and other ap-  
6           propriate societal concerns, including human health  
7           concerns.

8           “(b) PRIORITY REPORTS.—If the Director of the Na-  
9           tional Nanotechnology Coordination Office, working with  
10          the National Research Council and with input from the  
11          Advisory Panel, determines that a more narrowly focused  
12          review of the Program is in the best interests of the Pro-  
13          gram, the Director may enter into such an arrangement  
14          with the National Research Council in lieu of a full review  
15          as required under subsection (a), but not more often than  
16          every second triennial review.

17          “(c) EVALUATION TO BE TRANSMITTED TO CON-  
18          GRESS.—The National Research Council shall document  
19          the results of each triennial review carried out in accord-  
20          ance with this section in a report that includes any rec-  
21          ommendations for changes to the Program’s objectives,  
22          technical content, or other policy or Program changes.  
23          Each report shall be submitted to the Director of the Na-  
24          tional Nanotechnology Coordination Office, who shall  
25          transmit it to the Advisory Panel, the Committee on Com-

1 merce, Science, and Transportation of the Senate, and the  
2 Committee on Science, Space, and Technology of the  
3 House of Representatives.”; and

4 (5) in section 10—

5 (A) by amending paragraph (2) to read as  
6 follows:

7 “(2) NANOTECHNOLOGY.—The term ‘nanotech-  
8 nology’ means the science and technology that will  
9 enable one to understand, measure, model, image,  
10 manipulate, and manufacture at the nanoscale,  
11 aimed at creating materials, devices, and systems  
12 with fundamentally new properties or functions.”;  
13 and

14 (B) by adding at the end the following new  
15 paragraph:

16 “(7) NANOSCALE.—The term ‘nanoscale’ means  
17 one or more dimensions of between approximately 1  
18 and 100 nanometers.”.

19 **SEC. 113. SOCIETAL DIMENSIONS OF NANOTECHNOLOGY.**

20 (a) COORDINATOR FOR ENVIRONMENTAL, HEALTH,  
21 AND SAFETY RESEARCH.—The Director of the Office of  
22 Science and Technology Policy shall designate an associate  
23 director of the Office of Science and Technology Policy  
24 or other appropriate senior government official as the Co-  
25 ordinator for Environmental, Health, and Safety Re-

1 search. The Coordinator shall be responsible for oversight  
2 of the coordination, planning, and budget prioritization of  
3 research and other activities related to environmental,  
4 health, safety, and other appropriate societal concerns re-  
5 lated to nanotechnology. The responsibilities of the Coor-  
6 dinator shall include—

7           (1) ensuring that a research plan for the envi-  
8           ronmental, health, and safety research activities re-  
9           quired under subsection (b) is developed, updated,  
10          and implemented and that the plan is responsive to  
11          the recommendations of the Advisory Panel estab-  
12          lished under section 4(a) of the 21st Century Nano-  
13          technology Research and Development Act (15  
14          U.S.C. 7503(a)); and

15          (2) encouraging and monitoring the efforts of  
16          the agencies participating in the Program to allocate  
17          the level of resources and management attention  
18          necessary to ensure that the environmental, health,  
19          safety, and other appropriate societal concerns re-  
20          lated to nanotechnology are addressed under the  
21          Program.

22          (b) RESEARCH PLAN.—

23                (1) IN GENERAL.—The Coordinator for Envi-  
24                ronmental, Health, and Safety Research shall con-  
25                vene and chair a panel comprised of representatives

1 from the agencies funding research activities under  
2 the Environmental, Health, and Safety program  
3 component area of the Program, or any successor  
4 program component area, and from such other agen-  
5 cies as the Coordinator considers necessary to de-  
6 velop, periodically update, and coordinate the imple-  
7 mentation of a research plan for this program com-  
8 ponent area. Such panel may be a subgroup of the  
9 Nanoscale Science, Engineering, and Technology  
10 Subcommittee of the National Science and Tech-  
11 nology Council. In developing and updating the plan,  
12 the panel convened by the Coordinator shall solicit  
13 and be responsive to recommendations and advice  
14 from—

15 (A) the Advisory Panel established under  
16 section 4(a) of the 21st Century Nanotechnol-  
17 ogy Research and Development Act (15 U.S.C.  
18 7503(a)); and

19 (B) the agencies responsible for environ-  
20 mental, health, and safety regulations associ-  
21 ated with the production, use, and disposal of  
22 nanoscale materials and products.

23 (2) DEVELOPMENT OF STANDARDS.—The plan  
24 required under paragraph (1) shall include a de-

1 description of how the Program will help to ensure the  
2 development of—

3 (A) standards related to nomenclature as-  
4 sociated with engineered nanoscale materials;

5 (B) engineered nanoscale standard ref-  
6 erence materials for environmental, health, and  
7 safety testing; and

8 (C) standards related to methods and pro-  
9 cedures for detecting, measuring, monitoring,  
10 sampling, and testing engineered nanoscale ma-  
11 terials for environmental, health, and safety im-  
12 pacts.

13 (3) COMPONENTS OF PLAN.—The plan required  
14 under paragraph (1) shall, with respect to activities  
15 described in paragraphs (1) and (2)—

16 (A) specify near-term research objectives  
17 and long-term research objectives;

18 (B) specify milestones associated with each  
19 near-term objective and the estimated time and  
20 resources required to reach each milestone;

21 (C) with respect to subparagraphs (A) and  
22 (B), describe the role of each agency carrying  
23 out or sponsoring research in order to meet the  
24 objectives specified under subparagraph (A) and

1 to achieve the milestones specified under sub-  
2 paragraph (B); and

3 (D) specify the funding allocated to each  
4 major objective of the plan and the source of  
5 funding by agency for the current fiscal year.

6 (4) TRANSMITTAL TO CONGRESS.—Not later  
7 than 6 months after the date of enactment of this  
8 Act, the plan required under paragraph (1) shall be  
9 transmitted to the Committee on Commerce,  
10 Science, and Transportation of the Senate and the  
11 Committee on Science, Space, and Technology of the  
12 House of Representatives.

13 (5) UPDATING AND APPENDING TO REPORT.—  
14 The plan required under paragraph (1) shall be up-  
15 dated at least every 3 years and may be submitted  
16 as part of the report required under section 2(c)(4)  
17 of the 21st Century Nanotechnology Research and  
18 Development Act (15 U.S.C. 7501(c)(4)).

19 **SEC. 114. NANOTECHNOLOGY EDUCATION.**

20 (a) UNDERGRADUATE EDUCATION PROGRAMS.—The  
21 Program shall support efforts to introduce nanoscale  
22 science, engineering, and technology into undergraduate  
23 science and engineering education through a variety of  
24 interdisciplinary approaches. Activities supported may in-  
25 clude—



- 1           (1) development of courses of instruction or  
2       modules to existing courses;
- 3           (2) faculty professional development; and
- 4           (3) acquisition of equipment and instrumenta-  
5       tion suitable for undergraduate education and re-  
6       search in nanotechnology.

7       (b) INTERAGENCY COORDINATION OF EDUCATION.—  
8       The Committee established under section 2(c) of the 21st  
9       Century Nanotechnology Research and Development Act  
10      (15 U.S.C. 7501(c)) shall coordinate, as appropriate, with  
11      the Committee established under section 101 of the Amer-  
12      ica COMPETES Reauthorization Act of 2010 (42 U.S.C.  
13      6621) to prioritize, plan, and assess the educational activi-  
14      ties supported under the Program.

15      (c) SOCIETAL DIMENSIONS IN NANOTECHNOLOGY  
16      EDUCATION ACTIVITIES.—Activities supported under the  
17      Education and Societal Dimensions program component  
18      area, or any successor program component area, that in-  
19      volve informal, precollege, or undergraduate nanotechnol-  
20      ogy education shall include education regarding the envi-  
21      ronmental, health and safety, and other societal aspects  
22      of nanotechnology.

23      (d) REMOTE ACCESS TO NANOTECHNOLOGY FACILI-  
24      TIES.—

1           (1) IN GENERAL.—Agencies supporting nano-  
2           technology research facilities as part of the Program  
3           shall require the entities that operate such facilities  
4           to allow access via the Internet, and support the  
5           costs associated with the provision of such access, by  
6           secondary school students and teachers, to instru-  
7           ments and equipment within such facilities for edu-  
8           cational purposes. The agencies may waive this re-  
9           quirement for cases when particular facilities would  
10          be inappropriate for educational purposes or the  
11          costs for providing such access would be prohibitive.

12          (2) PROCEDURES.—The agencies identified in  
13          paragraph (1) shall require the entities that operate  
14          such nanotechnology research facilities to establish  
15          and publish procedures, guidelines, and conditions  
16          for the submission and approval of applications for  
17          the use of the facilities for the purpose identified in  
18          paragraph (1) and shall authorize personnel who op-  
19          erate the facilities to provide necessary technical  
20          support to students and teachers.

21 **SEC. 115. TECHNOLOGY TRANSFER.**

22          (a) PROTOTYPING.—

23               (1) ACCESS TO FACILITIES.—In accordance  
24               with section 2(b)(7) of 21st Century Nanotechnology  
25               Research and Development Act (15 U.S.C.

1       7501(b)(7)), the agencies supporting nanotechnology  
2       research facilities as part of the Program shall pro-  
3       vide access to such facilities to companies for the  
4       purpose of assisting the companies in the develop-  
5       ment of prototypes of nanoscale products, devices, or  
6       processes (or products, devices, or processes enabled  
7       by nanotechnology) for determining proof of concept.  
8       The agencies shall publicize the availability of these  
9       facilities and encourage their use by companies as  
10      provided for in this section. The agencies may waive  
11      this requirement for academic facilities for which the  
12      costs of providing such access would be prohibitive.

13           (2) PROCEDURES.—The agencies identified in  
14      paragraph (1)—

15           (A) shall establish and publish procedures,  
16           guidelines, and conditions for the submission  
17           and approval of applications for use of nano-  
18           technology facilities;

19           (B) shall publish descriptions of the capa-  
20           bilities of facilities available for use under this  
21           subsection, including the availability of tech-  
22           nical support; and

23           (C) may waive recovery, require full recov-  
24           ery, or require partial recovery of the costs as-

1           sociated with use of the facilities for projects  
2           under this subsection.

3           (3) SELECTION AND CRITERIA.—

4                   (A) IN GENERAL.—In cases when less than  
5           full cost recovery is required pursuant to para-  
6           graph (2)(C), projects provided access to nano-  
7           technology facilities in accordance with this sub-  
8           section shall be selected through a competitive,  
9           merit-based process, and the criteria for the se-  
10          lection of such projects shall include at a min-  
11          imum the readiness of the project for tech-  
12          nology demonstration.

13                   (B) SPECIAL CONSIDERATION.—The agen-  
14          cies may give special consideration in selecting  
15          projects to applications that are relevant to im-  
16          portant national needs or requirements.

17          (b) COLLABORATION WITH INDUSTRY.—The Pro-  
18          gram shall coordinate with industry from all industrial  
19          sectors that would benefit from applications of nanotech-  
20          nology by—

21                   (1) enhancing communication of information re-  
22          lated to nanotechnology innovation, including infor-  
23          mation about research, education and training, man-  
24          ufacturing issues, and market-driven needs;

1           (2) advancing and accelerating the creation of  
2           new products and manufacturing processes derived  
3           from discovery at the nanoscale by working with in-  
4           dustry, including small- and medium-sized manufac-  
5           turers;

6           (3) developing innovative methods for transfer-  
7           ring nanotechnology products and processes from  
8           Federal agencies to industry; and

9           (4) facilitating industry-led partnerships be-  
10          tween the Program and industry sectors, including  
11          regional partnerships.

12          (c) COORDINATION WITH STATE, REGIONAL, AND  
13          LOCAL INITIATIVES.—Section 2(b)(5) of the 21st Century  
14          Nanotechnology Research and Development Act (15  
15          U.S.C. 7501(b)(5)) is amended to read as follows:

16               “(5) ensuring United States global leadership in  
17               the development and application of nanotechnology,  
18               including through the coordination and leveraging of  
19               Federal investments with nanotechnology research,  
20               development, and technology transition initiatives  
21               supported by the States and regions across the coun-  
22               try;”.

1   **SEC. 116. SIGNATURE INITIATIVES IN AREAS OF NATIONAL**  
2                   **IMPORTANCE.**

3           (a) IN GENERAL.—The Program shall include sup-  
4   port for nanotechnology research and development activi-  
5   ties directed toward topical and application areas that  
6   have the potential for significant contributions to national  
7   economic competitiveness and for other significant societal  
8   benefits. The activities supported shall be designed to ad-  
9   vance the development of research discoveries by dem-  
10  onstrating technical solutions to important national chal-  
11  lenges. The Advisory Panel shall make recommendations  
12  to the Program for candidate research and development  
13  areas for support under this section.

14           (b) CHARACTERISTICS.—

15               (1) IN GENERAL.—Research and development  
16   activities under this section shall—

17                   (A) include projects selected on the basis  
18                   of applications for support through a competi-  
19                   tive, merit-based process;

20                   (B) involve collaborations among research-  
21                   ers in academic institutions and industry, and  
22                   may involve nonprofit research institutions and  
23                   Federal laboratories, as appropriate;

24                   (C) when possible, leverage Federal invest-  
25                   ments through collaboration with related State  
26                   initiatives; and

1 (D) include a plan for fostering the trans-  
2 fer of research discoveries and the results of  
3 technology demonstration activities to industry  
4 for commercial development.

5 (2) JOINT SOLICITATIONS.—Projects supported  
6 under this section shall include projects for which  
7 determination of the requirements for applications,  
8 review and selection of applications for support, and  
9 subsequent funding of projects shall be carried out  
10 by a collaboration of no fewer than 2 agencies par-  
11 ticipating in the Program. In selecting applications  
12 for support, agencies may, as appropriate, give spe-  
13 cial consideration to projects that include cost shar-  
14 ing from non-Federal sources.

15 (3) INTERDISCIPLINARY RESEARCH CENTERS.—  
16 Research and development activities under this sec-  
17 tion may be supported through interdisciplinary  
18 nanotechnology research centers, as authorized by  
19 section 2(b)(4) of the 21st Century Nanotechnology  
20 Research and Development Act (15 U.S.C.  
21 7501(b)(4)), that are organized to investigate basic  
22 research questions and carry out technology dem-  
23 onstration activities in areas such as those identified  
24 in subsection (a).

1 (c) REPORT.—Reports required under section 2(d) of  
2 the 21st Century Nanotechnology Research and Develop-  
3 ment Act (15 U.S.C. 7501(d)) shall include a description  
4 of research and development areas supported in accord-  
5 ance with this section.

6 **SEC. 117. NANOMANUFACTURING RESEARCH.**

7 (a) RESEARCH AREAS.—The Program shall include  
8 research on—

9 (1) the development of instrumentation and  
10 tools required for the rapid characterization of  
11 nanoscale materials and for monitoring of nanoscale  
12 manufacturing processes; and

13 (2) approaches and techniques for scaling the  
14 synthesis of new nanoscale materials to achieve in-  
15 dustrial-level production rates.

16 (b) GREEN NANOTECHNOLOGY.—Interdisciplinary  
17 research centers supported under the Program in accord-  
18 ance with section 2(b)(4) of the 21st Century Nanotech-  
19 nology Research and Development Act (15 U.S.C.  
20 7501(b)(4)) that are focused on nanomanufacturing re-  
21 search shall include as part of the activities of such cen-  
22 ters—

23 (1) research on methods and approaches to de-  
24 velop environmentally benign nanoscale products and  
25 nanoscale manufacturing processes, taking into con-



1       sideration relevant findings and results of research  
2       supported under the Environmental, Health, and  
3       Safety program component area, or any successor  
4       program component area;

5               (2) fostering the transfer of the results of such  
6       research to industry; and

7               (3) providing for the education of scientists and  
8       engineers through interdisciplinary studies in the  
9       principles and techniques for the design and develop-  
10      ment of environmentally benign nanoscale products  
11      and processes.

12 **SEC. 118. DEFINITIONS.**

13       In this subtitle, terms that are defined in section 10  
14      of the 21st Century Nanotechnology Research and Devel-  
15      opment Act (15 U.S.C. 7509) have the meaning given  
16      those terms in that section.

17       **Subtitle C—Engineering Biology**

18 **SEC. 121. SHORT TITLE.**

19       This subtitle may be cited as the “Engineering Biol-  
20      ogy Research and Development Act of 2015”.

21 **SEC. 122. FINDINGS.**

22       The Congress makes the following findings:

23               (1) Cellular and molecular processes may be  
24      used, mimicked, or redesigned to develop new prod-  
25      ucts, processes, and systems that improve societal

1 well-being, strengthen national security, and con-  
2 tribute to the economy.

3 (2) Engineering biology relies on scientists and  
4 engineers with a diverse and unique set of skills  
5 combining the biological, physical, and information  
6 sciences and engineering.

7 (3) Long-term research and development is nec-  
8 essary to create breakthroughs in engineering biol-  
9 ogy. Such research and development requires govern-  
10 ment investment as the benefits are too distant or  
11 uncertain for industry to support alone.

12 (4) The Federal Government can play an im-  
13 portant role by facilitating the development of tools  
14 and technologies to further advance engineering biol-  
15 ogy, including multiple user facilities that the Fed-  
16 eral Government is uniquely able to support.

17 (5) Since other countries are investing signifi-  
18 cant resources in engineering biology, the United  
19 States is at risk of losing its competitive lead in this  
20 emerging area if it does not invest the necessary re-  
21 sources and have a national strategy.

22 (6) A National Engineering Biology Initiative  
23 can serve to establish new research directions and  
24 technology goals, improve interagency coordination  
25 and planning processes, drive technology transfer,

1 and help ensure optimal returns on the Federal in-  
2 vestment.

3 **SEC. 123. DEFINITIONS.**

4 In this subtitle—

5 (1) the term “Advisory Committee” means the  
6 advisory committee designated under section 125;

7 (2) the term “biomanufacturing” means the  
8 manufacturing of products using biological manufac-  
9 turing technologies;

10 (3) the term “engineering biology” means the  
11 science and engineering of cellular and molecular  
12 processes to advance fundamental understanding of  
13 complex natural systems and to develop new and ad-  
14 vance existing products, processes, and systems that  
15 will contribute significantly to societal well-being,  
16 national security, and the economy;

17 (4) the term “Interagency Committee” means  
18 the interagency committee designated under section  
19 124(e); and

20 (5) the term “Program” means the National  
21 Engineering Biology Research and Development  
22 Program established under section 124.

1 **SEC. 124. NATIONAL ENGINEERING BIOLOGY RESEARCH**  
2 **AND DEVELOPMENT PROGRAM.**

3 (a) IN GENERAL.—The President shall implement a  
4 National Engineering Biology Research and Development  
5 Program to advance societal well-being, national security,  
6 and economic productivity and competitiveness through—

7 (1) advancing areas of research at the intersec-  
8 tion of the biological, physical, and information  
9 sciences and engineering;

10 (2) supporting social science research that ad-  
11 vances the field of engineering biology and contrib-  
12 utes to the adoption of new products, processes, and  
13 technologies;

14 (3) expanding the number of researchers, edu-  
15 cators, and students with engineering biology train-  
16 ing;

17 (4) accelerating the translation and commer-  
18 cialization of engineering biology research and devel-  
19 opment by the private sector; and

20 (5) improving the interagency planning and co-  
21 ordination of Federal Government activities related  
22 to engineering biology.

23 (b) PROGRAM ACTIVITIES.—The activities of the Pro-  
24 gram shall include—

25 (1) sustained support for engineering biology  
26 research and development through—

1 (A) grants to individual investigators and  
2 interdisciplinary teams of investigators;

3 (B) projects funded under joint solicita-  
4 tions by a collaboration of no fewer than two  
5 agencies participating in the Program; and

6 (C) interdisciplinary research centers that  
7 are organized to investigate basic research  
8 questions and carry out technology development  
9 and demonstration activities;

10 (2) education and training of undergraduate  
11 and graduate students in research at the intersection  
12 of biological, physical, and information sciences and  
13 engineering;

14 (3) activities to develop robust mechanisms for  
15 tracking and quantifying the outputs and economic  
16 benefits of engineering biology; and

17 (4) activities to accelerate the translation and  
18 commercialization of new products, processes, and  
19 technologies by—

20 (A) identifying precompetitive research op-  
21 portunities;

22 (B) facilitating public-private partnerships  
23 in engineering biology research and develop-  
24 ment;

1 (C) connecting researchers, graduate stu-  
2 dents, and postdoctoral fellows with entrepre-  
3 neurship education and training opportunities;  
4 and

5 (D) supporting proof of concept activities  
6 and the formation of startup companies includ-  
7 ing through programs such as the Small Busi-  
8 ness Innovation Research Program and the  
9 Small Business Technology Transfer Program.

10 (c) EXPANDING PARTICIPATION.—The Program shall  
11 include, to the maximum extent practicable, outreach to  
12 primarily undergraduate and minority-serving institutions  
13 about Program opportunities, and shall encourage the de-  
14 velopment of research collaborations between research-in-  
15 tensive universities and primarily undergraduate and mi-  
16 nority-serving institutions.

17 (d) ETHICAL, LEGAL, ENVIRONMENTAL, AND SOCI-  
18 ETAL ISSUES.—Program activities shall take into account  
19 ethical, legal, environmental, and other appropriate soci-  
20 etal issues, including the need for safeguards and moni-  
21 toring systems to protect society against the unintended  
22 release of engineered materials produced, by—

23 (1) supporting research, including in the social  
24 sciences, and other activities addressing ethical,  
25 legal, environmental, and other appropriate societal

1 issues related to engineering biology, including inte-  
2 grating research on these topics with the research  
3 and development in engineering biology, and ensur-  
4 ing that the results of such research are widely dis-  
5 seminated, including through interdisciplinary engi-  
6 neering biology research centers described in sub-  
7 section (b)(1)(C); and

8 (2) ensuring, through the agencies and depart-  
9 ments that participate in the Program, that public  
10 input and outreach are integrated into the Program  
11 by the convening of regular and ongoing public dis-  
12 cussions through mechanisms such as citizen panels,  
13 consensus conferences, and educational events, as  
14 appropriate.

15 (e) INTERAGENCY COMMITTEE.—The President shall  
16 designate an interagency committee on engineering biol-  
17 ogy, which shall include representatives from the Office  
18 of Science and Technology Policy, the National Science  
19 Foundation, the Department of Energy, the National Aer-  
20 onautics and Space Administration, the National Institute  
21 of Standards and Technology, the Environmental Protec-  
22 tion Agency, and any other agency that the President con-  
23 siders appropriate. The Director of the Office of Science  
24 and Technology Policy shall select a chairperson from  
25 among the members of the Interagency Committee. The

1 Interagency Committee shall oversee the planning, man-  
2 agement, and coordination of the Program. The Inter-  
3 agency Committee shall—

4 (1) provide for interagency coordination of Fed-  
5 eral engineering biology research, development, and  
6 other activities undertaken pursuant to the Pro-  
7 gram;

8 (2) establish and periodically update goals and  
9 priorities for the Program;

10 (3) develop, not later than 12 months after the  
11 date of enactment of this subtitle, and update every  
12 5 years, a strategic plan to guide the activities of the  
13 Program and meet the goals and priorities estab-  
14 lished under paragraph (2) and describe—

15 (A) the Program's support for long-term  
16 funding for interdisciplinary engineering biology  
17 research and development;

18 (B) the Program's support for education  
19 and public outreach activities;

20 (C) the Program's support for research  
21 and other activities on ethical, legal, environ-  
22 mental, and other appropriate societal issues re-  
23 lated to engineering biology; and

24 (D) how the Program will move results out  
25 of the laboratory and into application for the



1 benefit of society and United States competi-  
2 tiveness;

3 (4) propose an annually coordinated interagency  
4 budget for the Program that will ensure the mainte-  
5 nance of a robust engineering biology research and  
6 development portfolio and ensure that the balance of  
7 funding across the Program is sufficient to meet the  
8 goals and priorities established for the Program;

9 (5) develop a plan to utilize Federal programs,  
10 such as the Small Business Innovation Research  
11 Program and the Small Business Technology Trans-  
12 fer Program, in support of the goals described in  
13 subsection (b)(4); and

14 (6) in carrying out its responsibilities under this  
15 section, take into consideration the recommendations  
16 of the Advisory Committee, the results of the work-  
17 shop convened under section 126, existing reports on  
18 related topics, and the views of academic, State, in-  
19 dustry, and other appropriate groups.

20 (f) ANNUAL REPORT.—The Interagency Committee  
21 shall prepare an annual report, to be submitted to the  
22 Committee on Science, Space, and Technology of the  
23 House of Representatives and the Committee on Com-  
24 merce, Science, and Transportation of the Senate not later

1 than 90 days after submission of the President’s annual  
2 budget request, that includes—

3 (1) the Program budget for the fiscal year to  
4 which such budget request applies, and for the then  
5 current fiscal year, including a breakout of spending  
6 for each agency participating in the Program, and  
7 for the development and acquisition of any research  
8 facilities and instrumentation; and

9 (2) an assessment of how Federal agencies are  
10 implementing the plan described in subsection  
11 (e)(5), and a description of the amount and number  
12 of Small Business Innovation Research and Small  
13 Business Technology Transfer awards made in sup-  
14 port of the Program.

15 **SEC. 125. ADVISORY COMMITTEE.**

16 (a) IN GENERAL.—The President shall designate an  
17 advisory committee on engineering biology research and  
18 development with at least 12 members, including rep-  
19 resentatives of research and academic institutions, indus-  
20 try, and nongovernmental entities, who are qualified to  
21 provide advice on the Program.

22 (b) ASSESSMENT.—The Advisory Committee shall as-  
23 sess—

24 (1) progress made in implementing the Pro-  
25 gram;

1           (2) the need to revise the Program;

2           (3) the balance of activities and funding across  
3       the Program;

4           (4) whether the Program priorities and goals  
5       developed by the Interagency Committee are helping  
6       to maintain United States leadership in engineering  
7       biology;

8           (5) the management, coordination, implementa-  
9       tion, and activities of the Program; and

10          (6) whether ethical, legal, environmental, and  
11       other appropriate societal issues are adequately ad-  
12       dressed by the Program.

13       (c) REPORTS.—The Advisory Committee shall report  
14       within 3 years after the date of enactment of this Act,  
15       and thereafter not less frequently than once every 5 years,  
16       to the President, the Committee on Science, Space, and  
17       Technology of the House of Representatives, and the Com-  
18       mittee on Commerce, Science, and Transportation of the  
19       Senate, on its findings of the assessment carried out under  
20       this section and its recommendations for ways to improve  
21       the Program.

22       (d) FEDERAL ADVISORY COMMITTEE ACT APPLICA-  
23       TION.—Section 14 of the Federal Advisory Committee Act  
24       (5 U.S.C. App.) shall not apply to the Advisory Com-  
25       mittee.

1 **SEC. 126. EXTERNAL REVIEW OF ETHICAL, LEGAL, ENVI-**  
2 **RONMENTAL, AND SOCIETAL ISSUES.**

3 (a) IN GENERAL.—Not later than 12 months after  
4 the date of enactment of this Act, the Director of the Na-  
5 tional Science Foundation shall enter into an agreement  
6 with the National Academies to convene a workshop to  
7 review the ethical, legal, environmental, and other appro-  
8 priate societal issues related to engineering biology re-  
9 search and development. The goals of the workshop shall  
10 be to—

- 11 (1) assess the current research on such issues;  
12 (2) evaluate the research gaps relating to such  
13 issues; and  
14 (3) provide recommendations on how the Pro-  
15 gram can address the research needs identified.

16 (b) REPORT TO CONGRESS.—Not later than 2 years  
17 after the date of enactment of this Act, the Director of  
18 the National Science Foundation shall transmit to the  
19 Committee on Science, Space, and Technology of the  
20 House of Representatives and the Committee on Com-  
21 merce, Science, and Transportation of the Senate a sum-  
22 mary report containing the findings of the workshop con-  
23 vened under this section.

24 **SEC. 127. AGENCY ACTIVITIES.**

25 (a) NATIONAL SCIENCE FOUNDATION.—As part of  
26 the Program, the National Science Foundation shall—

1           (1) support basic research at the intersection of  
2           the biological, physical, and information sciences and  
3           engineering through individual grants and through  
4           interdisciplinary research centers;

5           (2) support research on the environmental and  
6           social effects of engineering biology;

7           (3) provide research instrumentation support  
8           for engineering biology disciplines; and

9           (4) award grants, on a competitive basis, to en-  
10          able institutions to support graduate students and  
11          postdoctoral fellows who perform some of their engi-  
12          neering biology research in an industry setting.

13          (b) DEPARTMENT OF COMMERCE.—As part of the  
14          Program, the Director of the National Institute of Stand-  
15          ards and Technology shall—

16               (1) establish a bioscience research program to  
17               advance the development of standard reference ma-  
18               terials and measurements and to create new data  
19               tools, techniques, and processes necessary to advance  
20               engineering biology and biomanufacturing;

21               (2) provide access to user facilities with ad-  
22               vanced or unique equipment, services, materials, and  
23               other resources to industry, institutions of higher  
24               education, nonprofit organizations, and government  
25               agencies to perform research and testing; and

1           (3) provide technical expertise to inform the de-  
2       velopment of guidelines and safeguards for new  
3       products, processes, and systems of engineering biol-  
4       ogy.

5       (c) DEPARTMENT OF ENERGY.—As part of the Pro-  
6       gram, the Secretary of Energy shall—

7           (1) conduct and support basic research, devel-  
8       opment, demonstration, and commercial application  
9       activities in engineering biology disciplines, including  
10      in the areas of synthetic biology, advanced biofuel  
11      development, biobased materials, and environmental  
12      remediation; and

13          (2) provide access to user facilities with ad-  
14      vanced or unique equipment, services, materials, and  
15      other resources, as appropriate, to industry, institu-  
16      tions of higher education, nonprofit organizations,  
17      and government agencies to perform research and  
18      testing.

19       (d) NATIONAL AERONAUTICS AND SPACE ADMINIS-  
20      TRATION.—As part of the Program, the National Aero-  
21      nautics and Space Administration shall—

22          (1) conduct and support basic and applied re-  
23      search in engineering biology fields, including in the  
24      field of synthetic biology, and related to Earth and  
25      space sciences, aeronautics, space technology, and

1 space exploration and experimentation, consistent  
2 with the priorities established in the National Acad-  
3 emies' decadal surveys; and

4 (2) award grants, on a competitive basis, that  
5 enable institutions to support graduate students and  
6 postdoctoral fellows who perform some of their engi-  
7 neering biology research in an industry setting.

8 (e) ENVIRONMENTAL PROTECTION AGENCY.—As  
9 part of the Program, the Environmental Protection Agen-  
10 cy shall support research on how products, processes, and  
11 systems of engineering biology will affect the environment.

12 **TITLE II—STEM EDUCATION AND**  
13 **DIVERSITY**  
14 **Subtitle A—STEM Education and**  
15 **Workforce**

16 **SEC. 201. SENSE OF CONGRESS.**

17 It is the sense of Congress that the National Science  
18 and Technology Council's Committee on STEM Education  
19 (CoSTEM), established under section 101 of the America  
20 COMPETES Reauthorization Act of 2010 (42 U.S.C.  
21 6621), has taken important initial steps toward developing  
22 and implementing a strategic plan for Federal investments  
23 in STEM education, but that more work must be done  
24 to solicit and take into account views and experience from  
25 stakeholders who help implement or are the beneficiaries

1 of Federal STEM programs across the Nation. It is fur-  
 2 ther the sense of Congress that science mission agencies  
 3 such as the National Aeronautics and Space Administra-  
 4 tion, the National Oceanic and Atmospheric Administra-  
 5 tion, and the Department of Energy are essential partners  
 6 in contributing to the goals and implementation of a Fed-  
 7 eral STEM strategic plan because such agencies have  
 8 unique scientific and technological facilities as well as  
 9 highly trained scientists who are eager and able to con-  
 10 tribute to improved STEM learning outcomes in their own  
 11 communities.

12 **SEC. 202. COORDINATION OF FEDERAL STEM EDUCATION.**

13 Section 101 of America COMPETES Reauthoriza-  
 14 tion Act of 2010 (42 U.S.C. 6621) is amended—

15 (1) in subsection (b)(5)—

16 (A) by redesignating subparagraphs (A)  
 17 through (D) as subparagraphs (B) through (E),  
 18 respectively; and

19 (B) by inserting before subparagraph (B),  
 20 as so redesigned by subparagraph (A) of this  
 21 paragraph, the following new subparagraph:

22 “(A) have as its primary goal to leverage  
 23 the limited STEM education funding and other  
 24 assets, including intellectual capital, invested by



1 Federal STEM agencies for maximum benefit  
2 to student learning;”;

3 (2) by striking the second subsection (b);

4 (3) by redesignating subsection (c) as sub-  
5 section (f);

6 (4) by inserting after subsection (b), the fol-  
7 lowing new subsections:

8 “(c) COORDINATOR FOR STEM EDUCATION.—The  
9 Director of the Office of Science and Technology Policy  
10 shall designate an associate director of the Office of  
11 Science and Technology Policy as the Coordinator for  
12 STEM Education. When an appropriate associate director  
13 is not available, the Director may designate another ap-  
14 propriate senior government official as the Coordinator for  
15 STEM Education. The Coordinator shall chair the com-  
16 mittee established under subsection (a). The Coordinator  
17 shall, with the assistance of appropriate senior officials  
18 from other Committee on STEM Education agencies, en-  
19 sure that the requirements of this section are satisfied.

20 “(d) STAKEHOLDER INPUT.—

21 “(1) INTERAGENCY CONSOLIDATION.—For all  
22 agency proposals to consolidate or transfer budgets  
23 or functions for STEM education programs or ac-  
24 tivities between agencies, at the time of submission  
25 of such proposals to Congress, the Director shall re-

1 port to Congress on activities undertaken by the Of-  
2 fice of Science and Technology Policy or by relevant  
3 agencies to take into consideration relevant input  
4 from the STEM Education Advisory Panel estab-  
5 lished under subsection (e) and other relevant edu-  
6 cation stakeholders.

7 “(2) INTRAAGENCY CONSOLIDATION.—For all  
8 agency proposals to internally consolidate or termi-  
9 nate STEM education programs with budgets ex-  
10 ceeding \$10,000,000, at the time of submission of  
11 such proposals to Congress, the head of the relevant  
12 agency shall report to Congress on activities to so-  
13 licit and take into consideration input on such pro-  
14 posals from the STEM Education Advisory Panel  
15 established under subsection (e) and other relevant  
16 education stakeholders.

17 “(e) STEM EDUCATION ADVISORY PANEL.—

18 “(1) IN GENERAL.—The President shall estab-  
19 lish or designate a STEM Education Advisory  
20 Panel. The cochairs of the Advisory Panel shall meet  
21 the qualifications of Panel membership required in  
22 paragraph (2) and may be members of the Presi-  
23 dent’s Council of Advisors on Science and Tech-  
24 nology.

1           “(2) QUALIFICATIONS.—The Advisory Panel es-  
2           tablished or designated by the President under this  
3           subsection shall consist of members from academic  
4           institutions, industry, informal education providers,  
5           nonprofit STEM education organizations, founda-  
6           tions, and local and State educational agencies.  
7           Members of the Advisory Panel shall be qualified to  
8           provide advice on Federal STEM education pro-  
9           grams, best practices in STEM education, assess-  
10          ment of STEM education programs, STEM edu-  
11          cation standards, industry needs for STEM grad-  
12          uates, and public-private STEM education partner-  
13          ships.

14          “(3) DUTIES.—The Advisory Panel shall advise  
15          the President and the committee established under  
16          subsection (a) on implementing the Federal STEM  
17          education strategic plan required under subsection  
18          (b)(5) and coordinating Federal STEM programs  
19          with nongovernmental STEM initiatives and State  
20          and local educational agencies.

21          “(4) REPORT.—The Advisory Panel shall re-  
22          port, not more than 1 year after enactment of the  
23          America Competes Reauthorization Act of 2015, on  
24          options for evidence-based implementation of the  
25          Federal STEM strategic plan required under sub-

1 section (b)(5), including options for designating cer-  
2 tain agencies as coordinating leads for different pri-  
3 ority investment areas, timelines for implementation,  
4 and specific management, budget, policy, or other  
5 steps that agencies must take to effectively imple-  
6 ment the strategic plan.

7 “(5) SUNSET.—The authorization for the Advi-  
8 sory Panel established under this subsection shall  
9 expire 3 years after the date of enactment of the  
10 America Competes Reauthorization Act of 2015.”;  
11 and

12 (5) in subsection (f), as so redesignated by  
13 paragraph (3) of this section—

14 (A) by inserting “progress made in imple-  
15 menting” after “describing”;

16 (B) by striking paragraph (3); and

17 (C) by redesignating paragraphs (4) and  
18 (5) as paragraphs (3) and (4), respectively.

19 **SEC. 203. GRAND CHALLENGES IN EDUCATION RESEARCH.**

20 (a) IN GENERAL.—The Director of the National  
21 Science Foundation and the Secretary of Education shall  
22 collaborate in—

23 (1) identifying, prioritizing, and developing  
24 strategies to address grand challenges in research  
25 and development, including assessment, on the

1 teaching and learning of STEM at the pre-K–12  
2 level, in formal and informal settings, for diverse  
3 learning populations, including individuals identified  
4 in section 33 or 34 of the Science and Engineering  
5 Equal Opportunities Act (42 U.S.C. 1885a or  
6 1885b); and

7 (2) ensuring the dissemination and promoting  
8 the utilization of the results of such research and de-  
9 velopment.

10 (b) STAKEHOLDER INPUT.—In identifying the grand  
11 challenges under subsection (a), the Director and the Sec-  
12 retary shall—

13 (1) take into consideration critical research  
14 gaps identified in existing reports, including reports  
15 by the National Academies, on the teaching and  
16 learning of STEM at the pre-K–12 level in formal  
17 and informal settings; and

18 (2) solicit input from a wide range of stake-  
19 holders, including officials from State educational  
20 agencies and local educational agencies, STEM  
21 teachers, STEM education researchers, scientific  
22 and engineering societies, STEM faculty at institu-  
23 tions of higher education, informal STEM education  
24 providers, businesses with a large STEM workforce,  
25 and other stakeholders in the teaching and learning

1 of STEM at the pre-K–12 level, and may enter into  
2 an arrangement with the National Research Council  
3 for these purposes.

4 (c) TOPICS TO CONSIDER.—In identifying the grand  
5 challenges under subsection (a), the Director and the Sec-  
6 retary shall, at a minimum, consider research and develop-  
7 ment on—

8 (1) scalability, sustainability, and replication of  
9 successful STEM activities, programs, and models,  
10 in formal and informal environments;

11 (2) model systems that support improved teach-  
12 ing and learning of STEM across entire local edu-  
13 cational agencies and States, including rural areas,  
14 and encompassing and integrating the teaching and  
15 learning of STEM in formal and informal venues;

16 (3) implementation of new State mathematics  
17 and science standards;

18 (4) what makes a STEM teacher effective and  
19 STEM teacher professional development effective,  
20 including development of tools and methodologies to  
21 measure STEM teacher effectiveness;

22 (5) cyber-enabled and other technology tools for  
23 teaching and learning, including massive open online  
24 courses;

1           (6) STEM teaching and learning in informal  
2 environments, including development of tools and  
3 methodologies for assessing STEM teaching and  
4 learning in informal environments; and

5           (7) how integrating engineering with mathe-  
6 matics and science education may—

7                 (A) improve student learning of mathe-  
8 matics and science;

9                 (B) increase student interest and persist-  
10 ence in STEM; or

11                (C) improve student understanding of engi-  
12 neering design principles and of the built world.

13       (d) REPORT TO CONGRESS.—Not later than 12  
14 months after the date of enactment of this Act, the Direc-  
15 tor and the Secretary shall report to Congress with a de-  
16 scription of—

17                (1) the grand challenges identified pursuant to  
18 this section;

19                (2) the role of each agency in supporting re-  
20 search and development activities to address the  
21 grand challenges;

22                (3) the common metrics that will be used to as-  
23 sess progress toward meeting the grand challenges;

24                (4) plans for periodically updating the grand  
25 challenges;

1           (5) how the agencies will disseminate and pro-  
2       mote the utilization of the results of research and  
3       development activities carried out under this section  
4       to STEM education practitioners, to other Federal  
5       agencies that support STEM programs and activi-  
6       ties, and to non-Federal funders of STEM edu-  
7       cation; and

8           (6) how the agencies will support implementa-  
9       tion of best practices identified by the research and  
10      development activities.

11 **SEC. 204. NATIONAL RESEARCH COUNCIL REPORT ON**  
12 **STEAM EDUCATION.**

13       (a) SENSE OF CONGRESS.—It is the sense of Con-  
14 gress that—

15           (1) the Science, Technology, Engineering, and  
16       Mathematics (STEM) Talent Expansion Program  
17       set an important goal of increasing the number of  
18       students graduating with associate or baccalaureate  
19       degrees in the STEM fields, and this should con-  
20       tinue to be a focus of that program;

21           (2) to further the goal of the STEM Talent Ex-  
22       pansion Program, as well as STEM education pro-  
23       motion programs across the Federal Government, in-  
24       novative approaches are needed to enhance STEM  
25       education in the United States;



1           (3) STEAM, which is the integration of arts  
2           and design, broadly defined, into Federal STEM  
3           programming, research, and innovation activities, is  
4           a method-validated approach to maintaining the  
5           competitiveness of the United States in both work-  
6           force and innovation and to increasing and broad-  
7           ening students' engagement in the STEM fields;

8           (4) STEM graduates need more than technical  
9           skills to thrive in the 21st century workforce; they  
10          also need to be creative, innovative, collaborative,  
11          and able to think critically;

12          (5) STEAM should be recognized as providing  
13          value to STEM research and education programs  
14          across Federal agencies, without supplanting the  
15          focus on the traditional STEM disciplines;

16          (6) Federal agencies should work cooperatively  
17          on interdisciplinary initiatives to support the inte-  
18          gration of arts and design into STEM, and current  
19          interdisciplinary programs should be strengthened;

20          (7) Federal agencies should allow for STEAM  
21          activities under current and future grant-making  
22          and other activities; and

23          (8) Federal agencies should clarify that, where  
24          appropriate, data collection, surveys, and reporting  
25          on STEM activities and grant-making should exam-

1       ine activities that involve cross-disciplinary learning  
2       that integrates specialized skills and expertise from  
3       both art and science.

4       (b) NATIONAL RESEARCH COUNCIL WORKSHOP.—

5       The National Science Foundation shall enter into an ar-  
6       rangement with the National Research Council to conduct  
7       a workshop on the integration of arts and design with  
8       STEM education. The workshop shall include a discussion  
9       of—

10               (1) how the perspectives and experience of art-  
11       ists and designers may contribute to the advance-  
12       ment of science, engineering, and innovation, for ex-  
13       ample through the development of visualization aids  
14       for large experimental and computational data sets;

15               (2) how arts and design-based education experi-  
16       ences might support formal and informal STEM  
17       education at the pre-K–12 level, particularly in fos-  
18       tering creativity and risk taking, and encourage  
19       more students to pursue STEM studies, including  
20       students from groups historically underrepresented  
21       in STEM;

22               (3) how the teaching of design principles can be  
23       better integrated into undergraduate engineering  
24       and other STEM curricula, including in the first two  
25       years of undergraduate studies, to enhance student

1 capacity for creativity and innovation and improve  
2 student retention, including students from groups  
3 historically underrepresented in STEM; and

4 (4) what additional steps, if any, Federal  
5 science agencies should take to promote the inclu-  
6 sion of arts and design principles in their respective  
7 STEM programs and activities in order to improve  
8 student STEM learning outcomes, increase the re-  
9 cruitment and retention of students into STEM  
10 studies and careers, and increase innovation in the  
11 United States.

12 (c) REPORT.—Not later than 18 months after the  
13 date of enactment of this Act, the National Research  
14 Council shall submit a report to Congress providing a  
15 summary description of the discussion and findings from  
16 the workshop required under subsection (b).

17 **SEC. 205. ENGAGING FEDERAL SCIENTISTS AND ENGI-**  
18 **NEERS IN STEM EDUCATION.**

19 The Director of the Office of Science and Technology  
20 Policy shall develop guidance for Federal agencies to in-  
21 crease opportunities and training, as appropriate, for Fed-  
22 eral scientists and engineers to participate in STEM en-  
23 gagement activities through their respective agencies and  
24 in their communities.

## **Subtitle B—Broadening Participation in STEM**

### **SEC. 211. SHORT TITLE.**

This subtitle may be cited as the “STEM Opportunities Act of 2015”.

### **SEC. 212. PURPOSE.**

(a) IN GENERAL.—The Director of the Office of Science and Technology Policy, acting through the Federal science agencies, shall carry out programs and activities with the purpose of ensuring that Federal science agencies and institutions of higher education receiving Federal research and development funding are fully engaging their entire talent pool.

(b) PURPOSES.—The purposes of this subtitle are as follows:

(1) To promote research on and increase understanding of the participation and trajectories of women and underrepresented minorities in STEM careers at institutions of higher education and Federal science agencies, including Federal laboratories.

(2) To raise awareness within Federal science agencies, including Federal laboratories, and institutions of higher education about cultural and institutional barriers limiting the recruitment, retention, promotion, and other indicators of participation and

1 achievement of women and underrepresented minori-  
2 ties in academic and Government STEM research  
3 careers at all levels.

4 (3) To identify, disseminate, and implement  
5 best practices at Federal science agencies, including  
6 Federal laboratories, and at institutions of higher  
7 education to remove or reduce cultural and institu-  
8 tional barriers limiting the recruitment, retention,  
9 and success of women and underrepresented minori-  
10 ties in academic and Government STEM research  
11 careers.

12 (4) To provide grants to institutions of higher  
13 education to recruit, retain, and advance STEM fac-  
14 ulty members from underrepresented minority  
15 groups and to implement or expand reforms in un-  
16 dergraduate STEM education in order to increase  
17 the number of students from underrepresented mi-  
18 nority groups receiving degrees in these fields.

19 **SEC. 213. FEDERAL SCIENCE AGENCY POLICIES FOR CARE-**  
20 **GIVERS.**

21 (a) OSTP GUIDANCE.—Not later than 6 months  
22 after the date of enactment of this Act, the Director of  
23 the Office of Science and Technology Policy shall provide  
24 guidance to Federal science agencies to establish policies  
25 that—

1 (1) apply to all—

2 (A) intramural and extramural research  
3 awards; and

4 (B) primary investigators who have  
5 caregiving responsibilities, including care for a  
6 newborn or newly adopted child and care for an  
7 immediate family member who is sick or dis-  
8 abled; and

9 (2) provide—

10 (A) flexibility in timing for the initiation of  
11 approved research awards;

12 (B) no-cost extensions of research awards;

13 (C) grant supplements as appropriate to  
14 research awards for research technicians or  
15 equivalent to sustain research activities; and

16 (D) any other appropriate accommodations  
17 at the discretion of the head of each agency.

18 (b) UNIFORMITY OF GUIDANCE.—In providing such  
19 guidance, the Director of the Office of Science and Tech-  
20 nology Policy shall encourage uniformity and consistency  
21 in the policies across all agencies.

22 (c) ESTABLISHMENT OF POLICIES.—Consistent with  
23 the guidance provided under this section, Federal science  
24 agencies shall maintain or develop and implement policies

1 for caregivers and shall broadly disseminate such policies  
2 to current and potential grantees.

3 (d) DATA ON USAGE.—Federal science agencies  
4 shall—

5 (1) collect data on the usage of the policies  
6 under subsection (c), by gender, at both institutions  
7 of higher education and Federal laboratories; and

8 (2) report such data on an annual basis to the  
9 Director of the Office of Science and Technology  
10 Policy in such form as required by the Director.

11 **SEC. 214. COLLECTION AND REPORTING OF DATA ON FED-**  
12 **ERAL RESEARCH GRANTS.**

13 (a) COLLECTION OF DATA.—

14 (1) IN GENERAL.—Each Federal science agency  
15 shall collect standardized record-level annual infor-  
16 mation on demographics, primary field, award type,  
17 budget request, funding outcome, and awarded  
18 budget for all applications for merit-reviewed re-  
19 search and development grants to institutions of  
20 higher education and Federal laboratories supported  
21 by that agency.

22 (2) UNIFORMITY AND STANDARDIZATION.—The  
23 Director of the Office of Science and Technology  
24 Policy shall establish a policy to ensure uniformity

1       and standardization of the data collection required  
2       under paragraph (1).

3           (3) RECORD-LEVEL DATA.—

4               (A) REQUIREMENT.—On an annual basis,  
5       beginning with the deadline under subpara-  
6       graph (C), each Federal science agency shall  
7       submit to the Director of the National Science  
8       Foundation record-level data collected under  
9       paragraph (1) in the form required by such Di-  
10      rector.

11              (B) PREVIOUS DATA.—As part of the first  
12      submission under subparagraph (A), each Fed-  
13      eral science agency, to the extent practicable,  
14      shall also submit comparable record-level data  
15      for the 5 years preceding the deadline under  
16      subparagraph (C).

17              (C) DEADLINE.—The deadline under this  
18      paragraph is 2 years after the date of enact-  
19      ment of this Act.

20           (b) REPORTING OF DATA.—The Director of the Na-  
21      tional Science Foundation shall publish statistical sum-  
22      mary data collected under this section, disaggregated and  
23      cross-tabulated by race, ethnicity, gender, age, and years  
24      since completion of doctoral degree, including in conjunc-  
25      tion with the National Science Foundation's report re-



1 quired by section 37 of the Science and Technology Equal  
2 Opportunities Act (42 U.S.C. 1885d; Public Law 96–  
3 516).

4 **SEC. 215. POLICIES FOR REVIEW OF FEDERAL RESEARCH**  
5 **GRANTS.**

6 (a) IN GENERAL.—The Director of the Office of  
7 Science and Technology Policy, in collaboration with the  
8 Director of the National Science Foundation, shall identify  
9 information and best practices useful for educating pro-  
10 gram officers and members of standing peer review com-  
11 mittees at Federal science agencies about—

12 (1) research on implicit bias based on gender,  
13 race, or ethnicity; and

14 (2) methods to minimize the effect of such bias  
15 in the review of extramural and intramural Federal  
16 research grants.

17 (b) GUIDANCE TO ALL FEDERAL SCIENCE AGEN-  
18 CIES.—The Director of the Office of Science and Tech-  
19 nology Policy shall disseminate the information and best  
20 practices identified in subsection (a) to all Federal science  
21 agencies and provide guidance as necessary on policies to  
22 implement such practices within each agency.

23 (c) ESTABLISHMENT OF POLICIES.—Consistent with  
24 the guidance provided in subsection (b), Federal science  
25 agencies shall maintain or develop and implement policies

1 and practices to minimize the effects of implicit bias in  
2 the review of extramural and intramural Federal research  
3 grants.

4 (d) REPORT TO CONGRESS.—Not later than 2 years  
5 after the date of enactment of this Act, the Director of  
6 the Office of Science and Technology Policy shall report  
7 to Congress on what steps all Federal science agencies  
8 have taken to implement policies and practices to minimize  
9 the effects of bias in the review of extramural and intra-  
10 mural Federal research grants.

11 **SEC. 216. COLLECTION OF DATA ON DEMOGRAPHICS OF**  
12 **FACULTY.**

13 (a) COLLECTION OF DATA.—

14 (1) IN GENERAL.—Not later than 3 years after  
15 the date of enactment of this Act, and at least every  
16 5 years thereafter, the Director of the National  
17 Science Foundation shall carry out a survey to col-  
18 lect institution-level data on the demographics of  
19 STEM faculty, by broad fields of STEM, at dif-  
20 ferent types of institutions of higher education.

21 (2) CONSIDERATIONS.—To the extent prac-  
22 ticable, the Director of the National Science Foun-  
23 dation shall consider, by gender, race, ethnicity, citi-  
24 zenship status, age, and years since completion of  
25 doctoral degree—

1 (A) the number and percentage of faculty;

2 (B) the number and percentage of faculty

3 at each rank;

4 (C) the number and percentage of faculty

5 who are in nontenure-track positions, including

6 teaching and research;

7 (D) the number and percentage of faculty

8 who are reviewed for promotion, including ten-

9 ure, and the percentage of that number who are

10 promoted, including being awarded tenure;

11 (E) faculty years in rank;

12 (F) the number and percentage of faculty

13 to leave tenure-track positions;

14 (G) the number and percentage of faculty

15 hired, by rank; and

16 (H) the number and percentage of faculty

17 in leadership positions.

18 (b) EXISTING SURVEYS.—The Director of the Na-

19 tional Science Foundation—

20 (1) may carry out the requirements under sub-

21 section (a) by collaborating with statistical centers

22 at other Federal agencies to modify or expand, as

23 necessary, existing Federal surveys of higher edu-

24 cation; or

1           (2) may award a grant or contract to an insti-  
2           tution of higher education or other nonprofit organi-  
3           zation to design and carry out the requirements  
4           under subsection (a).

5           (c) REPORTING DATA.—The Director of the National  
6           Science Foundation shall publish statistical summary data  
7           collected under this section, including as part of the Na-  
8           tional Science Foundation’s report required by section 37  
9           of the Science and Technology Equal Opportunities Act  
10          (42 U.S.C. 1885d; Public Law 96–516).

11          (d) AUTHORIZATION OF APPROPRIATIONS.—There  
12          are authorized to be appropriated to the Director of the  
13          National Science Foundation \$3,000,000 for each of fiscal  
14          years 2016 through 2018 to develop and carry out the  
15          initial survey required in subsection (a).

16   **SEC. 217. CULTURAL AND INSTITUTIONAL BARRIERS TO EX-**  
17                           **PANDING THE ACADEMIC AND FEDERAL**  
18                           **STEM WORKFORCE.**

19          (a) BEST PRACTICES AT INSTITUTIONS OF HIGHER  
20          EDUCATION.—

21           (1) DEVELOPMENT OF GUIDANCE.—Not later  
22           than 6 months after the date of enactment of this  
23           Act, the Director of the National Science Founda-  
24           tion shall develop written guidance for institutions of  
25           higher education on the best practices for—

1 (A) conducting periodic campus culture  
2 surveys of STEM departments, with a par-  
3 ticular focus on identifying any cultural or in-  
4 stitutional barriers to or successful enablers for  
5 the recruitment, retention, promotion, and  
6 other indicators of participation and achieve-  
7 ment, of women and underrepresented minori-  
8 ties in STEM degree programs and academic  
9 STEM careers; and

10 (B) providing educational opportunities, in-  
11 cluding workshops as described in subsection  
12 (c), for STEM faculty and administrators to  
13 learn about current research on implicit bias in  
14 recruitment, evaluation, and promotion of fac-  
15 ulty in STEM and recruitment and evaluation  
16 of undergraduate and graduate students in  
17 STEM degree programs.

18 (2) EXISTING GUIDANCE.—In developing the  
19 guidance in paragraph (1), the Director of the Na-  
20 tional Science Foundation shall utilize guidance al-  
21 ready developed by the National Aeronautics and  
22 Space Administration, the Department of Energy,  
23 and the Department of Education.

24 (3) DISSEMINATION OF GUIDANCE.—The Direc-  
25 tor of the National Science Foundation shall broadly

1 disseminate the guidance developed in paragraph (1)  
2 to institutions of higher education that receive Fed-  
3 eral research funding.

4 (4) REPORTS TO THE NATIONAL SCIENCE  
5 FOUNDATION.—The Director of the National Science  
6 Foundation shall develop a policy that—

7 (A) applies to, at a minimum, the institu-  
8 tions classified under the Indiana University  
9 Center for Postsecondary Research Carnegie  
10 Classification on January 1, 2015, as a doc-  
11 torate-granting university with a very high level  
12 of research activity; and

13 (B) requires each institution identified in  
14 subparagraph (A), not later than 3 years after  
15 the date of enactment of this Act, to report to  
16 the Director of the National Science Founda-  
17 tion on activities and policies developed and im-  
18 plemented based on the guidance provided in  
19 paragraph (1).

20 (b) BEST PRACTICES AT FEDERAL LABORA-  
21 TORIES.—

22 (1) DEVELOPMENT OF GUIDANCE.—Not later  
23 than 6 months after the date of enactment of this  
24 Act, the Director of the Office of Science and Tech-  
25 nology Policy shall develop written guidance for Fed-

1       eral laboratories to develop and implement practices  
2       and policies to—

3               (A) conduct periodic laboratorywide culture  
4       surveys of research personnel at all levels, with  
5       a particular focus on identifying any cultural or  
6       institutional barriers to the recruitment, reten-  
7       tion, and success of women and underrep-  
8       resented minorities in STEM careers at Federal  
9       laboratories; and

10              (B) provide educational opportunities, in-  
11       cluding workshops as described in subsection  
12       (c), for STEM research personnel to learn  
13       about current research in implicit bias in re-  
14       cruitment, evaluation, and promotion of re-  
15       search personnel at Federal laboratories.

16              (2) ESTABLISHMENT OF POLICIES.—Consistent  
17       with the guidance provided in paragraph (1), Fed-  
18       eral science agencies with Federal laboratories shall  
19       maintain or develop and implement policies for their  
20       respective Federal laboratories.

21       (c) WORKSHOPS TO ADDRESS CULTURAL BARRIERS  
22       TO EXPANDING THE ACADEMIC AND FEDERAL STEM  
23       WORKFORCE.—

24              (1) IN GENERAL.—Not later than 6 months  
25       after the date of enactment of this Act, the Director

1 of the National Science Foundation shall recommend  
2 a uniform policy for Federal science agencies to  
3 carry out a program of workshops that educate  
4 STEM department chairs at institutions of higher  
5 education, senior managers at Federal laboratories,  
6 and other federally funded researchers about meth-  
7 ods that minimize the effects of implicit bias in the  
8 career advancement, including hiring, tenure, pro-  
9 motion, and selection for any honor based in part on  
10 the recipient's research record, of academic and Fed-  
11 eral STEM researchers.

12 (2) INTERAGENCY COORDINATION.—The Direc-  
13 tor of the National Science Foundation shall ensure  
14 that workshops supported under this subsection are  
15 coordinated across Federal science agencies and  
16 jointly supported as appropriate.

17 (3) MINIMIZING COSTS.—To the extent prac-  
18 ticable, workshops shall be held in conjunction with  
19 national or regional STEM disciplinary meetings to  
20 minimize costs associated with participant travel.

21 (4) PRIORITY FIELDS FOR ACADEMIC PARTICI-  
22 PANTS.—In considering the participation of STEM  
23 department chairs and other academic researchers,  
24 the Director of the National Science Foundation  
25 shall prioritize workshops for the broad fields of



1 STEM in which the national rate of representation  
2 of women among tenured or tenure-track faculty or  
3 non-faculty researchers at doctorate-granting institu-  
4 tions of higher education is less than 25 percent, ac-  
5 cording to the most recent data available from the  
6 National Center for Science and Engineering Statis-  
7 tics.

8 (5) ORGANIZATIONS ELIGIBLE TO CARRY OUT  
9 WORKSHOPS.—Federal science agencies may carry  
10 out the program of workshops under this subsection  
11 by making grants to eligible organizations. In addi-  
12 tion to any other organizations made eligible by the  
13 Federal science agencies, the following organizations  
14 are eligible for grants under this subsection:

15 (A) Nonprofit scientific and professional  
16 societies and organizations that represent one  
17 or more STEM disciplines.

18 (B) Nonprofit organizations that have the  
19 primary mission of advancing the participation  
20 of women or underrepresented minorities in  
21 STEM.

22 (6) CHARACTERISTICS OF WORKSHOPS.—The  
23 workshops shall have the following characteristics:

24 (A) Invitees to workshops shall include at  
25 least—

1 (i) the chairs of departments in the  
2 relevant STEM discipline or disciplines  
3 from at least the top 50 institutions of  
4 higher education, as determined by the  
5 amount of Federal research and develop-  
6 ment funds obligated to each institution of  
7 higher education in the prior year based on  
8 data available from the National Science  
9 Foundation; and

10 (ii) in the case of Federal laboratories,  
11 individuals with personnel management re-  
12 sponsibilities comparable to those of an in-  
13 stitution of higher education department  
14 chair.

15 (B) Activities at the workshops shall in-  
16 clude research presentations and interactive dis-  
17 cussions or other activities that increase the  
18 awareness of the existence of implicit bias in re-  
19 cruitment, hiring, tenure review, promotion, and  
20 other forms of formal recognition of individual  
21 achievement for faculty and other federally  
22 funded STEM researchers and shall provide  
23 strategies to overcome such bias.

24 (C) Research presentations and other  
25 workshop programs, as appropriate, shall in-

1           clude a discussion of the unique challenges  
2           faced by underrepresented subgroups, including  
3           minority women, minority men, and first gen-  
4           eration minority graduates in research.

5           (D) Workshop programs shall include in-  
6           formation on best practices for mentoring un-  
7           dergraduate and graduate women and under-  
8           represented minority students.

9           (7) DATA ON WORKSHOPS.—Any proposal for  
10          funding by an organization seeking to carry out a  
11          workshop under this subsection shall include a de-  
12          scription of how such organization will—

13           (A) collect data on the rates of attendance  
14           by invitees in workshops, including information  
15           on the home institution and department of  
16           attendees, and the rank of faculty attendees;

17           (B) conduct attitudinal surveys on work-  
18           shop attendees before and after the workshops;  
19           and

20           (C) collect follow-up data on any relevant  
21           institutional policy or practice changes reported  
22           by attendees not later than 1 year after attend-  
23           ance in such a workshop.

24           (8) REPORT TO NSF.—Organizations receiving  
25          funding to carry out workshops under this sub-

1 section shall report the data required in paragraph  
2 (7) to the Director of the National Science Founda-  
3 tion in such form as required by such Director.

4 (d) REPORT TO CONGRESS.—Not later than 4 years  
5 after the date of enactment of this Act, the Director of  
6 the National Science Foundation shall submit a report to  
7 Congress that includes—

8 (1) a summary and analysis of the types and  
9 frequency of activities and policies developed and  
10 carried out under subsection (a) based on the re-  
11 ports submitted under paragraph (4) of such sub-  
12 section; and

13 (2) a description and evaluation of the status  
14 and effectiveness of the program of workshops re-  
15 quired under subsection (c), including a summary of  
16 any data reported under paragraph (8) of such sub-  
17 section.

18 (e) AUTHORIZATION OF APPROPRIATIONS.—There  
19 are authorized to be appropriated to the Director of the  
20 National Science Foundation \$2,000,000 for each of fiscal  
21 years 2016 through 2020 to carry out this section.

22 **SEC. 218. RESEARCH AND DISSEMINATION AT THE NA-**  
23 **TIONAL SCIENCE FOUNDATION.**

24 (a) IN GENERAL.—The Director of the National  
25 Science Foundation shall award research grants and carry

1 out dissemination activities consistent with the purposes  
2 of this subtitle, including—

3           (1) research grants to analyze the record-level  
4           data collected under section 214 and section 216,  
5           consistent with policies to ensure the privacy of indi-  
6           viduals identifiable by such data;

7           (2) research grants to study best practices for  
8           work-life accommodation;

9           (3) research grants to study the impact of poli-  
10          cies and practices that are implemented under this  
11          subtitle or that are otherwise consistent with the  
12          purposes of this subtitle;

13          (4) collaboration with other Federal science  
14          agencies and professional associations to exchange  
15          best practices, harmonize work-life accommodation  
16          policies and practices, and overcome common bar-  
17          riers to work-life accommodation; and

18          (5) collaboration with institutions of higher  
19          education in order to clarify and catalyze the adop-  
20          tion of a coherent and consistent set of work-life ac-  
21          commodation policies and practices.

22       (b) AUTHORIZATION OF APPROPRIATIONS.—There  
23       are authorized to be appropriated to the Director of the  
24       National Science Foundation \$5,000,000 for each of fiscal  
25       years 2016 through 2020 to carry out this section.

1 **SEC. 219. REPORT TO CONGRESS.**

2 Not later than 4 years after the date of enactment  
3 of this Act, the Director of the Office of Science and Tech-  
4 nology Policy shall submit a report to Congress that in-  
5 cludes—

6 (1) a description and evaluation of the status  
7 and usage of caregiver policies at all Federal science  
8 agencies, including any recommendations for revis-  
9 ing or expanding such policies;

10 (2) a description of any significant updates to  
11 the policies for review of Federal research grants re-  
12 quired under section 215, and any evidence of the  
13 impact of such policies on the review or awarding of  
14 Federal research grants; and

15 (3) a description and evaluation of the status of  
16 Federal laboratory policies and practices required  
17 under section 217(b), including any recommenda-  
18 tions for revising or expanding such policies.

19 **SEC. 220. NATIONAL SCIENCE FOUNDATION SUPPORT FOR**  
20 **INCREASING DIVERSITY AMONG STEM FAC-**  
21 **ULTY AT INSTITUTIONS OF HIGHER EDU-**  
22 **CATION.**

23 (a) GRANTS.—The Director of the National Science  
24 Foundation shall award grants to institutions of higher  
25 education (or consortia thereof) for the development of in-  
26 novative reform efforts designed to increase the recruit-

1 ment, retention, and advancement of individuals from  
2 underrepresented minority groups in academic STEM ca-  
3 reers.

4 (b) MERIT REVIEW; COMPETITION.—Grants shall be  
5 awarded under this section on a merit-reviewed, competi-  
6 tive basis.

7 (c) USE OF FUNDS.—Activities supported by grants  
8 under this section may include—

9 (1) institutional assessment activities, such as  
10 data analyses and policy review, in order to identify  
11 and address specific issues in the recruitment, reten-  
12 tion, and advancement of faculty members from  
13 underrepresented minority groups;

14 (2) implementation of institution-wide improve-  
15 ments in workload distribution, such that faculty  
16 members from underrepresented minority groups are  
17 not disadvantaged in the amount of time available to  
18 focus on research, publishing papers, and engaging  
19 in other activities required to achieve tenure status  
20 and run a productive research program;

21 (3) development and implementation of training  
22 courses for administrators and search committee  
23 members to ensure that candidates from underrep-  
24 resented minority groups are not subject to implicit  
25 biases in the search and hiring process;

1           (4) development and hosting of intra- or inter-  
2           institutional workshops to propagate best practices  
3           in recruiting, retaining, and advancing faculty mem-  
4           bers from underrepresented minority groups;

5           (5) professional development opportunities for  
6           faculty members from underrepresented minority  
7           groups;

8           (6) activities aimed at making undergraduate  
9           STEM students from underrepresented minority  
10          groups aware of opportunities for academic careers  
11          in STEM fields;

12          (7) activities to identify and engage exceptional  
13          graduate students from underrepresented minority  
14          groups at various stages of their studies and to en-  
15          courage them to enter academic careers; and

16          (8) other activities consistent with subsection  
17          (a), as determined by the Director of the National  
18          Science Foundation.

19       (d) SELECTION PROCESS.—

20           (1) APPLICATION.—An institution of higher  
21           education (or consortia thereof) seeking funding  
22           under this section shall submit an application to the  
23           Director of the National Science Foundation at such  
24           time, in such manner, and containing such informa-  
25           tion and assurances as such Director may require.



1       The application shall include, at a minimum, a de-  
2       scription of—

3               (A) the reform effort that is being pro-  
4               posed for implementation by the institution of  
5               higher education;

6               (B) any available evidence of specific dif-  
7               ficulties in the recruitment, retention, and ad-  
8               vancement of faculty members from underrep-  
9               resented minority groups in STEM academic  
10              careers within the institution of higher edu-  
11              cation submitting an application, and how the  
12              proposed reform effort would address such  
13              issues;

14              (C) how the institution of higher education  
15              submitting an application plans to sustain the  
16              proposed reform effort beyond the duration of  
17              the grant; and

18              (D) how the success and effectiveness of  
19              the proposed reform effort will be evaluated and  
20              assessed in order to contribute to the national  
21              knowledge base about models for catalyzing in-  
22              stitutional change.

23              (2) REVIEW OF APPLICATIONS.—In selecting  
24              grant recipients under this section, the Director of

1 the National Science Foundation shall consider, at a  
2 minimum—

3 (A) the likelihood of success in under-  
4 taking the proposed reform effort at the institu-  
5 tion of higher education submitting the applica-  
6 tion, including the extent to which the adminis-  
7 trators of the institution are committed to mak-  
8 ing the proposed reform effort a priority;

9 (B) the degree to which the proposed re-  
10 form effort will contribute to change in institu-  
11 tional culture and policy such that greater value  
12 is placed on the recruitment, retention, and ad-  
13 vancement of faculty members from underrep-  
14 resented minority groups;

15 (C) the likelihood that the institution of  
16 higher education will sustain or expand the pro-  
17 posed reform effort beyond the period of the  
18 grant; and

19 (D) the degree to which evaluation and as-  
20 sessment plans are included in the design of the  
21 proposed reform effort.

22 (3) GRANT DISTRIBUTION.—The Director of  
23 the National Science Foundation shall ensure, to the  
24 extent practicable, that grants awarded under this

1 section are made to a variety of types of institutions  
2 of higher education.

3 (e) AUTHORIZATION OF APPROPRIATIONS.—There  
4 are authorized to be appropriated to the Director of the  
5 National Science Foundation \$10,000,000 for each of fis-  
6 cal years 2016 through 2020 to carry out this section.

7 **SEC. 221. NATIONAL SCIENCE FOUNDATION SUPPORT FOR**  
8 **BROADENING PARTICIPATION IN UNDER-**  
9 **GRADUATE STEM EDUCATION.**

10 (a) GRANTS.—The Director of the National Science  
11 Foundation shall award grants to institutions of higher  
12 education (or consortia thereof) to implement or expand  
13 research-based reforms in undergraduate STEM edu-  
14 cation for the purpose of recruiting and retaining students  
15 from minority groups who are underrepresented in STEM  
16 fields, with a priority focus on natural science and engi-  
17 neering fields.

18 (b) MERIT REVIEW; COMPETITION.—Grants shall be  
19 awarded under this section on a merit-reviewed, competi-  
20 tive basis.

21 (c) USE OF FUNDS.—Activities supported by grants  
22 under this section may include—

23 (1) implementation or expansion of innovative,  
24 research-based approaches to broaden participation

1 of underrepresented minority groups in STEM  
2 fields;

3 (2) implementation or expansion of bridge, co-  
4 hort, tutoring, or mentoring programs designed to  
5 enhance the recruitment and retention of students  
6 from underrepresented minority groups in STEM  
7 fields;

8 (3) implementation or expansion of outreach  
9 programs linking institutions of higher education  
10 and K–12 school systems in order to heighten  
11 awareness among pre-college students from under-  
12 represented minority groups of opportunities in col-  
13 lege-level STEM fields and STEM careers;

14 (4) implementation or expansion of faculty de-  
15 velopment programs focused on improving retention  
16 of undergraduate STEM students from underrep-  
17 resented minority groups;

18 (5) implementation or expansion of mechanisms  
19 designed to recognize and reward faculty members  
20 who demonstrate a commitment to increasing the  
21 participation of students from underrepresented mi-  
22 nority groups in STEM fields;

23 (6) expansion of successful reforms aimed at in-  
24 creasing the number of STEM students from under-  
25 represented minority groups beyond a single course

1 or group of courses to achieve reform within an en-  
2 tire academic unit, or expansion of successful reform  
3 efforts beyond a single academic unit to other  
4 STEM academic units within an institution of high-  
5 er education;

6 (7) expansion of opportunities for students from  
7 underrepresented minority groups to conduct STEM  
8 research in industry, at Federal laboratories, and at  
9 international research institutions or research sites;

10 (8) provision of stipends for students from  
11 underrepresented minority groups participating in  
12 research;

13 (9) development of research collaborations be-  
14 tween research-intensive universities and primarily  
15 undergraduate minority-serving institutions;

16 (10) support for graduate students and post-  
17 doctoral fellows from underrepresented minority  
18 groups to participate in instructional or assessment  
19 activities at primarily undergraduate institutions, in-  
20 cluding primarily undergraduate minority-serving in-  
21 stitutions and two-year institutions of higher edu-  
22 cation; and

23 (11) other activities consistent with subsection  
24 (a), as determined by the Director of the National  
25 Science Foundation.

1 (d) SELECTION PROCESS.—

2 (1) APPLICATION.—An institution of higher  
3 education (or consortium thereof) seeking a grant  
4 under this section shall submit an application to the  
5 Director of the National Science Foundation at such  
6 time, in such manner, and containing such informa-  
7 tion and assurances as such Director may require.  
8 The application shall include, at a minimum—

9 (A) a description of the proposed reform  
10 effort;

11 (B) a description of the research findings  
12 that will serve as the basis for the proposed re-  
13 form effort or, in the case of applications that  
14 propose an expansion of a previously imple-  
15 mented reform, a description of the previously  
16 implemented reform effort, including data about  
17 the recruitment, retention, and academic  
18 achievement of students from underrepresented  
19 minority groups;

20 (C) evidence of an institutional commit-  
21 ment to, and support for, the proposed reform  
22 effort, including a long-term commitment to im-  
23 plement successful strategies from the current  
24 reform beyond the academic unit or units in-  
25 cluded in the grant proposal;

1 (D) a description of existing or planned in-  
2 stitutional policies and practices regarding fac-  
3 ulty hiring, promotion, tenure, and teaching as-  
4 signment that reward faculty contributions to  
5 improving the education of students from  
6 underrepresented minority groups in STEM;  
7 and

8 (E) how the success and effectiveness of  
9 the proposed reform effort will be evaluated and  
10 assessed in order to contribute to the national  
11 knowledge base about models for catalyzing in-  
12 stitutional change.

13 (2) REVIEW OF APPLICATIONS.—In selecting  
14 grant recipients under this section, the Director of  
15 the National Science Foundation shall consider, at a  
16 minimum—

17 (A) the likelihood of success of the pro-  
18 posed reform effort at the institution submit-  
19 ting the application, including the extent to  
20 which the faculty, staff, and administrators of  
21 the institution are committed to making the  
22 proposed institutional reform a priority of the  
23 participating academic unit or units;

24 (B) the degree to which the proposed re-  
25 form effort will contribute to change in institu-

1           tional culture and policy such that greater value  
2           is placed on faculty engagement in the retention  
3           of students from underrepresented minority  
4           groups;

5           (C) the likelihood that the institution will  
6           sustain or expand the proposed reform effort  
7           beyond the period of the grant; and

8           (D) the degree to which evaluation and as-  
9           sessment plans are included in the design of the  
10          proposed reform effort.

11          (3) PRIORITY.—For applications that include  
12          an expansion of existing reforms beyond a single  
13          academic unit, the Director of the National Science  
14          Foundation shall give priority to applications for  
15          which a senior institutional administrator, such as a  
16          dean or other administrator of equal or higher rank,  
17          serves as the principal investigator.

18          (4) GRANT DISTRIBUTION.—The Director of  
19          the National Science Foundation shall ensure, to the  
20          extent practicable, that grants awarded under this  
21          section are made to a variety of types of institutions  
22          of higher education, including two-year and minor-  
23          ity-serving institutions of higher education.

24          (e) EDUCATION RESEARCH.—



1           (1) IN GENERAL.—All grants made under this  
2       section shall include an education research compo-  
3       nent that will support the design and implementa-  
4       tion of a system for data collection and evaluation  
5       of proposed reform efforts in order to build the  
6       knowledge base on promising models for increasing  
7       recruitment and retention of students from under-  
8       represented minority groups in STEM education at  
9       the undergraduate level across a diverse set of insti-  
10      tutions.

11           (2) DISSEMINATION.—The Director of the Na-  
12      tional Science Foundation shall coordinate with rel-  
13      evant Federal agencies in disseminating the results  
14      of the research under this subsection to ensure that  
15      best practices in broadening participation in STEM  
16      education at the undergraduate level are made read-  
17      ily available to all institutions of higher education,  
18      other Federal agencies that support STEM pro-  
19      grams, non-Federal funders of STEM education,  
20      and the general public.

21           (f) AUTHORIZATION OF APPROPRIATIONS.—There  
22      are authorized to be appropriated to the Director of the  
23      National Science Foundation \$15,000,000 for each of fis-  
24      cal years 2016 through 2020 to carry out this section.

1 **SEC. 222. DEFINITIONS.**

2 (a) THIS SUBTITLE.—In this subtitle:

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

7 (2) FEDERAL SCIENCE AGENCY.—The term  
8 “Federal science agency” means any Federal agency  
9 with at least \$100,000,000 in research and develop-  
10 ment expenditures in fiscal year 2014.

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

15 (4) STEM.—The term “STEM” means science,  
16 technology, engineering, and mathematics, including  
17 other academic subjects that build on these dis-  
18 ciplines such as computer science.

19 (b) NATIONAL SCIENCE FOUNDATION AUTHORIZA-  
20 TION ACT OF 2002.—Section 4 of the National Science  
21 Foundation Authorization Act of 2002 (42 U.S.C. 1862n  
22 note) is amended—

23 (1) by redesignating paragraph (16) as para-  
24 graph (17); and

25 (2) by inserting after paragraph (15) the fol-  
26 lowing new paragraph:

1           “(16) STEM.—The term ‘STEM’ means  
2           science, technology, engineering, and mathematics,  
3           including other academic subjects that build on  
4           these disciplines such as computer science.”.

5           **TITLE III—NATIONAL SCIENCE**  
6           **FOUNDATION**

7           **Subtitle A—General Provisions**

8           **SEC. 301. AUTHORIZATION OF APPROPRIATIONS.**

9           (a) FISCAL YEAR 2016.—

10           (1) IN GENERAL.—There are authorized to be  
11           appropriated to the Foundation \$7,723,550,000 for  
12           fiscal year 2016.

13           (2) SPECIFIC ALLOCATIONS.—Of the amount  
14           authorized under paragraph (1)—

15                   (A) \$6,186,300,000 shall be made avail-  
16                   able for research and related activities;

17                   (B) \$962,570,000 shall be made available  
18                   for education and human resources;

19                   (C) \$200,310,000 shall be made available  
20                   for major research equipment and facilities con-  
21                   struction;

22                   (D) \$354,840,000 shall be made available  
23                   for agency operations and award management;

24                   (E) \$4,370,000 shall be made available for  
25                   the Office of the National Science Board, in-

cluding salaries and compensation for members of the Board and staff appointed under section 4 of the National Science Foundation Act of 1950 (42 U.S.C. 1863), travel and training costs for members of the Board and such staff, general and Board operating expenses, representational expenses for the Board, honorary awards made by the Board, Board reports (other than the report entitled “Science and Engineering Indicators”), and contracts; and

(F) \$15,160,000 shall be made available for the Office of Inspector General.

(b) FISCAL YEAR 2017.—

(1) IN GENERAL.—There are authorized to be appropriated to the Foundation \$8,099,010,000 for fiscal year 2017.

(2) SPECIFIC ALLOCATIONS.—Of the amount authorized under paragraph (1)—

(A) \$6,495,620,000 shall be made available for research and related activities;

(B) \$1,010,700,000 shall be made available for education and human resources;

(C) \$200,000,000 shall be made available for major research equipment and facilities construction;

1 (D) \$372,580,000 shall be made available  
2 for agency operations and award management;

3 (E) \$4,500,000 shall be made available for  
4 the Office of the National Science Board, in-  
5 cluding salaries and compensation for members  
6 of the Board and staff appointed under section  
7 4 of the National Science Foundation Act of  
8 1950 (42 U.S.C. 1863), travel and training  
9 costs for members of the Board and such staff,  
10 general and Board operating expenses, rep-  
11 resentational expenses for the Board, honorary  
12 awards made by the Board, Board reports  
13 (other than the report entitled “Science and  
14 Engineering Indicators”), and contracts; and

15 (F) \$15,610,000 shall be made available  
16 for the Office of Inspector General.

17 (c) FISCAL YEAR 2018.—

18 (1) IN GENERAL.—There are authorized to be  
19 appropriated to the Foundation \$8,493,560,000 for  
20 fiscal year 2018.

21 (2) SPECIFIC ALLOCATIONS.—Of the amount  
22 authorized under paragraph (1)—

23 (A) \$6,820,400,000 shall be made avail-  
24 able for research and related activities;

1 (B) \$1,061,230,000 shall be made avail-  
2 able for education and human resources;

3 (C) \$200,000,000 shall be made available  
4 for major research equipment and facilities con-  
5 struction;

6 (D) \$391,210,000 shall be made available  
7 for agency operations and award management;

8 (E) \$4,640,000 shall be made available for  
9 the Office of the National Science Board, in-  
10 cluding salaries and compensation for members  
11 of the Board and staff appointed under section  
12 4 of the National Science Foundation Act of  
13 1950 (42 U.S.C. 1863), travel and training  
14 costs for members of the Board and such staff,  
15 general and Board operating expenses, rep-  
16 resentational expenses for the Board, honorary  
17 awards made by the Board, Board reports  
18 (other than the report entitled “Science and  
19 Engineering Indicators”), and contracts; and

20 (F) \$16,080,000 shall be made available  
21 for the Office of Inspector General.

22 (d) FISCAL YEAR 2019.—

23 (1) IN GENERAL.—There are authorized to be  
24 appropriated to the Foundation \$8,907,820,000 for  
25 fiscal year 2019.

1           (2) SPECIFIC ALLOCATIONS.—Of the amount  
2 authorized under paragraph (1)—

3           (A) \$7,161,420,000 shall be made avail-  
4 able for research and related activities;

5           (B) \$1,114,300,000 shall be made avail-  
6 able for education and human resources;

7           (C) \$200,000,000 shall be made available  
8 for major research equipment and facilities con-  
9 struction;

10          (D) \$410,770,000 shall be made available  
11 for agency operations and award management;

12          (E) \$4,780,000 shall be made available for  
13 the Office of the National Science Board, in-  
14 cluding salaries and compensation for members  
15 of the Board and staff appointed under section  
16 4 of the National Science Foundation Act of  
17 1950 (42 U.S.C. 1863), travel and training  
18 costs for members of the Board and such staff,  
19 general and Board operating expenses, rep-  
20 resentational expenses for the Board, honorary  
21 awards made by the Board, Board reports  
22 (other than the report entitled “Science and  
23 Engineering Indicators”), and contracts; and

24          (F) \$16,570,000 shall be made available  
25 for the Office of Inspector General.

1 (e) FISCAL YEAR 2020.—

2 (1) IN GENERAL.—There are authorized to be  
3 appropriated to the Foundation \$9,342,790,000 for  
4 fiscal year 2020.

5 (2) SPECIFIC ALLOCATIONS.—Of the amount  
6 authorized under paragraph (1)—

7 (A) \$7,519,490,000 shall be made avail-  
8 able for research and related activities;

9 (B) \$1,170,010,000 shall be made avail-  
10 able for education and human resources;

11 (C) \$200,000,000 shall be made available  
12 for major research equipment and facilities con-  
13 struction;

14 (D) \$431,310,000 shall be made available  
15 for agency operations and award management;

16 (E) \$4,920,000 shall be made available for  
17 the Office of the National Science Board, in-  
18 cluding salaries and compensation for members  
19 of the Board and staff appointed under section  
20 4 of the National Science Foundation Act of  
21 1950 (42 U.S.C. 1863), travel and training  
22 costs for members of the Board and such staff,  
23 general and Board operating expenses, rep-  
24 resentational expenses for the Board, honorary  
25 awards made by the Board, Board reports



1 (other than the report entitled “Science and  
2 Engineering Indicators”), and contracts; and

3 (F) \$17,060,000 shall be made available  
4 for the Office of Inspector General.

5 **SEC. 302. FINDINGS AND SENSE OF CONGRESS ON SUP-**  
6 **PORT FOR ALL FIELDS OF SCIENCE AND EN-**  
7 **GINEERING.**

8 (a) FINDINGS.—Congress finds that the Founda-  
9 tion’s investments in social, behavioral, and economic re-  
10 search have addressed challenges, including—

11 (1) in medicine, matching organ donors to pa-  
12 tients, leading to a dramatic growth in paired kidney  
13 transplants;

14 (2) in policing, implementing predictive models  
15 that help to yield significant reductions in crime;

16 (3) in resource allocation, developing the theo-  
17 ries underlying the Federal Communications Com-  
18 mission spectrum auction, which has generated over  
19 \$60,000,000,000 in revenue;

20 (4) in disaster preparation and recovery, identi-  
21 fying barriers to effective disaster evacuation strate-  
22 gies;

23 (5) in national defense, assisting United States  
24 troops in cross-cultural communication and in identi-  
25 fying threats; and

1           (6) in areas such as economics, education, cy-  
2       bersecurity, transportation, and national defense,  
3       supporting informed decisionmaking in foreign and  
4       domestic policy.

5       (b) SENSE OF CONGRESS.—It is the sense of Con-  
6       gress that in order to achieve its mission “to promote the  
7       progress of science; to advance the national health, pros-  
8       perity, and welfare; to secure the national defense” the  
9       Foundation must continue to support unfettered, competi-  
10      tive, merit-reviewed basic research across all fields of  
11      science and engineering, including the social, behavioral,  
12      and economic sciences.

13   **SEC. 303. NATIONAL SCIENCE FOUNDATION MERIT REVIEW.**

14       (a) SENSE OF CONGRESS.—It is the sense of Con-  
15      gress that—

16           (1) the Foundation’s Intellectual Merit and  
17       Broader Impacts criteria remain appropriate for  
18       evaluating grant proposals, as concluded by the  
19       2011 National Science Board Task Force on Merit  
20       Review;

21           (2) evaluating proposals on the basis of the  
22       Foundation’s Intellectual Merit and Broader Im-  
23       pacts criteria ensures that—

1 (A) proposals funded by the Foundation  
2 are of high quality and advance scientific  
3 knowledge; and

4 (B) the Foundation's overall funding port-  
5 folio addresses societal needs through research  
6 findings or through related activities; and

7 (3) as evidenced by the Foundation's contribu-  
8 tions to scientific advancement, economic develop-  
9 ment, human health, and national security, its peer  
10 review and merit review processes have successfully  
11 identified and funded scientifically and societally rel-  
12 evant research, remain the gold standard for the  
13 world, and must be preserved.

14 (b) CRITERIA.—The Foundation shall maintain the  
15 Intellectual Merit and Broader Impacts criteria as the  
16 basis for evaluating grant proposals in the merit review  
17 process.

18 **SEC. 304. MANAGEMENT AND OVERSIGHT OF LARGE FA-**  
19 **CILITIES.**

20 (a) LARGE FACILITIES OFFICE.—The Director shall  
21 maintain a Large Facilities Office within the Foundation.  
22 The functions of the Large Facilities Office shall be to  
23 support the research directorates in the development and  
24 implementation of major research facilities, including by—

1           (1) serving as the Foundation’s primary re-  
2           source for all policy or process issues related to the  
3           development and implementation of major research  
4           facilities;

5           (2) serving as a Foundation-wide resource on  
6           project management, including providing expert as-  
7           sistance on nonscientific and nontechnical aspects of  
8           project planning, budgeting, implementation, man-  
9           agement, and oversight; and

10          (3) coordinating and collaborating with research  
11          directorates to share best management practices and  
12          lessons learned from prior projects.

13          (b) OVERSIGHT OF LARGE FACILITIES.—The Direc-  
14          tor shall appoint a senior agency official within the Office  
15          of the Director whose primary responsibility is oversight  
16          of major research facilities. The duties of this official shall  
17          include—

18               (1) oversight of the development, construction,  
19               and operation of major research facilities across the  
20               Foundation;

21               (2) in collaboration with the directors of the re-  
22               search directorates and other senior agency officials  
23               as appropriate, ensuring that the requirements of  
24               section 14(a) of the National Science Foundation  
25               Authorization Act of 2002 are satisfied;

1           (3) serving as a liaison to the National Science  
2       Board for approval and oversight of major research  
3       facilities; and

4           (4) periodically reviewing and updating as nec-  
5       essary Foundation policies and guidelines for the de-  
6       velopment and construction of major research facili-  
7       ties.

8       (c) POLICIES FOR COSTING LARGE FACILITIES.—

9           (1) IN GENERAL.—The Director shall ensure  
10      that the Foundation’s policies for developing and  
11      managing major research facility construction costs  
12      are consistent with the best practices described in  
13      the March 2009 General Accountability Office Re-  
14      port GAO–09–3SP.

15          (2) REPORT.—Not later than 12 months after  
16      the date of enactment of this Act, the Director shall  
17      submit to Congress a report describing the Founda-  
18      tion’s policies for developing and managing major re-  
19      search facility construction costs, including a de-  
20      scription of any aspects of the policies that diverge  
21      from the best practices recommended in General Ac-  
22      countability Office Report GAO–09–3SP.

1 **SEC. 305. SUPPORT FOR POTENTIALLY TRANSFORMATIVE**  
2 **RESEARCH.**

3 (a) IN GENERAL.—The Director shall establish and  
4 periodically update grant solicitation, merit review, and  
5 funding policies and mechanisms designed to identify and  
6 provide support for high-risk, high-reward basic research  
7 proposals.

8 (b) POLICIES AND MECHANISMS.—Such policies and  
9 mechanisms may include—

10 (1) development of solicitations specifically for  
11 high-risk, high-reward basic research;

12 (2) establishment of review panels for the pri-  
13 mary purpose of selecting high-risk, high-reward  
14 proposals;

15 (3) development of guidance to standard review  
16 panels to encourage the identification and consider-  
17 ation of high-risk, high-reward proposals; and

18 (4) support for workshops and other con-  
19 ferences with the primary purpose of identifying new  
20 opportunities for high-risk, high-reward basic re-  
21 search, especially at interdisciplinary interfaces.

22 (c) DEFINITION.—For purposes of this section, the  
23 term “high-risk, high-reward basic research” means re-  
24 search driven by ideas that have the potential to radically  
25 change our understanding of an important existing sci-  
26 entific or engineering concept, or leading to the creation

1 of a new paradigm or field of science or engineering, and  
2 that is characterized by its challenge to current under-  
3 standing or its pathway to new frontiers.

4 **SEC. 306. STRENGTHENING INSTITUTIONAL RESEARCH**  
5 **PARTNERSHIPS.**

6 (a) IN GENERAL.—For any Foundation research  
7 grant, in an amount greater than \$5,000,000, to be car-  
8 ried out through a partnership that includes one or more  
9 minority-serving institutions or predominantly under-  
10 graduate institutions and one or more institutions de-  
11 scribed in subsection (b), the Director shall award funds  
12 directly, according to the budget justification described in  
13 the grant proposal, to at least two of the institutions of  
14 higher education in the partnership, including at least one  
15 minority-serving institution or one predominantly under-  
16 graduate institution, to ensure a strong and equitable  
17 partnership.

18 (b) INSTITUTIONS.—The institutions referred to in  
19 subsection (a) are institutions of higher education that are  
20 among the 100 institutions receiving, over the 3-year pe-  
21 riod immediately preceding the awarding of grants, the  
22 highest amount of research funding from the Foundation.

23 (c) REPORT.—Not later than 2 years after the date  
24 of enactment of this Act, the Director shall provide a re-  
25 port to Congress on institutional research partnerships

1 identified in subsection (a) funded in the 2 previous fiscal  
2 years and make any recommendations for how such part-  
3 nerships can continue to be strengthened.

4 **SEC. 307. INNOVATION CORPS.**

5 (a) SENSE OF CONGRESS.—It is the sense of Con-  
6 gress that—

7 (1) the National Science Foundation’s Innova-  
8 tion Corps (I–Corps) was established to foster a na-  
9 tional innovation ecosystem by encouraging institu-  
10 tions, scientists, engineers, and entrepreneurs to  
11 identify and explore the innovation and commercial  
12 potential of Foundation-funded research well beyond  
13 the laboratory;

14 (2) the Foundation’s I–Corps includes invest-  
15 ments in entrepreneurship and commercialization  
16 education, training, and mentoring, ultimately lead-  
17 ing to the practical deployment of technologies,  
18 products, processes, and services that improve the  
19 Nation’s competitiveness, promote economic growth,  
20 and benefit society; and

21 (3) by building networks of entrepreneurs, edu-  
22 cators, mentors, institutions, and collaborations, and  
23 supporting specialized education and training, I–  
24 Corps is at the leading edge of a strong, lasting  
25 foundation for an American innovation ecosystem.



1 (b) PROGRAM.—

2 (1) IN GENERAL.—The Director shall carry out  
3 a program to award grants for entrepreneurship and  
4 commercialization education to Foundation-funded  
5 researchers to increase the economic and social im-  
6 pact of federally funded research.

7 (2) PURPOSES.—The purpose of the program  
8 shall be to increase the capacity of STEM research-  
9 ers and students to successfully engage in entrepre-  
10 neurial activities and to help transition the results of  
11 federally funded research into the marketplace by—

12 (A) identifying STEM research that can  
13 lead to the practical deployment of technologies,  
14 products, processes, and services that improve  
15 the Nation’s economic competitiveness;

16 (B) bringing STEM researchers and stu-  
17 dents together with entrepreneurs, venture cap-  
18 italists, and other industry representatives expe-  
19 rienced in commercialization of new tech-  
20 nologies;

21 (C) supporting entrepreneurship and com-  
22 mercialization education and training for fac-  
23 ulty, students, postdoctoral fellows, and other  
24 STEM researchers; and

1 (D) promoting the development of regional  
2 and national networks of entrepreneurs, venture  
3 capitalists, and other industry representatives  
4 who can serve as mentors to researchers and  
5 students at Foundation-funded institutions  
6 across the country.

7 (3) ADDITIONAL USE OF FUNDS.—Grants  
8 awarded under this subsection may be used to help  
9 support—

10 (A) prototype and proof-of-concept devel-  
11 opment for the funded project; and

12 (B) additional activities needed to build a  
13 national infrastructure for STEM entrepreneur-  
14 ship.

15 (4) OTHER FEDERAL AGENCIES.—The Director  
16 may establish agreements with other Federal agen-  
17 cies that fund scientific research to make research-  
18 ers funded by those agencies eligible to participate  
19 in the Foundation’s Innovation Corps program.

20 **SEC. 308. DEFINITIONS.**

21 For purposes of this title:

22 (1) DIRECTOR.—The term “Director” means  
23 the Director of the Foundation.

24 (2) FOUNDATION.—The term “Foundation”  
25 means the National Science Foundation.

1           (3) INSTITUTION OF HIGHER EDUCATION.—The  
2       term “institution of higher education” has the  
3       meaning given such term in section 101(a) of the  
4       Higher Education Act of 1965 (20 U.S.C. 1001(a)).

5           (4) STEM.—The term “STEM” means science,  
6       technology, engineering, and mathematics, including  
7       other academic subjects that build on these dis-  
8       ciplines such as computer science.

## 9           **Subtitle B—STEM Education**

### 10   **SEC. 321. NATIONAL SCIENCE BOARD REPORT ON CONSOLI-** 11                   **DATION OF STEM EDUCATION ACTIVITIES AT** 12                   **THE FOUNDATION.**

13       (a) IN GENERAL.—The National Science Board shall  
14       review and evaluate the appropriateness of the Founda-  
15       tion’s portfolio of STEM education programs and activi-  
16       ties at the pre-K–12 and undergraduate levels, including  
17       informal education, taking into account the mission of the  
18       Foundation and the 2013 Federal STEM Education 5-  
19       Year Strategic Plan.

20       (b) REPORT.—Not later than 1 year after the date  
21       of enactment of this Act, the National Science Board shall  
22       submit to Congress a report summarizing their findings  
23       and including—

1           (1) an analysis of how well the Foundation's  
2       portfolio of STEM education programs is contrib-  
3       uting to the mission of the Foundation;

4           (2) an analysis of how well STEM education  
5       programs and activities are coordinated and best  
6       practices are shared across the Foundation;

7           (3) an analysis of how well the Foundation's  
8       portfolio of STEM education programs is aligned  
9       with and contributes to priority STEM education in-  
10      vestment areas described in the 2013 Federal STEM  
11      Education 5-Year Strategic Plan;

12          (4) any Board recommendations regarding in-  
13      ternal reorganization, including consolidation, of the  
14      Foundation's STEM education programs and activi-  
15      ties, taking into account both the mission of the  
16      Foundation and the 2013 Federal STEM Education  
17      5-Year Strategic Plan;

18          (5) any Board recommendations regarding the  
19      Foundation's role in helping to implement the Fed-  
20      eral STEM Education 5-Year Strategic Plan, includ-  
21      ing opportunities for the Foundation to more effec-  
22      tively partner and collaborate with other Federal  
23      agencies; and

24          (6) any additional Board recommendations re-  
25      garding specific management, policy, budget, or

1 other steps the Foundation should take to increase  
2 effectiveness and accountability across its portfolio  
3 of STEM education programs and activities.

4 **SEC. 322. MODELS FOR GRADUATE STUDENT SUPPORT.**

5 (a) IN GENERAL.—The Director shall enter into an  
6 agreement with the National Research Council to convene  
7 a workshop or roundtable to examine models of Federal  
8 support for STEM graduate students, including the Foun-  
9 dation’s Graduate Research Fellowship program and com-  
10 parable fellowship programs at other agencies, traineeship  
11 programs, and the research assistant model.

12 (b) PURPOSE.—The purpose of the workshop or  
13 roundtable shall be to compare and evaluate the extent  
14 to which each of these models helps to prepare graduate  
15 students for diverse careers utilizing STEM degrees, in-  
16 cluding at diverse types of institutions of higher education,  
17 in industry, and at government agencies and research lab-  
18 oratories, and to make recommendations regarding—

19 (1) how current Federal programs and models,  
20 including programs and models at the Foundation,  
21 can be improved;

22 (2) the appropriateness of the current distribu-  
23 tion of funding among the different models at the  
24 Foundation and across the agencies; and

1           (3) the appropriateness of creating a new edu-  
2           cation and training program for graduate students  
3           distinct from programs that provide direct financial  
4           support, including the grants authorized in section  
5           527 of the America COMPETES Reauthorization  
6           Act of 2010 (42 U.S.C. 1862p–15).

7           (c) CRITERIA.—At a minimum, in comparing pro-  
8           grams and models, the workshop or roundtable partici-  
9           pants shall consider the capacity of such programs or  
10          models to provide students with knowledge and skills—

11               (1) to become independent, creative, successful  
12          researchers;

13               (2) to participate in large interdisciplinary re-  
14          search projects, including in an international con-  
15          text;

16               (3) to adhere to the highest standards for re-  
17          search ethics;

18               (4) to become high-quality teachers utilizing the  
19          most currently available evidence-based pedagogy;

20               (5) in oral and written communication, to both  
21          technical and nontechnical audiences;

22               (6) in innovation, entrepreneurship, and busi-  
23          ness ethics; and

24               (7) in program management.

1 (d) GRADUATE STUDENT INPUT.—The participants  
2 in the workshop or roundtable shall include current or re-  
3 cent STEM graduate students.

4 (e) REPORT.—Not later than 1 year after the date  
5 of enactment of this Act, the National Research Council  
6 shall submit to Congress a summary report of the findings  
7 and recommendations of the workshop or roundtable con-  
8 vened under this section.

9 **SEC. 323. UNDERGRADUATE STEM EDUCATION REFORM.**

10 Section 17 of the National Science Foundation Au-  
11 thorization Act of 2002 (42 U.S.C. 1862n–6) is amended  
12 to read as follows:

13 **“SEC. 17. UNDERGRADUATE STEM EDUCATION REFORM.**

14 “(a) IN GENERAL.—The Director, through the Direc-  
15 torate for Education and Human Resources, shall award  
16 grants, on a competitive, merit-reviewed basis, to institu-  
17 tions of higher education (or to consortia thereof) and to  
18 other eligible nonprofit organizations to reform under-  
19 graduate STEM education for the purpose of increasing  
20 the number and quality of students studying toward and  
21 completing baccalaureate degrees in STEM and improving  
22 the STEM learning outcomes for all undergraduate stu-  
23 dents.

24 “(b) INTERDIRECTORATE WORKING GROUP ON UN-  
25 DERGRADUATE STEM EDUCATION.—In carrying out the

1 requirements of this section, the Directorate for Education  
2 and Human Resources shall collaborate and coordinate  
3 with the Research Directorates, including through the es-  
4 tablishment of an interdirectorate working group on un-  
5 dergraduate STEM education reform, in order to identify  
6 and implement new and expanded opportunities for col-  
7 laboration between STEM disciplinary researchers and  
8 education researchers on the reform of undergraduate  
9 STEM education.

10 “(c) GRANTS.—Research and development supported  
11 by grants under this section may encompass a single dis-  
12 cipline, multiple disciplines, or interdisciplinary education  
13 at the undergraduate level, and may include—

14 “(1) research foundational to the improvement  
15 of teaching, learning, and retention;

16 “(2) development, implementation, and assess-  
17 ment of innovative, research-based approaches to  
18 transforming teaching, learning, and retention; and

19 “(3) scaling of successful efforts on learning  
20 and learning environments, broadening participation,  
21 workforce preparation, employing emerging tech-  
22 nologies, or other reforms in STEM education, in-  
23 cluding expansion of successful STEM reform ef-  
24 forts beyond a single course or group of courses to  
25 achieve reform within an entire academic unit, or ex-



1       pansion of successful reform efforts beyond a single  
2       academic unit to other STEM academic units within  
3       an institution or to comparable academic units at  
4       other institutions.

5       “(d) SELECTION PROCESS.—

6               “(1) APPLICATIONS.—An institution of higher  
7       education or other eligible nonprofit organization  
8       seeking a grant under this section shall submit an  
9       application to the Director at such time, in such  
10      manner, and containing such information as the Di-  
11      rector may require. In addition to a description of  
12      the proposed research, development, or scaling ef-  
13      fort, including a description of the research findings  
14      that will serve as the basis for the proposed effort,  
15      applications shall include, at a minimum—

16               “(A) evidence of institutional support for,  
17              and commitment to, the proposed effort, includ-  
18              ing long-term commitment to implement and  
19              scale successful strategies resulting from the  
20              current effort;

21               “(B) a description of existing or planned  
22              institutional policies and practices regarding  
23              faculty hiring, promotion, tenure, and teaching  
24              assignment that reward faculty contributions to  
25              undergraduate STEM education; and

1           “(C) a description of the plans for assess-  
2           ment and evaluation of the effort, including evi-  
3           dence of participation by individuals with expe-  
4           rience in assessment and evaluation of teaching  
5           and learning programs.

6           “(2) REVIEW OF APPLICATIONS.—In selecting  
7           grant recipients for funding under this section, the  
8           Director shall consider, as appropriate to the scale  
9           of the proposed effort—

10           “(A) the likelihood of success in under-  
11           taking the proposed effort at the institution  
12           submitting the application, including the extent  
13           to which the faculty, staff, and administrators  
14           of the institution are committed to making un-  
15           dergraduate STEM education reform a priority  
16           of the participating academic unit or units;

17           “(B) the degree to which the proposed ef-  
18           fort will contribute to change in institutional  
19           culture and policy such that a greater value is  
20           placed on faculty engagement in undergraduate  
21           education;

22           “(C) the likelihood that the institution will  
23           sustain or expand the effort beyond the period  
24           of the grant; and

1                   “(D) the degree to which the proposed ef-  
2                   fort will contribute to the systematic accumula-  
3                   tion of knowledge on STEM education.

4                   “(3) PRIORITY.—The Director shall give pri-  
5                   ority to proposals focused on the first 2 years of un-  
6                   dergraduate education, including STEM education  
7                   at 2-year institutions of higher education.

8                   “(4) GRANT DISTRIBUTION.—The Director  
9                   shall ensure, to the extent practicable, that grants  
10                  awarded under this section are made to a variety of  
11                  types of institutions of higher education.”.

12 **SEC. 324. ADVANCED MANUFACTURING EDUCATION.**

13                  Section 506(b) of the America COMPETES Reau-  
14                  thorization Act of 2010 (42 U.S.C. 1862p–1(b)) is amend-  
15                  ed to read as follows:

16                  “(b) ADVANCED MANUFACTURING EDUCATION.—  
17                  The Director shall award grants, on a competitive, merit  
18                  reviewed basis, to community colleges for the development  
19                  and implementation of innovative advanced manufacturing  
20                  education reforms to ensure an adequate and well-trained  
21                  advanced manufacturing workforce. Activities supported  
22                  by grants under this subsection may include—

23                         “(1) the development or expansion of edu-  
24                         cational materials, courses, curricula, strategies, and  
25                         methods that will lead to improved advanced manu-

1       facturing degree or certification programs, including  
2       the integration of industry standards and workplace  
3       competencies into the curriculum;

4           “(2) the development and implementation of  
5       faculty professional development programs that en-  
6       hance a faculty member’s capabilities and teaching  
7       skills in advanced manufacturing, including efforts  
8       to understand current advanced manufacturing tech-  
9       nologies and practices;

10          “(3) the establishment of centers that provide  
11       models and leadership in advanced manufacturing  
12       education and serve as regional or national clearing-  
13       houses for educational materials and methods, in-  
14       cluding in rural areas;

15          “(4) activities to enhance the recruitment and  
16       retention of students into certification and degree  
17       programs in advanced manufacturing, including the  
18       provision of improved mentoring and internship op-  
19       portunities;

20          “(5) the establishment of partnerships with pri-  
21       vate sector entities to ensure the development of an  
22       advanced manufacturing workforce with the skills  
23       necessary to meet regional economic needs; and

24          “(6) other activities as determined appropriate  
25       by the Director.”.

1 **SEC. 325. STEM EDUCATION PARTNERSHIPS.**

2 Section 9 of the National Science Foundation Au-  
3 thorization Act of 2002 (42 U.S.C. 1862n) is amended—

4 (1) in the section heading, by striking “**MATH-**  
5 **EMATICS AND SCIENCE**” and inserting “**STEM**”;

6 (2) by striking “mathematics and science” each  
7 place it appears in subsections (a) and (b) and in-  
8 serting “STEM”;

9 (3) by striking “mathematics or science” each  
10 place it appears in subsection (a)(3) and (4)(A) and  
11 inserting “STEM”;

12 (4) by striking “mathematics, science, or engi-  
13 neering” in subsection (a)(2)(B) and inserting  
14 “STEM”;

15 (5) by striking “mathematics, science, and tech-  
16 nology” in subsection (a)(3)(B)(ii)(II) and (8) and  
17 inserting “STEM”;

18 (6) by striking “professional mathematicians,  
19 scientists, and engineers” in subsection (a)(3)(F)  
20 and inserting “STEM professionals”;

21 (7) by striking “mathematicians, scientists, and  
22 engineers” in subsection (a)(3)(J) and (M) and in-  
23 serting “STEM professionals”;

24 (8) by striking “scientists, technologists, engi-  
25 neers, or mathematicians” in subsection (a)(8) and  
26 inserting “STEM professionals”;

1           (9) by striking “science, technology, engineer-  
2           ing, and mathematics” each place it appears in sub-  
3           section (a)(3)(K) and (10) and inserting “STEM”;

4           (10) by striking “science, technology, engineer-  
5           ing, or mathematics” in subsection (a)(10)(A)(ii)(II)  
6           and inserting “STEM”;

7           (11) by striking “science, mathematics, engi-  
8           neering, and technology” each place it appears in  
9           subsection (a)(5) and inserting “STEM”;

10          (12) by striking “science, mathematics, engi-  
11          neering, or technology” in subsection (a)(5) and in-  
12          serting “STEM”;

13          (13) by striking “mathematics, science, engi-  
14          neering, and technology” in subsection (b)(1) and  
15          (2) and inserting “STEM”; and

16          (14) by striking subsection (d).

17 **SEC. 326. NOYCE SCHOLARSHIP PROGRAM AMENDMENTS.**

18          Section 10A of the National Science Foundation Au-  
19          thorization Act of 2002 (42 U.S.C. 1862n–1a) is amend-  
20          ed—

21               (1) in subsection (a)(2)(B), by inserting “or  
22               bachelor’s” after “master’s”;

23               (2) in subsection (c)—

24                       (A) by striking “and” at the end of para-  
25                       graph (2)(B);

1 (B) in paragraph (3), by—

2 (i) inserting “for teachers with mas-  
3 ter’s degrees in their field” after “Teach-  
4 ing Fellowships”; and

5 (ii) by striking the period at the end  
6 of subparagraph (B) and inserting “;  
7 and”; and

8 (C) by adding at the end the following new  
9 paragraph:

10 “(4) in the case of National Science Foundation  
11 Master Teaching Fellowships for teachers with bach-  
12 elor’s degrees in their field—

13 “(A) offering academic courses leading to  
14 a master’s degree and leadership training to  
15 prepare individuals to become master teachers  
16 in elementary and secondary schools; and

17 “(B) offering programs both during and  
18 after matriculation in the program for which  
19 the fellowship is received to enable fellows to  
20 become highly effective mathematics and  
21 science teachers, including mentoring, training,  
22 induction, and professional development activi-  
23 ties, to fulfill the service requirements of this  
24 section, including the requirements of sub-

1 section (e), and to exchange ideas with others  
 2 in their fields.”;

3 (3) in subsection (e), by striking “subsection  
 4 (g)” and inserting “subsection (h)”; and

5 (4) by adding after subsection (f) the following  
 6 new subsection:

7 “(g) SUPPORT FOR MASTER TEACHING FELLOWS  
 8 WHILE ENROLLED IN A MASTER’S DEGREE PROGRAM.—  
 9 A National Science Foundation Master Teacher Fellow  
 10 may receive a maximum of 1 year of fellowship support  
 11 while enrolled in a master’s degree program as described  
 12 in subsection (c)(4)(A), except that if such fellow is en-  
 13 rolled in a part-time program, such amount shall be pro-  
 14 rated according to the length of the program.”.

15 **SEC. 327. INFORMAL STEM EDUCATION.**

16 (a) GRANTS.—The Director, through the Directorate  
 17 for Education and Human Resources, shall continue to  
 18 award competitive, merit-reviewed grants to support—

19 (1) research and development of innovative out-  
 20 of-school STEM learning and emerging STEM  
 21 learning environments in order to improve STEM  
 22 learning outcomes and engagement in STEM; and

23 (2) research that advances the field of informal  
 24 STEM education.



1 (b) USES OF FUNDS.—Activities supported by grants  
2 under this section may encompass a single STEM dis-  
3 cipline, multiple STEM disciplines, or integrative STEM  
4 initiatives and shall include—

5 (1) research and development that improves our  
6 understanding of learning and engagement in infor-  
7 mal environments, including the role of informal en-  
8 vironments in broadening participation in STEM;  
9 and

10 (2) design and testing of innovative STEM  
11 learning models, programs, and other resources for  
12 informal learning environments to improve STEM  
13 learning outcomes and increase engagement for K–  
14 12 students, K–12 teachers, and the general public,  
15 including design and testing of the scalability of  
16 models, programs, and other resources.

17 **SEC. 328. RESEARCH AND DEVELOPMENT TO SUPPORT IM-**  
18 **PROVED K-12 LEARNING.**

19 (a) IN GENERAL.—The Director, acting through the  
20 Directorate for Education and Human Resources, shall  
21 award competitive, merit-reviewed grants to support re-  
22 search and development on alignment, implementation,  
23 impact, and ongoing improvement of standards and equiv-  
24 alent learning expectations used by States in mathematics,

1 science, and, as appropriate, other State-based STEM  
2 standards.

3 (b) RESEARCH AREAS.—In making awards under  
4 this section, the Director shall consider proposals for re-  
5 search and development, including, as appropriate, large-  
6 scale research and development, of—

7 (1) resources, including virtual resources such  
8 as web portals, for content, professional develop-  
9 ment, and research results;

10 (2) teacher education and professional develop-  
11 ment;

12 (3) learning progressions;

13 (4) assessments;

14 (5) metrics for evaluating the impact of stand-  
15 ards; and

16 (6) other areas of research and development  
17 that are likely to contribute to the alignment, imple-  
18 mentation, impact, and ongoing improvement of  
19 standards in STEM subjects.

20 **TITLE IV—NATIONAL INSTITUTE**  
21 **OF STANDARDS AND TECH-**  
22 **NOLOGY**

23 **SEC. 401. SHORT TITLE.**

24 This title may be cited as the “National Institute of  
25 Standards and Technology Authorization Act of 2015”.

1 **SEC. 402. AUTHORIZATION OF APPROPRIATIONS.**

2 (a) FISCAL YEAR 2016.—

3 (1) IN GENERAL.—There are authorized to be  
4 appropriated to the Secretary of Commerce  
5 \$1,119,700,000 for the National Institute of Stand-  
6 ards and Technology for fiscal year 2016.

7 (2) SPECIFIC ALLOCATIONS.—Of the amount  
8 authorized by paragraph (1)—

9 (A) \$754,700,000 shall be authorized for  
10 scientific and technical research and services  
11 laboratory activities;

12 (B) \$59,000,000 shall be authorized for  
13 the construction and maintenance of facilities;  
14 and

15 (C) \$306,000,000 shall be authorized for  
16 industrial technology services activities, of  
17 which—

18 (i) \$141,000,000 shall be authorized  
19 for the Hollings Manufacturing Extension  
20 Partnership under section 25 of the Na-  
21 tional Institute of Standards and Tech-  
22 nology Act (15 U.S.C. 278k) and the pro-  
23 gram under section 26 of such Act (15  
24 U.S.C. 278l), of which not more than  
25 \$20,000,000 shall be for the competitive

1 grant program under section 25(f) of such  
2 Act; and

3 (ii) \$150,000,000 shall be authorized  
4 for the Network for Manufacturing Inno-  
5 vation Program established under section  
6 34 of such Act (15 U.S.C. 278s).

7 (b) FISCAL YEAR 2017.—

8 (1) IN GENERAL.—There are authorized to be  
9 appropriated to the Secretary of Commerce  
10 \$1,484,390,000 for the National Institute of Stand-  
11 ards and Technology for fiscal year 2017.

12 (2) SPECIFIC ALLOCATIONS.—Of the amount  
13 authorized by paragraph (1)—

14 (A) \$792,440,000 shall be authorized for  
15 scientific and technical research and services  
16 laboratory activities;

17 (B) \$61,950,000 shall be authorized for  
18 the construction and maintenance of facilities;  
19 and

20 (C) \$320,000,000 shall be authorized for  
21 industrial technology services activities, of  
22 which—

23 (i) \$160,000,000 shall be authorized  
24 for the Hollings Manufacturing Extension  
25 Partnership under section 25 of the Na-

1           tional Institute of Standards and Tech-  
2           nology Act (15 U.S.C. 278k) and the pro-  
3           gram under section 26 of such Act (15  
4           U.S.C. 278l), of which not more than  
5           \$20,000,000 shall be for the competitive  
6           grant program under section 25(f) of such  
7           Act; and

8                   (ii) \$150,000,000 shall be authorized  
9           for the Network for Manufacturing Inno-  
10          vation Program established under section  
11          34 of such Act (15 U.S.C. 278s).

12       (c) FISCAL YEAR 2018.—

13           (1) IN GENERAL.—There are authorized to be  
14       appropriated to the Secretary of Commerce  
15       \$1,517,100,000 for the National Institute of Stand-  
16       ards and Technology for fiscal year 2018.

17           (2) SPECIFIC ALLOCATIONS.—Of the amount  
18       authorized by paragraph (1)—

19                   (A) \$832,060,000 shall be authorized for  
20       scientific and technical research and services  
21       laboratory activities;

22                   (B) \$65,050,000 shall be authorized for  
23       the construction and maintenance of facilities;  
24       and

1 (C) \$310,000,000 shall be authorized for  
2 industrial technology services activities, of  
3 which—

4 (i) \$160,000,000 shall be authorized  
5 for the Hollings Manufacturing Extension  
6 Partnership under section 25 of the Na-  
7 tional Institute of Standards and Tech-  
8 nology Act (15 U.S.C. 278k) and the pro-  
9 gram under section 26 of such Act (15  
10 U.S.C. 278l), of which not more than  
11 \$20,000,000 shall be for the competitive  
12 grant program under section 25(f) of such  
13 Act; and

14 (ii) \$150,000,000 shall be authorized  
15 for the Network for Manufacturing Inno-  
16 vation Program established under section  
17 34 of such Act (15 U.S.C. 278s).

18 (d) FISCAL YEAR 2019.—

19 (1) IN GENERAL.—There are authorized to be  
20 appropriated to the Secretary of Commerce  
21 \$1,561,960,000 for the National Institute of Stand-  
22 ards and Technology for fiscal year 2019.

23 (2) SPECIFIC ALLOCATIONS.—Of the amount  
24 authorized by paragraph (1)—

1 (A) \$873,660,000 shall be authorized for  
2 scientific and technical research and services  
3 laboratory activities;

4 (B) \$68,300,000 shall be authorized for  
5 the construction and maintenance of facilities;  
6 and

7 (C) \$310,000,000 shall be authorized for  
8 industrial technology services activities, of  
9 which—

10 (i) \$160,000,000 shall be authorized  
11 for the Hollings Manufacturing Extension  
12 Partnership under section 25 of the Na-  
13 tional Institute of Standards and Tech-  
14 nology Act (15 U.S.C. 278k) and the pro-  
15 gram under section 26 of such Act (15  
16 U.S.C. 278l), of which not more than  
17 \$20,000,000 shall be for the competitive  
18 grant program under section 25(f) of such  
19 Act; and

20 (ii) \$150,000,000 shall be authorized  
21 for the Network for Manufacturing Inno-  
22 vation Program established under section  
23 34 of such Act (15 U.S.C. 278s).

24 (e) FISCAL YEAR 2020.—

1           (1) IN GENERAL.—There are authorized to be  
2           appropriated to the Secretary of Commerce  
3           \$1,609,060,000 for the National Institute of Stand-  
4           ards and Technology for fiscal year 2020.

5           (2) SPECIFIC ALLOCATIONS.—Of the amount  
6           authorized by paragraph (1)—

7                   (A) \$917,340,000 shall be authorized for  
8                   scientific and technical research and services  
9                   laboratory activities;

10                   (B) \$71,710,000 shall be authorized for  
11                   the construction and maintenance of facilities;  
12                   and

13                   (C) \$310,000,000 shall be authorized for  
14                   industrial technology services activities, of  
15                   which—

16                           (i) \$160,000,000 shall be authorized  
17                           for the Hollings Manufacturing Extension  
18                           Partnership under section 25 of the Na-  
19                           tional Institute of Standards and Tech-  
20                           nology Act (15 U.S.C. 278k) and the pro-  
21                           gram under section 26 of such Act (15  
22                           U.S.C. 278l), of which not more than  
23                           \$20,000,000 shall be for the competitive  
24                           grant program under section 25(f) of such  
25                           Act; and



1 (ii) \$150,000,000 shall be authorized  
2 for the Network for Manufacturing Inno-  
3 vation Program established under section  
4 34 of such Act (15 U.S.C. 278s).

5 **SEC. 403. HOLLINGS MANUFACTURING EXTENSION PART-**  
6 **NERSHIP.**

7 Section 25 of the National Institute of Standards and  
8 Technology Act (15 U.S.C. 278k) is amended to read as  
9 follows:

10 **“SEC. 25. HOLLINGS MANUFACTURING EXTENSION PART-**  
11 **NERSHIP.**

12 “(a) ESTABLISHMENT AND PURPOSE.—

13 “(1) IN GENERAL.—The Secretary, through the  
14 Director shall provide assistance for the creation and  
15 support of regional manufacturing extension centers  
16 for the transfer of manufacturing technology and  
17 best business practices. These centers shall be  
18 known as the ‘Hollings Manufacturing Extension  
19 Centers’ (in this Act referred to as the ‘Centers’).  
20 The program under this section shall be known as  
21 the ‘Hollings Manufacturing Extension Partnership’.

22 “(2) AFFILIATIONS.—Such Centers shall be af-  
23 filiated with any United States-based public or non-  
24 profit institution or organization, or group thereof,

1       that applies for and is awarded financial assistance  
2       under this section.

3               “(3) OBJECTIVE.—The objective of the pro-  
4       gram is to enhance productivity, competitiveness,  
5       and technological performance in United States  
6       manufacturing through—

7               “(A) the transfer of manufacturing tech-  
8       nology and techniques to Centers and, through  
9       them, to manufacturing companies throughout  
10       the United States;

11              “(B) the participation of individuals from  
12       industry, institutions of higher education, State  
13       governments, other Federal agencies, and, when  
14       appropriate, the Institute in cooperative tech-  
15       nology transfer activities;

16              “(C) efforts to make new manufacturing  
17       technology and processes usable by United  
18       States-based small- and medium-sized compa-  
19       nies;

20              “(D) the active dissemination of scientific,  
21       engineering, technical, and management infor-  
22       mation about manufacturing to industrial firms,  
23       including small- and medium-sized manufac-  
24       turing companies;

1           “(E) the development of new partnerships,  
2           networks, and services that will assist small-  
3           and medium-sized manufacturing companies ex-  
4           pand into new markets, including global mar-  
5           kets;

6           “(F) the utilization, when appropriate, of  
7           the expertise and capability that exists in Fed-  
8           eral laboratories other than the Institute; and

9           “(G) the provision to community colleges  
10          and area career and technical education schools  
11          of information about the job skills needed in  
12          small- and medium-sized manufacturing busi-  
13          nesses in the regions they serve.

14       “(b) ACTIVITIES.—The activities of the Centers shall  
15       include—

16           “(1) the establishment of automated manufac-  
17          turing systems and other advanced production tech-  
18          nologies, based on research by the Institute and  
19          other entities, for the purpose of demonstrations and  
20          technology transfer;

21           “(2) assistance to Federal agencies in sup-  
22          porting United States-based manufacturing by iden-  
23          tifying and providing technical assistance to small-  
24          and medium-sized manufacturers to help them meet  
25          Federal agency procurement and acquisition needs;

1           “(3) the active transfer and dissemination of re-  
2           search findings and Center expertise to a wide range  
3           of companies and enterprises, particularly small- and  
4           medium-sized manufacturers; and

5           “(4) the facilitation of collaborations and part-  
6           nerships between small- and medium-sized manufac-  
7           turing companies and community colleges and area  
8           career and technical education schools to help such  
9           colleges and schools better understand the specific  
10          needs of manufacturers and to help manufacturers  
11          better understand the skill sets that students learn  
12          in the programs offered by such colleges and schools.

13          “(c) FINANCIAL ASSISTANCE AND REQUIRE-  
14          MENTS.—

15                 “(1) FINANCIAL SUPPORT.—The Secretary may  
16                 provide financial support to any Center created  
17                 under subsection (a) for an initial period of 5 years,  
18                 which may be renewed for an additional 5-year pe-  
19                 riod. The Secretary may provide to a Center up to  
20                 50 percent of the capital and annual operating and  
21                 maintenance funds required to create and maintain  
22                 such Center.

23                 “(2) REGULATIONS.—The Secretary shall im-  
24                 plement, review, and update the sections of the Code

1 of Federal Regulations related to this section at  
2 least once every 5 years.

3 “(3) APPLICATION.—

4 “(A) IN GENERAL.—Any public or non-  
5 profit institution, or consortium thereof, may  
6 submit to the Secretary an application for fi-  
7 nancial support under this section, in accord-  
8 ance with the procedures established by the  
9 Secretary.

10 “(B) COST-SHARING.—In order to receive  
11 assistance under this section, an applicant for  
12 financial assistance under subparagraph (A)  
13 shall provide adequate assurances that non-  
14 Federal assets obtained from the applicant and  
15 the applicant’s partnering organizations will be  
16 used as a funding source to meet not less than  
17 50 percent of the costs incurred. For purposes  
18 of the preceding sentence, the costs incurred  
19 means the costs incurred in connection with the  
20 activities undertaken to improve the manage-  
21 ment, productivity, competitiveness, and techno-  
22 logical performance of small- and medium-sized  
23 manufacturing companies.

24 “(C) AGREEMENTS WITH OTHER ENTI-  
25 TIES.—In meeting the 50-percent requirement,

1 it is anticipated that a Center will enter into  
2 agreements with other entities such as private  
3 industry, institutions of higher education, and  
4 State governments to accomplish programmatic  
5 objectives and access new and existing resources  
6 that will further the impact of the Federal in-  
7 vestment made on behalf of small- and medium-  
8 sized manufacturing companies.

9 “(D) LEGAL RIGHTS.—Each applicant  
10 under subparagraph (A) shall submit a proposal  
11 for the allocation of the legal rights associated  
12 with any invention that may result from the  
13 proposed Center’s activities.

14 “(4) MERIT REVIEW.—The Secretary shall sub-  
15 ject each such application to merit review. In mak-  
16 ing a decision whether to approve such application  
17 and provide financial support under this section, the  
18 Secretary shall consider, at a minimum, the fol-  
19 lowing:

20 “(A) The merits of the application, par-  
21 ticularly those portions of the application re-  
22 garding technology transfer, training and edu-  
23 cation, and adaptation of manufacturing tech-  
24 nologies to the needs of particular industrial  
25 sectors.

1           “(B) The quality of service to be provided.

2           “(C) Geographical diversity and extent of  
3 service area.

4           “(D) The percentage of funding and  
5 amount of in-kind commitment from other  
6 sources.

7           “(5) EVALUATION.—

8           “(A) IN GENERAL.—Each Center that re-  
9 ceives financial assistance under this section  
10 shall be evaluated during its third year of oper-  
11 ation by an evaluation panel appointed by the  
12 Secretary.

13           “(B) COMPOSITION.—Each such evalua-  
14 tion panel shall be composed of independent ex-  
15 perts, none of whom shall be connected with the  
16 involved Center, and Federal officials.

17           “(C) CHAIR.—An official of the Institute  
18 shall chair the panel.

19           “(D) PERFORMANCE MEASUREMENT.—  
20 Each evaluation panel shall measure the in-  
21 volved Center’s performance against the objec-  
22 tives specified in this section.

23           “(E) POSITIVE EVALUATION.—If the eval-  
24 uation is positive, the Secretary may provide  
25 continued funding through the fifth year.

1           “(F) CORRECTIVE ACTION PLAN.—The  
2           Secretary may not provide funding for the re-  
3           maining years of a Center’s operation unless  
4           the evaluation is positive. A Center that has not  
5           received a positive evaluation by the evaluation  
6           panel shall be notified by the panel of the defi-  
7           ciencies in its performance and shall be placed  
8           on a corrective action plan and provided the op-  
9           portunity to address deficiencies unless imme-  
10          diate action is necessary to protect the public  
11          interest. The program shall re-evaluate the Cen-  
12          ter within one year and if the Center has not  
13          addressed the deficiencies identified by the  
14          panel, or shown a significant improvement in its  
15          performance, the Director shall conduct a new  
16          competition or may close the Center.

17          “(G) ADDITIONAL FINANCIAL SUPPORT.—  
18          After the fifth year, a Center may receive addi-  
19          tional financial support under this section if it  
20          has received a positive evaluation through an  
21          independent review, under procedures estab-  
22          lished by the Institute.

23          “(H) RECOMPETITION.—If a Center has  
24          received financial support for 10 consecutive  
25          years, the Director shall conduct a new com-



petition. An existing Center may submit an application as part of the new competition.

“(I) RECOMPETITION PLAN.—Not later than 180 days after the date of enactment of the America Competes Reauthorization Act of 2015, the Director shall submit a plan to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate detailing how the program will implement the new competitions required under subparagraph (H). The Director shall consult with the MEP Advisory Board established under subsection (f) in the development and implementation of the plan.

“(6) OVERSIGHT BOARD.—

“(A) IN GENERAL.—Each Center that receives financial assistance under this section shall establish an oversight board that is broadly representative of regional stakeholders with a majority of board members drawn from local small- and medium-sized manufacturing firms.

“(B) BYLAWS AND CONFLICT OF INTEREST.—Each board under subparagraph (A) shall adopt and submit to the Director bylaws

1 to govern the operation of the board, including  
2 a conflict of interest policy to ensure relevant  
3 relationships are disclosed and proper recusal  
4 procedures are in place.

5 “(C) LIMITATION.—Board members may  
6 not serve simultaneously on more than one Cen-  
7 ter’s oversight board or serve as a contractor  
8 providing services to a Center.

9 “(7) PROTECTION OF CONFIDENTIAL INFORMA-  
10 TION.—The Secretary shall ensure that the following  
11 are not publically disclosed:

12 “(A) Confidential information on the busi-  
13 ness operations of—

14 “(i) a participant under the program;  
15 or

16 “(ii) a client of a Center.

17 “(B) Trade secrets possessed by any client  
18 of a Center.

19 “(8) PATENT RIGHTS.—The provisions of chap-  
20 ter 18 of title 35, United States Code, shall apply,  
21 to the extent not inconsistent with this section, to  
22 the promotion of technology from research by Cen-  
23 ters under this section except for contracts for such  
24 specific technology extension or transfer services as  
25 may be specified by statute or by the Director.

1 “(d) REPORTING AND AUDITING REQUIREMENTS.—

2 The Director shall establish procedures regarding Center  
3 financial reporting and auditing to ensure that awards are  
4 used for the purposes specified in this section and are in  
5 accordance with sound accounting practices.

6 “(e) ACCEPTANCE OF FUNDS.—

7 “(1) IN GENERAL.—In addition to such sums  
8 as may be appropriated to the Secretary and Direc-  
9 tor to operate the Hollings Manufacturing Extension  
10 Partnership, the Secretary and Director also may  
11 accept funds from other Federal departments and  
12 agencies and, under section 2(c)(7), from the private  
13 sector for the purpose of strengthening United  
14 States manufacturing.

15 “(2) ALLOCATION OF FUNDS.—

16 “(A) FUNDS ACCEPTED FROM OTHER FED-  
17 ERAL DEPARTMENTS OR AGENCIES.—The Di-  
18 rector shall determine whether funds accepted  
19 from other Federal departments or agencies  
20 shall be counted in the calculation of the Fed-  
21 eral share of capital and annual operating and  
22 maintenance costs under subsection (c).

23 “(B) FUNDS ACCEPTED FROM THE PRI-  
24 VATE SECTOR.—Funds accepted from the pri-  
25 vate sector under section 2(c)(7), if allocated to

1 a Center, may not be considered in the calcula-  
2 tion of the Federal share under subsection (c)  
3 of this section.

4 “(f) MEP ADVISORY BOARD.—

5 “(1) ESTABLISHMENT.—There is established  
6 within the Institute a Manufacturing Extension  
7 Partnership Advisory Board (in this subsection re-  
8 ferred to as the ‘MEP Advisory Board’).

9 “(2) MEMBERSHIP.—

10 “(A) IN GENERAL.—The MEP Advisory  
11 Board shall consist of not fewer than 10 mem-  
12 bers broadly representative of stakeholders, to  
13 be appointed by the Director. At least 2 mem-  
14 bers shall be employed by or on an advisory  
15 board for the Centers, at least 1 member shall  
16 represent a community college, and at least 5  
17 other members shall be from United States  
18 small businesses in the manufacturing sector.  
19 No member shall be an employee of the Federal  
20 Government.

21 “(B) TERM.—Except as provided in sub-  
22 paragraph (C) or (D), the term of office of each  
23 member of the MEP Advisory Board shall be 3  
24 years.

1           “(C) VACANCIES.—Any member appointed  
2           to fill a vacancy occurring prior to the expira-  
3           tion of the term for which his predecessor was  
4           appointed shall be appointed for the remainder  
5           of such term.

6           “(D) SERVING CONSECUTIVE TERMS.—  
7           Any person who has completed two consecutive  
8           full terms of service on the MEP Advisory  
9           Board shall thereafter be ineligible for appoint-  
10          ment during the one-year period following the  
11          expiration of the second such term.

12          “(3) MEETINGS.—The MEP Advisory Board  
13          shall meet not less than 2 times annually and shall  
14          provide to the Director—

15               “(A) advice on Hollings Manufacturing  
16               Extension Partnership programs, plans, and  
17               policies;

18               “(B) assessments of the soundness of Hol-  
19               lings Manufacturing Extension Partnership  
20               plans and strategies; and

21               “(C) assessments of current performance  
22               against Hollings Manufacturing Extension  
23               Partnership program plans.

24          “(4) FEDERAL ADVISORY COMMITTEE ACT AP-  
25          PLICABILITY.—

1           “(A) IN GENERAL.—In discharging its du-  
2           ties under this subsection, the MEP Advisory  
3           Board shall function solely in an advisory ca-  
4           pacity, in accordance with the Federal Advisory  
5           Committee Act.

6           “(B) EXCEPTION.—Section 14 of the Fed-  
7           eral Advisory Committee Act shall not apply to  
8           the MEP Advisory Board.

9           “(5) REPORT.—The MEP Advisory Board shall  
10          transmit an annual report to the Secretary for  
11          transmittal to Congress within 30 days after the  
12          submission to Congress of the President’s annual  
13          budget request in each year. Such report shall ad-  
14          dress the status of the program established pursuant  
15          to this section and comment on the relevant sections  
16          of the programmatic planning document and updates  
17          thereto transmitted to Congress by the Director  
18          under subsections (c) and (d) of section 23.

19          “(g) COMPETITIVE GRANT PROGRAM.—

20          “(1) ESTABLISHMENT.—The Director shall es-  
21          tablish, within the Hollings Manufacturing Exten-  
22          sion Partnership, a program of competitive awards  
23          among participants described in paragraph (2) for  
24          the purposes described in paragraph (3).

1           “(2) PARTICIPANTS.—Participants receiving  
2           awards under this subsection shall be the Centers, or  
3           a consortium of such Centers.

4           “(3) PURPOSE.—The purpose of the program  
5           under this subsection is to add capabilities to the  
6           Hollings Manufacturing Extension Partnership, in-  
7           cluding the development of projects to solve new or  
8           emerging manufacturing problems as determined by  
9           the Director, in consultation with the Director of the  
10          Hollings Manufacturing Extension Partnership, the  
11          MEP Advisory Board, and small- and medium-sized  
12          manufacturers.

13          “(4) THEMES.—One or more themes for the  
14          competition may be identified, which may vary from  
15          year to year, depending on the needs of manufactur-  
16          ers and the success of previous competitions. These  
17          themes may include—

18                 “(A) supply chain integration and quality  
19                 management;

20                 “(B) the creation of partnerships to en-  
21                 courage the development of a workforce with  
22                 the skills necessary to meet the needs of a re-  
23                 gion, including the creation of apprenticeship  
24                 opportunities and the adoption of universally  
25                 recognized credential programs, as appropriate;

1           “(C) energy efficiency, including efficient  
2           building technologies and environmentally  
3           friendly materials, products, and processes;

4           “(D) enhancing the competitiveness of  
5           small- and medium-sized manufacturers in the  
6           global marketplace;

7           “(E) the transfer of technology based on  
8           the technological needs of manufacturers and  
9           available technologies from institutions of high-  
10          er education, laboratories, and other technology  
11          producing entities; and

12          “(F) areas that extend beyond traditional  
13          areas of manufacturing extension activities, in-  
14          cluding projects related to construction industry  
15          modernization.

16          “(5) REIMBURSEMENT.—Centers may be reim-  
17          bursed for costs incurred under the program under  
18          this subsection.

19          “(6) APPLICATIONS.—Applications for awards  
20          under this subsection shall be submitted in such  
21          manner, at such time, and containing such informa-  
22          tion as the Director shall require, in consultation  
23          with the MEP Advisory Board.

24          “(7) SELECTION.—Awards under this sub-  
25          section shall be peer reviewed and competitively



1 awarded. The Director shall endeavor to have broad  
2 geographic diversity among selected proposals. The  
3 Director shall select proposals to receive awards that  
4 will—

5 “(A) utilize innovative or collaborative ap-  
6 proaches to solving the problem described in the  
7 competition;

8 “(B) improve the competitiveness of indus-  
9 tries in the region in which the Center or Cen-  
10 ters are located; and

11 “(C) contribute to the long-term economic  
12 stability of that region, including the creation of  
13 jobs or training employees.

14 “(8) PROGRAM CONTRIBUTION.—Recipients of  
15 awards under this subsection shall not be required  
16 to provide a matching contribution.

17 “(9) DURATION.—Awards under this subsection  
18 shall last no longer than 5 years.

19 “(h) INNOVATIVE SERVICES INITIATIVE.—

20 “(1) ESTABLISHMENT.—The Director, in co-  
21 ordination with the Advanced Manufacturing Office  
22 of the Department of Energy, shall establish, within  
23 the Hollings Manufacturing Extension Partnership,  
24 an innovative services initiative to assist small- and  
25 medium-sized manufacturers in—

1           “(A) reducing their energy usage, green-  
2           house gas emissions, and environmental waste  
3           to improve profitability;

4           “(B) accelerating the domestic commer-  
5           cialization of new product technologies, includ-  
6           ing components for renewable energy and en-  
7           ergy efficiency systems; and

8           “(C) identifying and diversifying to new  
9           markets, including support for transitioning to  
10          the production of components for renewable en-  
11          ergy and energy efficiency systems.

12          “(2) MARKET DEMAND.—The Director may not  
13          undertake any activity to accelerate the domestic  
14          commercialization of a new product technology  
15          under this subsection unless an analysis of market  
16          demand for the new product technology has been  
17          conducted.

18          “(i) EXPORT ASSISTANCE TO SMALL- AND MEDIUM-  
19          SIZED MANUFACTURERS.—

20                 “(1) IN GENERAL.—The Director shall—

21                 “(A) evaluate obstacles that are unique to  
22                 small- and medium-sized manufacturers that  
23                 prevent such manufacturers from effectively  
24                 competing in the global market;

1           “(B) implement a comprehensive export  
2           assistance initiative through the Centers to help  
3           small- and medium-sized manufacturers address  
4           such obstacles; and

5           “(C) to the maximum extent practicable,  
6           ensure that the activities carried out under this  
7           subsection are coordinated with, and do not du-  
8           plicate the efforts of, other export assistance  
9           programs within the Federal Government.

10          “(2) REQUIREMENTS.—The initiative shall in-  
11          clude—

12               “(A) export assistance counseling;

13               “(B) the development of partnerships that  
14               will provide small- and medium-sized manufac-  
15               turers with greater access to and knowledge of  
16               global markets; and

17               “(C) improved communication between the  
18               Centers to assist such manufacturers in imple-  
19               menting appropriate, targeted solutions to such  
20               obstacles.

21          “(j) DEFINITIONS.—In this section:

22               “(1) AREA CAREER AND TECHNICAL EDU-  
23               CATION SCHOOL.—The term ‘area career and tech-  
24               nical education school’ has the meaning given such  
25               term in section 3 of the Carl D. Perkins Career and

1        Technical Education Improvement Act of 2006 (20  
2        U.S.C. 2302).

3            “(2) COMMUNITY COLLEGE.—The term ‘com-  
4        munity college’ means an institution of higher edu-  
5        cation (as defined under section 101(a) of the High-  
6        er Education Act of 1965 (20 U.S.C. 1001(a))) at  
7        which the highest degree that is predominately  
8        awarded to students is an associate’s degree.”.

9        **SEC. 404. NATIONAL ACADEMIES REVIEW.**

10       Not later than 6 months after the date of enactment  
11       of this Act, the Director of the National Institute of  
12       Standards and Technology shall enter into a contract with  
13       the National Academies to conduct a single, comprehen-  
14       sive review of the Institute’s laboratory programs. The re-  
15       view shall—

16            (1) assess the technical merits and scientific  
17        caliber of the research conducted at the laboratories;

18            (2) examine the strengths and weaknesses of  
19        the 2010 laboratory reorganization on the Institute’s  
20        ability to fulfill its mission;

21            (3) evaluate how cross-cutting research and de-  
22        velopment activities are planned, coordinated, and  
23        executed across the laboratories; and

24            (4) assess how the laboratories are engaging in-  
25        dustry, including the incorporation of industry need,

1 into the research goals and objectives of the Insti-  
2 tute.

3 **SEC. 405. IMPROVING NIST COLLABORATION WITH OTHER**  
4 **AGENCIES.**

5 Section 8 of the National Bureau of Standards Au-  
6 thorization Act for Fiscal Year 1983 (15 U.S.C. 275b)  
7 is amended—

8 (1) in the section heading, by inserting “AND  
9 WITH” after “PERFORMED FOR”; and

10 (2) by adding at the end the following: “The  
11 Secretary may accept, apply for, use, and spend  
12 Federal, State, and non-governmental acquisition  
13 and assistance funds to further the mission of the  
14 Institute without regard to the source or the period  
15 of availability of these funds as well as share per-  
16 sonnel, associates, facilities, and property with these  
17 partner organizations, with or without reimburse-  
18 ment, upon mutual agreement.”.

19 **SEC. 406. MISCELLANEOUS PROVISIONS.**

20 (a) **FUNCTIONS AND ACTIVITIES.**—Section 15 of the  
21 of the National Institute of Standards and Technology Act  
22 (15 U.S.C. 278e) is amended—

23 (1) by striking “of the Government; and” and  
24 inserting “of the Government;”;

1           (2) by striking “transportation services for em-  
2       ployees of the Institute” and inserting “transport-  
3       ation services for employees, associates, or fellows  
4       of the Institute”; and

5           (3) by striking “Code.” and inserting “Code;  
6       and (i) the protection of Institute buildings and  
7       other plant facilities, equipment, and property, and  
8       of employees, associates, visitors, or other persons  
9       located therein or associated therewith, notwith-  
10      standing any other provision of law.”.

11       (b) POST-DOCTORAL FELLOWSHIP PROGRAM.—Sec-  
12      tion 19 of the National Institute of Standards and Tech-  
13      nology Act (15 U.S.C. 278g–2) is amended to read as fol-  
14      lows:

15      **“SEC. 19. POST-DOCTORAL FELLOWSHIP PROGRAM.**

16       “The Director, in conjunction with the National  
17      Academy of Sciences, shall establish and conduct a post-  
18      doctoral fellowship program that shall include not less  
19      than 20 new fellows per fiscal year. In evaluating applica-  
20      tions for fellowships under this section, the Director shall  
21      give consideration to the goal of promoting the participa-  
22      tion of underrepresented minorities in research areas sup-  
23      ported by the Institute.”.

## **TITLE V—INNOVATION**

### **SEC. 501. OFFICE OF INNOVATION AND ENTREPRENEURSHIP.**

Section 25 of the Stevenson-Wydler Technology Innovation Act of 1980 (15 U.S.C. 3720) is amended—

(1) in subsection (a) by inserting “with a Director and full-time staff” after “Office of Innovation and Entrepreneurship”;

(2) in subsection (b)—

(A) by amending paragraph (3) to read as follows:

“(3) providing access to relevant data, research, and technical assistance on innovation and commercialization, including best practices for university-based incubators and accelerators;”;

(B) by redesignating paragraphs (4) and (5) as paragraphs (6) and (7), respectively; and

(C) by inserting the following after paragraph (3):

“(4) overseeing the implementation of the loan guarantee programs and the Regional Innovation Program established under sections 26 and 27, respectively;

“(5) developing, within 180 days after the date of enactment of the America Competes Reauthoriza-

tion Act of 2015, and updating at least every 5 years, a strategic plan to guide the activities of the Office of Innovation and Entrepreneurship that shall—

“(A) specify and prioritize near-term and long-term goals, objectives, and policies to accelerate innovation and advance the commercialization of research and development, including federally funded research and development, set forth the anticipated time for achieving the objectives, and identify metrics for use in assessing progress toward such objectives;

“(B) describe how the Department of Commerce is working in conjunction with other Federal agencies to foster innovation and commercialization across the United States; and

“(C) provide a summary of the activities, including the development of metrics to evaluate regional innovation strategies undertaken through the Regional Innovation Research and Information Program established under section 27(e);”;

(3) by amending subsection (c) to read as follows:

“(c) ADVISORY COMMITTEE.—



1           “(1) ESTABLISHMENT.—The Secretary shall es-  
2       tablish or designate an advisory committee, which  
3       shall meet at least twice each fiscal year, to provide  
4       advice to the Secretary on carrying out the duties  
5       and responsibilities of the Office of Innovation and  
6       Entrepreneurship.

7           “(2) REPORT TO CONGRESS.—The advisory  
8       committee shall prepare a report, to be submitted to  
9       the Committee on Science, Space, and Technology of  
10      the House of Representatives and the Committee on  
11      Commerce, Science, and Transportation of the Sen-  
12      ate every 3 years. The first report shall be submitted  
13      not later than 1 year after the date of enactment of  
14      the America Competes Reauthorization Act of 2015  
15      and shall include—

16           “(A) an assessment of the strategic plan  
17      developed under subsection (b)(5) and the  
18      progress made in implementing the plan and  
19      the duties of the Office of Innovation and En-  
20      trepreneurship;

21           “(B) an assessment of how the Office of  
22      Innovation and Entrepreneurship is working  
23      with other Federal agencies to meet the goals  
24      and duties of the office; and

1           “(C) any recommendations for how the Of-  
2           fice of Innovation and Entrepreneurship could  
3           be improved.”; and

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

5           “(d) AUTHORIZATION OF APPROPRIATIONS.—There  
6           are authorized to be appropriated to the Secretary  
7           \$5,000,000 for each of fiscal years 2016 through 2020  
8           to carry out this section.”.

9   **SEC. 502. FEDERAL LOAN GUARANTEES FOR INNOVATIVE**  
10           **TECHNOLOGIES IN MANUFACTURING.**

11          Section 26(t) of the Stevenson-Wydler Technology  
12          Innovation Act of 1980 (15 U.S.C. 3721(t)) is amended  
13          by striking “fiscal years 2011 through 2013” and insert-  
14          ing “fiscal years 2016 through 2020”.

15   **SEC. 503. INNOVATION VOUCHER PILOT PROGRAM.**

16          Section 25 of the Stevenson-Wydler Technology Inno-  
17          vation Act of 1980 (15 U.S.C. 3720) as amended by sec-  
18          tion 501 of this Act, is further amended by adding at the  
19          end the following:

20          “(e) INNOVATION VOUCHER PILOT PROGRAM.—

21               “(1) IN GENERAL.—The Secretary, acting  
22               through the Office of Innovation and Entrepreneur-  
23               ship and in conjunction with the States, shall estab-  
24               lish an innovation voucher pilot program to accel-  
25               erate innovative activities and enhance the competi-

1 tiveness of small- and medium-sized manufacturers  
2 in the United States. The pilot program shall—

3 “(A) foster collaborations between small-  
4 and medium-sized manufacturers and research  
5 institutions; and

6 “(B) enable small- and medium-sized man-  
7 ufacturers to access technical expertise and ca-  
8 pabilities that will lead to the development of  
9 innovative products or manufacturing processes,  
10 including through—

11 “(i) research and development, includ-  
12 ing proof of concept, technical develop-  
13 ment, and compliance testing activities;

14 “(ii) early-stage product development,  
15 including engineering design services; and

16 “(iii) technology transfer and related  
17 activities.

18 “(2) AWARD SIZE.—The Secretary shall com-  
19 petitively award vouchers worth up to \$20,000 to  
20 small- and medium-sized manufacturers for use at  
21 eligible research institutions to acquire the services  
22 described in paragraph (1)(B).

23 “(3) STREAMLINED PROCEDURES.—The Sec-  
24 retary shall streamline and simplify the application,

1 administrative, and reporting procedures for vouch-  
2 ers administered under the program.

3 “(4) REGULATIONS.—Prior to awarding any  
4 vouchers under the program, the Secretary shall pro-  
5 mulgate regulations—

6 “(A) establishing criteria for the selection  
7 of recipients of awards under this subsection;

8 “(B) establishing procedures regarding fi-  
9 nancial reporting and auditing—

10 “(i) to ensure that awards are used  
11 for the purposes of the program; and

12 “(ii) that are in accordance with  
13 sound accounting practices; and

14 “(C) describing any other policies, proce-  
15 dures, or information necessary to implement  
16 this subsection, including those intended to  
17 streamline and simplify the program in accord-  
18 ance with paragraph (3).

19 “(5) TRANSFER AUTHORITY.—The Secretary  
20 may transfer funds appropriated to the Department  
21 of Commerce to other Federal agencies for the per-  
22 formance of services authorized under this sub-  
23 section.

24 “(6) ADMINISTRATIVE COSTS.—All of the  
25 amounts appropriated to carry out this subsection

1 for a fiscal year shall be used for vouchers awarded  
2 under this subsection, except that the Secretary may  
3 set aside a percentage of such amounts for eligible  
4 research institutions performing the services de-  
5 scribed in paragraph (1)(B) to defray administrative  
6 costs associated with the services. The Secretary  
7 shall establish a single, fixed percentage for such  
8 purposes that will apply to all eligible research insti-  
9 tutions.

10 “(7) OUTREACH.—The Secretary may use cen-  
11 ters established under section 25 of the National In-  
12 stitute of Standards and Technology Act (15 U.S.C.  
13 278k) to provide information about the program es-  
14 tablished under this subsection and to conduct out-  
15 reach to potential applicants, as appropriate.

16 “(8) REPORTS TO CONGRESS.—

17 “(A) PLAN.—Not later than 180 days  
18 after the date of enactment of the America  
19 Competes Reauthorization Act of 2015, the  
20 Secretary shall transmit to Congress a plan  
21 that will serve as a guide for the activities of  
22 the program. The plan shall include a descrip-  
23 tion of the specific objectives of the program  
24 and the metrics that will be used in assessing  
25 progress toward those objectives.

1           “(B) OUTCOMES.—Not later than 3 years  
2           after the date of enactment of the America  
3           Competes Reauthorization Act of 2015, the  
4           Secretary shall transmit to Congress a report  
5           containing—

6                   “(i) a summary of the activities car-  
7                   ried out under this subsection;

8                   “(ii) an assessment of the impact of  
9                   such activities on the innovative capacity of  
10                  small- and medium-sized manufacturers re-  
11                  ceiving assistance under the pilot program;  
12                  and

13                  “(iii) any recommendations for admin-  
14                  istrative and legislative action that could  
15                  optimize the effectiveness of the pilot pro-  
16                  gram.

17           “(9) COORDINATION AND NONDUPLICATION.—

18           To the maximum extent practicable, the Secretary  
19           shall ensure that the activities carried out under this  
20           subsection are coordinated with, and do not dupli-  
21           cate the efforts of, other programs within the Fed-  
22           eral Government.

23           “(10) ELIGIBLE RESEARCH INSTITUTIONS DE-  
24           FINED.—For the purposes of this subsection, the  
25           term ‘eligible research institution’ means—

1           “(A) an institution of higher education, as  
 2           such term is defined in section 101(a) of the  
 3           Higher Education Act of 1965 (20 U.S.C.  
 4           1001(a));

5           “(B) a Federal laboratory;

6           “(C) a federally funded research and devel-  
 7           opment center; or

8           “(D) a Hollings Manufacturing Extension  
 9           Center established under section 25 of the Na-  
 10          tional Institute of Standards and Technology  
 11          Act (15 U.S.C. 278k).

12          “(11) AUTHORIZATION OF APPROPRIATIONS.—  
 13          There are authorized to be appropriated to the Sec-  
 14          retary to carry out the pilot program in this sub-  
 15          section \$5,000,000 for each of fiscal years 2016  
 16          through 2020.”.

17 **SEC. 504. FEDERAL ACCELERATION OF STATE TECH-**  
 18 **NOLOGY COMMERCIALIZATION PILOT PRO-**  
 19 **GRAM.**

20          The Stevenson-Wydler Technology Innovation Act of  
 21          1980 (15 U.S.C. 3701 et seq.) is amended by adding at  
 22          the end the following:

1 **“SEC. 28. FEDERAL ACCELERATION OF STATE TECH-**  
2 **NOLOGY COMMERCIALIZATION PILOT PRO-**  
3 **GRAM.**

4 “(a) AUTHORITY.—

5 “(1) ESTABLISHMENT.—The Secretary shall es-  
6 tablish a Federal Acceleration of State Technology  
7 Commercialization Pilot Program or FAST Com-  
8 mercialization Pilot Program to award grants to  
9 States, or consortia thereof, for the purposes de-  
10 scribed in paragraph (2). Awards under this section  
11 shall be made through a competitive, merit-based  
12 process.

13 “(2) PURPOSE.—The purpose of the program  
14 under this section is to advance United States pro-  
15 ductivity and global competitiveness by accelerating  
16 commercialization of innovative technology by  
17 leveraging Federal support for State commercializa-  
18 tion efforts. The program shall provide matching  
19 funds to a State, or consortium thereof, for the ac-  
20 celeration of commercialization activities and the  
21 promotion of small manufacturing enterprises in the  
22 United States.

23 “(b) APPLICATION.—Applications for awards under  
24 this section shall be submitted in such a manner, at such  
25 a time, and containing such information as the Secretary  
26 shall require, including—



1           “(1) a description of the current state of tech-  
2           nology commercialization in the State or States, in-  
3           cluding successes and barriers to commercialization;  
4           and

5           “(2) a description of the State’s or consortium’s  
6           plan for increasing commercialization of new tech-  
7           nologies, products, processes, and services.

8           “(c) SELECTION CRITERIA.—The Secretary shall es-  
9           tablish criteria for the selection of awardees, which shall  
10          consider at a minimum a review of efforts during the fiscal  
11          year prior to submitting an application to—

12           “(1) promote manufacturing; and

13           “(2) commercialize new technologies, products,  
14          processes, and services, including activities to trans-  
15          late federally funded research and technologies to  
16          small manufacturing enterprises.

17          “(d) MATCHING REQUIREMENT.—A State or consor-  
18          tium receiving a grant under this section shall provide  
19          non-Federal cash contributions in an amount equal to 50  
20          percent of the total cost of the project for which the grant  
21          is provided.

22          “(e) COORDINATION AND NONDUPLICATION.—In  
23          carrying out the program under this section, the Secretary  
24          shall ensure that grants made under the program are co-  
25          ordinated with, and do not duplicate, the efforts of other

1 commercialization programs within the Federal Govern-  
2 ment.

3 “(f) EVALUATION.—

4 “(1) IN GENERAL.—Not later than 3 years  
5 after the date of enactment of the America Com-  
6 petes Reauthorization Act of 2015, the Secretary  
7 shall enter into a contract with an independent enti-  
8 ty, such as the National Academy of Sciences, to  
9 conduct an evaluation of the program established  
10 under subsection (a).

11 “(2) REQUIREMENTS.—The evaluation shall—

12 “(A) assess whether the program is achiev-  
13 ing its goals;

14 “(B) include any recommendations for how  
15 the program may be improved; and

16 “(C) include a recommendation as to  
17 whether the program should be continued or  
18 terminated.

19 “(g) DEFINITIONS.—In this section—

20 “(1) the term ‘State’ has the meaning given  
21 that term in section 3 of the Public Works and Eco-  
22 nomic Development Act of 1965 (42 U.S.C. 3122);  
23 and

1           “(2) the term ‘commercialization’ has the  
2           meaning given that term in section 9(e)(10) of the  
3           Small Business Act (15 U.S.C. 638(e)(10)).

4           “(h) DURATION.—Each award shall be for a 5-year  
5           period.

6           “(i) AUTHORIZATION OF APPROPRIATIONS.—There  
7           are authorized to be appropriated to the Secretary  
8           \$50,000,000 for each of fiscal years 2016 through 2018  
9           to carry out this section.”.

## 10           **TITLE VI—DEPARTMENT OF** 11                                   **ENERGY**

### 12           **Subtitle A—Office of Science**

#### 13           **SEC. 601. SHORT TITLE.**

14           This subtitle may be cited as the “Department of En-  
15           ergy Office of Science Authorization Act of 2015”.

#### 16           **SEC. 602. DEFINITIONS.**

17           Except as otherwise provided, in this subtitle:

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

20                   (2) DIRECTOR.—The term “Director” means  
21           the Director of the Office of Science.

22                   (3) OFFICE OF SCIENCE.—The term “Office of  
23           Science” means the Department of Energy Office of  
24           Science.

1           (4) UNDER SECRETARY.—The term “Under  
2       Secretary” means the Under Secretary for Science  
3       and Energy.

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

6   **SEC. 603. MISSION OF THE OFFICE OF SCIENCE.**

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

10       “(c) MISSION.—The mission of the Office of Science  
11       shall be the delivery of scientific discoveries, capabilities,  
12       and major scientific tools to transform the understanding  
13       of nature and to advance the energy, economic, and na-  
14       tional security of the United States.

15       “(d) DUTIES.—In support of this mission, the Direc-  
16       tor shall carry out programs, including those in basic en-  
17       ergy sciences, biological and environmental research, ad-  
18       vanced scientific computing research, fusion energy  
19       sciences, high energy physics, and nuclear physics,  
20       through activities focused on—

21           “(1) Science for Discovery to unravel nature’s  
22       mysteries through activities which range from the  
23       study of subatomic particles, atoms, and molecules  
24       that make up the materials of our everyday world to

1 the study of DNA, proteins, cells, and entire biological  
2 cal systems;

3 “(2) Science for National Need by—

4 “(A) advancing a clean energy agenda  
5 through research on energy production, storage,  
6 transmission, efficiency, and use; and

7 “(B) advancing our understanding of the  
8 Earth and its climate through research in at-  
9 mospheric and environmental sciences and cli-  
10 mate change; and

11 “(3) National Scientific User Facilities to de-  
12 liver the 21st century tools of science, engineering,  
13 and technology and provide the Nation’s researchers  
14 with the most advanced tools of modern science in-  
15 cluding accelerators, colliders, supercomputers, light  
16 sources and neutron sources, and facilities for study-  
17 ing complex molecular systems and the nanoworld.

18 “(e) SUPPORTING ACTIVITIES.—The activities de-  
19 scribed in subsection (d) shall include providing for rel-  
20 evant facilities and infrastructure, programmatic analysis,  
21 interagency coordination, and workforce development and  
22 outreach activities.

23 “(f) USER FACILITIES.—

24 “(1) IN GENERAL.—The Director shall carry  
25 out the construction, operation, and maintenance of

1 user facilities, including underground research facili-  
2 ties, to support the activities described in subsection  
3 (d). As practicable, these facilities shall serve the  
4 needs of the Department, industry, the academic  
5 community, and other relevant entities for the pur-  
6 poses of advancing the missions of the Department.

7 “(2) COORDINATION WITH OTHER FEDERAL  
8 AGENCIES.—The Director may form partnerships to  
9 enhance the utilization of and ensure access to user  
10 facilities, including underground research facilities,  
11 by other Federal agencies.

12 “(g) OTHER AUTHORIZED ACTIVITIES.—In addition  
13 to the activities authorized under the Department of En-  
14 ergy Office of Science Authorization Act of 2015, the Of-  
15 fice of Science shall carry out other such activities as it  
16 is authorized or required to carry out by law.

17 “(h) COORDINATION AND JOINT ACTIVITIES WITH  
18 OTHER DEPARTMENT OF ENERGY PROGRAMS.—The  
19 Under Secretary shall ensure the coordination of activities  
20 under the Department of Energy Office of Science Author-  
21 ization Act of 2015 with the other activities of the Depart-  
22 ment, and shall support joint activities among the pro-  
23 grams of the Department.

24 “(i) DOMESTIC MANUFACTURING CAPABILITY FOR  
25 OFFICE OF SCIENCE FACILITIES REPORT.—Not later

1 than one year after the date of enactment of the Depart-  
2 ment of Energy Office of Science Authorization Act of  
3 2015, the Secretary shall transmit a report to the Com-  
4 mittee on Science, Space, and Technology of the House  
5 of Representatives and the Committee on Energy and  
6 Natural Resources of the Senate. The report shall—

7           “(1) assess the current ability of domestic man-  
8           ufacturers to meet the procurement requirements for  
9           major ongoing projects funded by the Office of  
10          Science, including a calculation of the percentage of  
11          equipment acquired from domestic manufacturers  
12          for this purpose; and

13          “(2) identify steps that can be taken by the  
14          Federal Government and by private industry to in-  
15          crease the capability of domestic manufacturers to  
16          meet procurement requirements of the Office of  
17          Science for major projects.”.

18 **SEC. 604. BASIC ENERGY SCIENCES PROGRAM.**

19          (a) PROGRAM.—As part of the activities authorized  
20 under the amendment made by section 603, the Director  
21 shall carry out a program in basic energy sciences, includ-  
22 ing materials sciences and engineering, chemical sciences,  
23 physical biosciences, and geosciences, for the purpose of  
24 providing the scientific foundations for new energy tech-  
25 nologies and addressing scientific grand challenges.

1 (b) BASIC ENERGY SCIENCES USER FACILITIES.—

2 (1) IN GENERAL.—The Director shall carry out  
3 a subprogram to support and oversee the construc-  
4 tion, operation, and maintenance of national user fa-  
5 cilities that support the program under this section.  
6 As practicable, these facilities shall serve the needs  
7 of the Department, industry, the academic commu-  
8 nity, and other relevant entities to create and exam-  
9 ine new materials and chemical processes for the  
10 purposes of advancing new energy technologies and  
11 improving the competitiveness of the United States.  
12 These facilities shall include—

13 (A) x-ray light sources;

14 (B) neutron sources;

15 (C) nanoscale science research centers; and

16 (D) other facilities the Director considers  
17 appropriate, consistent with section 209(f) of  
18 the Department of Energy Organization Act  
19 (42 U.S.C. 7139(f)).

20 (2) FACILITY RESEARCH AND DEVELOPMENT.—

21 The Director shall carry out research and develop-  
22 ment on advanced accelerator and storage ring tech-  
23 nologies relevant to the Basic Energy Sciences user  
24 facilities, in consultation with the Office of Science's



1 High Energy Physics and Nuclear Physics pro-  
2 grams.

3 (3) FACILITY CONSTRUCTION AND UP-  
4 GRADES.—Consistent with the Office of Science’s  
5 project management practices, the Director shall  
6 support construction of—

7 (A) an upgrade of the Advanced Photon  
8 Source to optimize and enhance beam bright-  
9 ness;

10 (B) a Second Target Station at the Spall-  
11 ation Neutron Source to double user capacity  
12 and expand the suite of instruments to meet  
13 new scientific challenges;

14 (C) the Linac Coherent Light Source II to  
15 expand the x-ray wavelength range, incorporate  
16 high repetition rate operation for soft and me-  
17 dium energy x-rays, and increase user capacity  
18 of the Linac Coherent Light Source; and

19 (D) an upgrade to the Advanced Light  
20 Source to improve brightness and performance.

21 (c) ENERGY FRONTIER RESEARCH CENTERS.—

22 (1) IN GENERAL.—The Director shall carry out  
23 a program to provide awards, on a competitive,  
24 merit-reviewed basis, to multi-institutional collabora-  
25 tions or other appropriate entities to conduct funda-

1        mental and use-inspired energy research to accel-  
2        erate scientific breakthroughs related to needs iden-  
3        tified in—

4                (A) the Grand Challenges report of the De-  
5        partment’s Basic Energy Sciences Advisory  
6        Committee;

7                (B) the report of the Department’s Basic  
8        Energy Sciences Advisory Committee entitled  
9        “From Quanta to the Continuum: Opportuni-  
10       ties for Mesoscale Science”;

11               (C) the Basic Energy Sciences Basic Re-  
12       search Needs workshop report; or

13               (D) other relevant reports identified by the  
14       Director.

15        (2) COLLABORATIONS.—A collaboration receiv-  
16       ing an award under this subsection may include mul-  
17       tiple types of institutions and private sector entities.

18        (3) SELECTION AND DURATION.—

19               (A) IN GENERAL.—A collaboration under  
20       this subsection shall be selected for a period of  
21       5 years. An Energy Frontier Research Center  
22       already in existence and supported by the Di-  
23       rector on the date of enactment of this Act may  
24       continue to receive support for a period of 5

1           years beginning on the date of establishment of  
2           that center.

3                   (B) REAPPLICATION.—After the end of the  
4           period described in subparagraph (A), an  
5           awardee may reapply for selection for a second  
6           period of 5 years on a competitive, merit-re-  
7           viewed basis.

8                   (C) TERMINATION.—Consistent with the  
9           existing authorities of the Department, the Di-  
10          rector may terminate an underperforming cen-  
11          ter for cause during the performance period.

12                   (4) NO FUNDING FOR CONSTRUCTION.—No  
13          funding provided pursuant to this subsection may be  
14          used for the construction of new buildings or facili-  
15          ties.

16 **SEC. 605. BIOLOGICAL AND ENVIRONMENTAL RESEARCH.**

17           (a) IN GENERAL.—As part of the activities author-  
18          ized under section 209 of the Department of Energy Orga-  
19          nization Act (42 U.S.C. 7139), and coordinated with the  
20          activities authorized under section 604 and section 606,  
21          the Director shall carry out a program of research and  
22          development in the areas of biological systems science and  
23          climate and environmental science, including subsurface  
24          science, to support the energy and environmental missions  
25          of the Department.

1 (b) BIOLOGICAL SYSTEMS SCIENCE ACTIVITIES.—

2 (1) ACTIVITIES.—As part of the activities au-  
3 thorized under subsection (a), the Director shall  
4 carry out research and development activities in fun-  
5 damental, structural, computational, and systems bi-  
6 ology to increase systems-level understanding of the  
7 complex biological systems, which shall include ac-  
8 tivities to—

9 (A) accelerate breakthroughs and new  
10 knowledge that will enable cost-effective sus-  
11 tainable production of—

12 (i) biomass-based liquid transpor-  
13 tation fuels;

14 (ii) bioenergy; and

15 (iii) biobased materials;

16 (B) improve understanding of the global  
17 carbon cycle, including processes for removing  
18 carbon dioxide from the atmosphere, through  
19 photosynthesis and other biological processes,  
20 for sequestration and storage; and

21 (C) understand the biological mechanisms  
22 used to transform, immobilize, or remove con-  
23 taminants from subsurface environments.

24 (2) BIOENERGY RESEARCH CENTERS.—

1           (A) IN GENERAL.—In carrying out activi-  
2           ties under paragraph (1), the Director shall  
3           support at least 3 bioenergy research centers to  
4           accelerate advanced research and development  
5           of biomass-based liquid transportation fuels,  
6           bioenergy, or biobased materials that are pro-  
7           duced from a variety of regionally diverse feed-  
8           stocks.

9           (B) SELECTION AND DURATION.—A center  
10          established under subparagraph (A) shall be se-  
11          lected on a competitive, merit-reviewed basis for  
12          a period of 5 years beginning on the date of es-  
13          tablishment of that center. A center already in  
14          existence on the date of enactment of this Act  
15          may continue to receive support for a period of  
16          5 years beginning on the date of establishment  
17          of that center.

18          (C) RENEWAL.—After the end of the pe-  
19          riod described in subparagraph (B), an awardee  
20          may apply for a second period of 5 years on a  
21          merit-reviewed basis.

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

1           (3) LOW DOSE RADIATION RESEARCH PRO-  
2       GRAM.—

3           (A) IN GENERAL.—The Director shall  
4       carry out a research program on low dose radi-  
5       ation. The purpose of the program is to en-  
6       hance the scientific understanding of and re-  
7       duce uncertainties associated with the effects of  
8       exposure to low dose radiation in order to in-  
9       form improved risk management methods.

10          (B) DEFINITION.—In this paragraph, the  
11       term “low dose radiation” means a radiation  
12       dose of less than 100 millisieverts.

13          (C) STUDY.—Not later than 60 days after  
14       the date of enactment of this Act, the Director  
15       shall enter into an agreement with the National  
16       Academies to conduct a study assessing the  
17       current status and development of a long-term  
18       strategy for low dose radiation research. The  
19       study shall be conducted in coordination with  
20       Federal agencies that perform ionizing radi-  
21       ation effects research.

22          (D) CONTENTS.—The study performed  
23       under subparagraph (C) shall—

1 (i) identify current scientific chal-  
2 lenges for understanding the long-term ef-  
3 fects of ionizing radiation;

4 (ii) assess the status of current low  
5 dose radiation research in the United  
6 States and internationally;

7 (iii) formulate overall scientific goals  
8 for the future of low-dose radiation re-  
9 search in the United States;

10 (iv) recommend a long-term strategic  
11 and prioritized research agenda to address  
12 scientific research goals for overcoming the  
13 identified scientific challenges in coordina-  
14 tion with other research efforts;

15 (v) define the essential components of  
16 a research program that would address  
17 this research agenda within the universities  
18 and the National Laboratories; and

19 (vi) assess the cost-benefit effective-  
20 ness of such a program.

21 (E) 5-YEAR RESEARCH PLAN.—Not later  
22 than 90 days after the completion of the assess-  
23 ment performed under subparagraph (C), the  
24 Secretary shall deliver to the Committee on  
25 Science, Space, and Technology of the House of

1           Representatives and the Committee on Energy  
2           and Natural Resources of the Senate a five-year  
3           research plan that responds to the assessment's  
4           findings and recommendations and identifies  
5           and prioritizes research needs.

6           (4) REPEAL.—Section 977 of the Energy Policy  
7           Act of 2005 (42 U.S.C. 16317) is repealed.

8           (c) CLIMATE AND ENVIRONMENTAL SCIENCE ACTIVI-  
9           TIES.—

10           (1) IN GENERAL.—As part of the activities au-  
11           thorized under subsection (a), and in coordination  
12           with activities carried out under subsection (b), the  
13           Director shall carry out climate and environmental  
14           science research, which shall include activities to—

15                   (A) understand, observe, and model the re-  
16                   sponse of Earth's atmosphere and biosphere to  
17                   increased concentrations of greenhouse gas  
18                   emissions and any associated changes in cli-  
19                   mate;

20                   (B) understand the processes for immo-  
21                   bilization, or removal of, and understand the  
22                   movement of, energy production-derived con-  
23                   taminants such as radionuclides and heavy met-  
24                   als, and understand the process of sequestration



1 and transformation of carbon dioxide in sub-  
2 surface environments; and

3 (C) inform potential mitigation and adap-  
4 tation options for increased concentrations of  
5 greenhouse gas emissions and any associated  
6 changes in climate.

7 (2) SUBSURFACE BIOGEOCHEMICAL RE-  
8 SEARCH.—

9 (A) IN GENERAL.—As part of the activities  
10 described in paragraph (1), the Director shall  
11 carry out research to advance a fundamental  
12 understanding of coupled physical, chemical,  
13 and biological processes for controlling the  
14 movement of sequestered carbon and subsurface  
15 environmental contaminants.

16 (B) COORDINATION.—

17 (i) DIRECTOR.—The Director shall  
18 carry out activities under this paragraph in  
19 accordance with priorities established by  
20 the Under Secretary to support and accel-  
21 erate the decontamination of relevant fa-  
22 cilities managed by the Department.

23 (ii) UNDER SECRETARY.—The Under  
24 Secretary shall ensure the coordination of  
25 activities of the Department, including ac-

1                   tivities under this paragraph, to support  
2                   and accelerate the decontamination of rel-  
3                   evant facilities managed by the Depart-  
4                   ment.

5                   (3) CLIMATE AND EARTH MODELING.—As part  
6                   of the activities described in paragraph (1), the Di-  
7                   rector, in collaboration with the Advanced Scientific  
8                   Computing Research program described in section  
9                   606, shall carry out research to develop, evaluate,  
10                  and use high-resolution regional climate, global cli-  
11                  mate, and Earth models to inform decisions on re-  
12                  ducing the impacts of a changing climate. Such  
13                  modeling shall include, among other critical ele-  
14                  ments, greenhouse gas emissions, land use, and  
15                  interaction among human and Earth systems.

16 **SEC. 606. ADVANCED SCIENTIFIC COMPUTING RESEARCH**  
17 **PROGRAM.**

18                  (a) IN GENERAL.—As part of the activities author-  
19                  ized under section 209 of the Department of Energy Orga-  
20                  nization Act (42 U.S.C. 7139), the Director shall carry  
21                  out a research, development, demonstration, and commer-  
22                  cial application program to advance computational and  
23                  networking capabilities for data-driven discovery and to  
24                  analyze, model, simulate, and predict complex phenomena

1 relevant to the development of new energy technologies  
2 and the competitiveness of the United States.

3 (b) COORDINATION.—The Under Secretary shall en-  
4 sure the coordination of the activities of the Department,  
5 including activities under this section, to determine and  
6 meet the computational and networking research and fa-  
7 cility needs of the Office of Science and all other relevant  
8 energy technology and energy efficiency programs within  
9 the Department.

10 (c) RESEARCH TO SUPPORT ENERGY APPLICA-  
11 TIONS.—

12 (1) IN GENERAL.—As part of the activities au-  
13 thorized under subsection (a), the program shall  
14 support research in high-performance computing and  
15 networking relevant to energy applications including  
16 modeling, simulation, and advanced data analytics  
17 for basic and applied energy research programs car-  
18 ried out by the Secretary.

19 (2) REPORT.—Not later than 1 year after the  
20 date of enactment of this Act, the Secretary shall  
21 transmit to the Congress a plan to integrate and le-  
22 verage the expertise and capabilities of the program  
23 described in subsection (a), as well as other relevant  
24 computational and networking research programs  
25 and resources supported by the Federal Government,

1 to advance the missions of the Department’s applied  
2 energy and energy efficiency programs.

3 (d) APPLIED MATHEMATICS AND SOFTWARE DEVEL-  
4 OPMENT FOR HIGH-END COMPUTING SYSTEMS.—The Di-  
5 rector shall carry out activities to develop, test, and sup-  
6 port mathematics, models, and algorithms for complex  
7 systems, as well as programming environments, tools, lan-  
8 guages, and operating systems for high-end computing  
9 systems (as defined in section 2 of the Department of En-  
10 ergy High-End Computing Revitalization Act of 2004 (15  
11 U.S.C. 5541)).

12 (e) EXASCALE COMPUTING PROGRAM.—Section 3 of  
13 the Department of Energy High-End Computing Revital-  
14 ization Act of 2004 (15 U.S.C. 5542) is amended—

15 (1) in subsection (a)—

16 (A) in paragraph (1), by striking “pro-  
17 gram” and inserting “coordinated program  
18 across the Department”;

19 (B) by striking “and” at the end of para-  
20 graph (1);

21 (C) by striking the period at the end of  
22 paragraph (2) and inserting “; and”; and

23 (D) by adding at the end the following new  
24 paragraph:

1           “(3) partner with universities, National Labora-  
2           tories, and industry to ensure the broadest possible  
3           application of the technology developed in this pro-  
4           gram to other challenges in science, engineering,  
5           medicine, and industry.”;

6           (2) in subsection (b)(2), by striking “vector”  
7           and all that follows through “architectures” and in-  
8           serting “computer technologies that show promise of  
9           substantial reductions in power requirements and  
10          substantial gains in parallelism of multicore proc-  
11          essors, concurrency, memory and storage, band-  
12          width, and reliability”; and

13          (3) by striking subsection (d) and inserting the  
14          following:

15          “(d) EXASCALE COMPUTING PROGRAM.—

16               “(1) IN GENERAL.—The Secretary shall con-  
17               duct a coordinated research program to develop  
18               exascale computing systems to advance the missions  
19               of the Department.

20               “(2) EXECUTION.—The Secretary shall,  
21               through competitive merit review, establish two or  
22               more National Laboratory-industry-university part-  
23               nerships to conduct integrated research, develop-  
24               ment, and engineering of multiple exascale architec-  
25               tures, and—

1           “(A) conduct mission-related co-design ac-  
2           tivities in developing such exascale platforms;

3           “(B) develop those advancements in hard-  
4           ware and software technology required to fully  
5           realize the potential of an exascale production  
6           system in addressing Department target appli-  
7           cations and solving scientific problems involving  
8           predictive modeling and simulation and large-  
9           scale data analytics and management; and

10          “(C) explore the use of exascale computing  
11          technologies to advance a broad range of  
12          science and engineering.

13          “(3) ADMINISTRATION.—In carrying out this  
14          program, the Secretary shall—

15               “(A) provide, on a competitive, merit-re-  
16               viewed basis, access for researchers in United  
17               States industry, institutions of higher edu-  
18               cation, National Laboratories, and other Fed-  
19               eral agencies to these exascale systems, as ap-  
20               propriate; and

21               “(B) conduct outreach programs to in-  
22               crease the readiness for the use of such plat-  
23               forms by domestic industries, including manu-  
24               facturers.

25          “(4) REPORTS.—

1           “(A) INTEGRATED STRATEGY AND PRO-  
2           GRAM MANAGEMENT PLAN.—The Secretary  
3           shall submit to Congress, not later than 90  
4           days after the date of enactment of the Depart-  
5           ment of Energy Office of Science Authorization  
6           Act of 2015, a report outlining an integrated  
7           strategy and program management plan, in-  
8           cluding target dates for prototypical and pro-  
9           duction exascale platforms, interim milestones  
10          to reaching these targets, functional require-  
11          ments, roles and responsibilities of National  
12          Laboratories and industry, acquisition strategy,  
13          and estimated resources required, to achieve  
14          this exascale system capability. The report shall  
15          include the Secretary’s plan for Departmental  
16          organization to manage and execute the  
17          Exascale Computing Program, including defini-  
18          tion of the roles and responsibilities within the  
19          Department to ensure an integrated program  
20          across the Department. The report shall also  
21          include a plan for ensuring balance and  
22          prioritizing across ASCR subprograms in a flat  
23          or slow-growth budget environment.

24          “(B) STATUS REPORTS.—At the time of  
25          the budget submission of the Department for

1 each fiscal year, the Secretary shall submit a  
2 report to Congress that describes the status of  
3 milestones and costs in achieving the objectives  
4 of the exascale computing program.

5 “(C) EXASCALE MERIT REPORT.—At least  
6 18 months prior to the initiation of construction  
7 or installation of any exascale-class computing  
8 facility, the Secretary shall transmit a plan to  
9 the Congress detailing—

10 “(i) the proposed facility’s cost projec-  
11 tions and capabilities to significantly accel-  
12 erate the development of new energy tech-  
13 nologies;

14 “(ii) technical risks and challenges  
15 that must be overcome to achieve success-  
16 ful completion and operation of the facility;  
17 and

18 “(iii) an independent assessment of  
19 the scientific and technological advances  
20 expected from such a facility relative to  
21 those expected from a comparable invest-  
22 ment in expanded research and applica-  
23 tions at terascale-class and petascale-class  
24 computing facilities, including an evalua-  
25 tion of where investments should be made



1                   in the system software and algorithms to  
2                   enable these advances.”.

3       (f) DEFINITIONS.—Section 2 of the Department of  
4 Energy High-End Computing Revitalization Act of 2004  
5 (15 U.S.C. 5541) is amended by striking paragraphs (1)  
6 through (5) and inserting the following:

7           “(1) CO-DESIGN.—The term ‘co-design’ means  
8       the joint development of application algorithms,  
9       models, and codes with computer technology archi-  
10      tectures and operating systems to maximize effective  
11      use of high-end computing systems.

12          “(2) DEPARTMENT.—The term ‘Department’  
13      means the Department of Energy.

14          “(3) EXASCALE.—The term ‘exascale’ means  
15      computing system performance at or near 10 to the  
16      18th power floating point operations per second.

17          “(4) HIGH-END COMPUTING SYSTEM.—The  
18      term ‘high-end computing system’ means a com-  
19      puting system with performance that substantially  
20      exceeds that of systems that are commonly available  
21      for advanced scientific and engineering applications.

22          “(5) LEADERSHIP SYSTEM.—The term ‘Leader-  
23      ship System’ means a high-end computing system  
24      that is among the most advanced in the world in

1 terms of performance in solving scientific and engi-  
2 neering problems.

3 “(6) INSTITUTION OF HIGHER EDUCATION.—  
4 The term ‘institution of higher education’ has the  
5 meaning given the term in section 2 of the Energy  
6 Policy Act of 2005 (42 U.S.C. 15801).

7 “(7) NATIONAL LABORATORY.—The term ‘Na-  
8 tional Laboratory’ has the meaning given the term  
9 in section 2 of the Energy Policy Act of 2005 (42  
10 U.S.C. 15801).

11 “(8) SECRETARY.—The term ‘Secretary’ means  
12 the Secretary of Energy.

13 “(9) SOFTWARE TECHNOLOGY.—The term  
14 ‘software technology’ includes optimal algorithms,  
15 programming environments, tools, languages, and  
16 operating systems for high-end computing systems.”.

17 **SEC. 607. FUSION ENERGY RESEARCH.**

18 (a) PROGRAM.—As part of the activities authorized  
19 under section 209 of the Department of Energy Organiza-  
20 tion Act (42 U.S.C. 7139) and section 972 of the Energy  
21 Policy Act of 2005 (42 U.S.C. 16312), the Director shall  
22 carry out a fusion energy sciences research and enabling  
23 technology development program to effectively address the  
24 scientific and engineering challenges to building a cost-  
25 competitive fusion power plant and to establish a competi-

1 tive fusion power industry in the United States. As part  
2 of this program, the Director shall carry out research ac-  
3 tivities to expand the fundamental understandings of plas-  
4 mas and matter at very high temperatures and densities  
5 for fusion applications and for other plasma science appli-  
6 cations.

7 (b) TOKAMAK RESEARCH AND DEVELOPMENT.—

8 (1) IN GENERAL.—As part of the program de-  
9 scribed in subsection (a), the Director shall support  
10 research and development activities and facility oper-  
11 ations to—

12 (A) optimize the tokamak approach to fu-  
13 sion energy; and

14 (B) determine the viability of the tokamak  
15 approach to fusion energy to lead to a commer-  
16 cial fusion power plant.

17 (2) ITER.—

18 (A) RESPONSIBILITIES.—The Director  
19 shall coordinate and carry out the responsibil-  
20 ities of the United States with respect to the  
21 ITER international fusion project pursuant to  
22 the Agreement on the Establishment of the  
23 International Fusion Energy Organization for  
24 the Joint Implementation of the ITER Project.

1 (B) REPORT.—Not later than 1 year after  
2 the date of enactment of this Act, the Secretary  
3 shall submit to Congress a report providing an  
4 assessment of—

5 (i) the most recent schedule for ITER  
6 that has been approved by the ITER  
7 Council; and

8 (ii) progress of the ITER Council and  
9 the ITER Director-General toward imple-  
10 mentation of the recommendations of the  
11 Third Biennial International Organization  
12 Management Assessment Report.

13 (C) FAIRNESS IN COMPETITION FOR SO-  
14 LICITATIONS FOR INTERNATIONAL PROJECT AC-  
15 TIVITIES.—Section 33 of the Atomic Energy  
16 Act of 1954 (42 U.S.C. 2053) is amended by  
17 adding at the end the following: “For purposes  
18 of this section, with respect to international re-  
19 search projects, the term ‘private facilities or  
20 laboratories’ shall refer to facilities or labora-  
21 tories located in the United States.”.

22 (D) SENSE OF CONGRESS.—It is the sense  
23 of Congress that the United States should sup-  
24 port a robust, diverse program in addition to  
25 meeting its commitments to ITER. It is further

1 the sense of Congress that developing the sci-  
2 entific basis for fusion, providing research re-  
3 sults key to the success of ITER, and training  
4 the next generation of fusion scientists are of  
5 critical importance to the United States and  
6 should in no way be diminished by participation  
7 of the United States in the ITER project.

8 (c) INERTIAL FUSION ENERGY RESEARCH AND DE-  
9 VELOPMENT PROGRAM.—The Secretary shall carry out a  
10 program of research and technology development in iner-  
11 tial fusion for energy applications, including ion beam,  
12 laser, and pulsed power fusion systems.

13 (d) ALTERNATIVE AND ENABLING CONCEPTS.—

14 (1) IN GENERAL.—As part of the program de-  
15 scribed in subsection (a), the Director shall support  
16 research and development activities and facility oper-  
17 ations at United States universities, national labora-  
18 tories, and private facilities for a portfolio of alter-  
19 native and enabling fusion energy concepts that may  
20 provide solutions to significant challenges to the es-  
21 tablishment of a commercial magnetic fusion power  
22 plant, prioritized based on the ability of the United  
23 States to play a leadership role in the international  
24 fusion research community. Fusion energy concepts

1 and activities explored under this paragraph may in-  
2 clude—

3 (A) high magnetic field approaches facili-  
4 tated by high temperature superconductors;

5 (B) advanced stellarator concepts;

6 (C) non-tokamak confinement configura-  
7 tions operating at low magnetic fields;

8 (D) magnetized target fusion energy con-  
9 cepts;

10 (E) liquid metals to address issues associ-  
11 ated with fusion plasma interactions with the  
12 inner wall of the encasing device;

13 (F) immersion blankets for heat manage-  
14 ment and fuel breeding;

15 (G) advanced scientific computing activi-  
16 ties: and

17 (H) other promising fusion energy con-  
18 cepts identified by the Director.

19 (2) COORDINATION WITH ARPA-E.—The Under  
20 Secretary and the Director shall coordinate with the  
21 Director of the Advanced Research Projects Agency–  
22 Energy (in this paragraph referred to as “ARPA–  
23 E”) to—

24 (A) assess the potential for any fusion en-  
25 ergy project supported by ARPA-E to rep-

1           resent a promising approach to a commercially  
2           viable fusion power plant;

3           (B) determine whether the results of any  
4           fusion energy project supported by ARPA-E  
5           merit the support of follow-on research activi-  
6           ties carried out by the Office of Science; and

7           (C) avoid unintentional duplication of ac-  
8           tivities.

9           (e) FUSION MATERIALS RESEARCH AND DEVELOP-  
10          MENT.—As part of the activities authorized in section 978  
11          of the Energy Policy Act of 2005 (42 U.S.C. 16318), the  
12          Director, in coordination with the Assistant Secretary for  
13          Nuclear Energy of the Department, shall carry out re-  
14          search and development activities to identify, characterize,  
15          and create materials that can endure the neutron, plasma,  
16          and heat fluxes expected in a commercial fusion power  
17          plant. As part of the activities authorized under subsection  
18          (g), the Secretary shall—

19               (1) provide an assessment of the need for a fa-  
20               cility or facilities that can examine and test potential  
21               fusion and next generation fission reactor materials  
22               and other enabling technologies relevant to the de-  
23               velopment of commercial fusion power plants; and

24               (2) provide an assessment of whether a single  
25               new facility that substantially addresses magnetic

1 fusion, inertial fusion, and next generation fission  
2 materials research needs is feasible, in conjunction  
3 with the expected capabilities of facilities operational  
4 at the time of this assessment.

5 (f) GENERAL PLASMA SCIENCE AND APPLICA-  
6 TIONS.—Not later than 2 years after the date of enact-  
7 ment of this Act, the Secretary shall provide to Congress  
8 an assessment of opportunities in which the United States  
9 can provide world-leading contributions to advancing plas-  
10 ma science and non-fusion energy applications, and iden-  
11 tify opportunities for partnering with other Federal agen-  
12 cies both within and outside of the Department of Energy.

13 (g) IDENTIFICATION OF PRIORITIES.—

14 (1) REPORT.—Not later than 2 years after the  
15 date of enactment of this Act, the Secretary shall  
16 transmit to Congress a report on the Department's  
17 proposed fusion energy research and development  
18 activities over the following 10 years under at least  
19 3 realistic budget scenarios, including a scenario  
20 based on 3 percent annual growth in the non-ITER  
21 portion of the budget for fusion energy research and  
22 development activities. The report shall—

23 (A) identify specific areas of fusion energy  
24 research and enabling technology development  
25 in which the United States can and should es-



1           tablish or solidify a lead in the global fusion en-  
2           ergy development effort;

3           (B) identify priorities for initiation of facil-  
4           ity construction and facility decommissioning  
5           under each of those scenarios;

6           (C) provide a roadmap addressing critical  
7           scientific challenges to ensure that within 10  
8           years after the date of enactment of this Act  
9           there is sufficient basis to justify and motivate  
10          the initiation of an applied fusion energy devel-  
11          opment program; and

12          (D) assess the ability of the United States  
13          fusion workforce to carry out the activities iden-  
14          tified in subparagraphs (A) through (C), includ-  
15          ing the adequacy of college and university pro-  
16          grams to train the leaders and workers of the  
17          next generation of fusion energy researchers.

18          (2) PROCESS.—In order to develop the report  
19          required under paragraph (1), the Secretary shall le-  
20          verage best practices and lessons learned from the  
21          process used to develop the most recent report of the  
22          Particle Physics Project Prioritization Panel of the  
23          High Energy Physics Advisory Panel. No member of  
24          the Fusion Energy Sciences Advisory Committee  
25          shall be excluded from participating in developing or

1 voting on final approval of the report required under  
2 paragraph (1).

3 **SEC. 608. HIGH ENERGY PHYSICS PROGRAM.**

4 (a) IN GENERAL.—As part of the activities author-  
5 ized under section 209 of the Department of Energy Orga-  
6 nization Act (42 U.S.C. 7139), the Director shall carry  
7 out a research program on the elementary constituents of  
8 matter and energy and the nature of space and time.

9 (b) ENERGY FRONTIER RESEARCH.—As part of the  
10 program described in subsection (a), the Director shall  
11 carry out research using high energy accelerators and ad-  
12 vanced detectors to create and study interactions of novel  
13 particles and investigate fundamental forces.

14 (c) NEUTRINO RESEARCH.—As part of the program  
15 described in subsection (a), the Director shall carry out  
16 research activities on rare decay processes and the nature  
17 of the neutrino, which may include collaborations with the  
18 National Science Foundation or international collabora-  
19 tions on relevant research projects.

20 (d) DARK ENERGY AND DARK MATTER RE-  
21 SEARCH.—As part of the program described in subsection  
22 (a), the Director shall carry out research activities on the  
23 nature of dark energy and dark matter. These activities  
24 shall be consistent with the research priorities identified

1 by the High Energy Physics Advisory Panel or the Na-  
2 tional Academy of Sciences, and may include—

3 (1) collaborations with the National Aeronautics  
4 and Space Administration, the National Science  
5 Foundation, or international collaborations on rel-  
6 evant research projects; and

7 (2) the development of space-based, land-based,  
8 and underground facilities and experiments.

9 (e) FACILITY CONSTRUCTION AND MAJOR ITEMS OF  
10 EQUIPMENT.—Consistent with the Office of Science’s  
11 project management practices, the Director shall support  
12 construction or fabrication of—

13 (1) an international Long-Baseline Neutrino  
14 Facility based in the United States;

15 (2) the Muon to Electron Conversion Experi-  
16 ment;

17 (3) Second Generation Dark Matter experi-  
18 ments;

19 (4) the Dark Energy Spectroscopic Instrument;

20 (5) the Large Synoptic Survey Telescope cam-  
21 era;

22 (6) upgrades to components of the Large  
23 Hadron Collider; and

24 (7) other high priority projects recommended in  
25 the most recent report of the Particle Physics

1 Project Prioritization Panel of the High Energy  
2 Physics Advisory Panel.

3 (f) ACCELERATOR RESEARCH AND DEVELOPMENT.—

4 As part of the program described in subsection (a), the  
5 Director shall carry out research and development in ad-  
6 vanced accelerator concepts and technologies, including  
7 laser technologies, to reduce the necessary scope and cost  
8 for the next generation of particle accelerators, in coordi-  
9 nation with the Office of Science's Basic Energy Sciences  
10 and Nuclear Physics programs.

11 (g) INTERNATIONAL COLLABORATION.—The Direc-  
12 tor, as practicable and in coordination with other appro-  
13 priate Federal agencies as necessary, shall ensure the ac-  
14 cess of United States researchers to the most advanced  
15 accelerator facilities and research capabilities in the world,  
16 including the Large Hadron Collider.

17 **SEC. 609. NUCLEAR PHYSICS PROGRAM.**

18 (a) PROGRAM.—As part of the activities authorized  
19 under section 209 of the Department of Energy Organiza-  
20 tion Act (42 U.S.C. 7139), the Director shall carry out  
21 a research program, and support relevant facilities, to dis-  
22 cover and understand various forms of nuclear matter.

23 (b) FACILITY CONSTRUCTION.—

24 (1) IN GENERAL.—Consistent with the Office of  
25 Science's project management practices, the Director

1       shall continue to support the construction of the Fa-  
2       cility for Rare Isotope Beams.

3               (2) REPEAL.—Section 981 of the Energy Policy  
4       Act of 2005 (42 U.S.C. 16321) is repealed.

5       (c) ISOTOPE DEVELOPMENT AND PRODUCTION FOR  
6       RESEARCH APPLICATIONS.—

7               (1) IN GENERAL.—The Director shall carry out  
8       a program for the production of isotopes that the  
9       Director determines are needed for research and ap-  
10      plications, including—

11               (A) the development of techniques to  
12      produce isotopes; and

13               (B) support for infrastructure required for  
14      isotope research and production.

15               (2) COORDINATION.—In making the determina-  
16      tion described in paragraph (1), the Secretary  
17      shall—

18               (A) ensure that isotope production activi-  
19      ties do not compete with private industry unless  
20      critical national interests necessitate the Fed-  
21      eral Government's involvement; and

22               (B) consider any relevant recommendations  
23      made by Federal advisory committees, the Na-  
24      tional Academies, and interagency working  
25      groups in which the Department participates.

1 **SEC. 610. SCIENCE LABORATORIES INFRASTRUCTURE PRO-**  
2 **GRAM.**

3 (a) PROGRAM.—The Director shall carry out a pro-  
4 gram to improve the safety, efficiency, and mission readi-  
5 ness of infrastructure at Office of Science laboratories.

6 The program shall include projects to—

7 (1) renovate or replace space that does not  
8 meet research needs;

9 (2) replace facilities that are no longer cost ef-  
10 fective to renovate or operate;

11 (3) modernize utility systems to prevent failures  
12 and ensure efficiency;

13 (4) remove excess facilities to allow safe and ef-  
14 ficient operations; and

15 (5) construct modern facilities to conduct ad-  
16 vanced research in controlled environmental condi-  
17 tions.

18 (b) APPROACH.—In carrying out this section, the Di-  
19 rector shall utilize all available approaches and mecha-  
20 nisms, including capital line items, minor construction  
21 projects, energy savings performance contracts, utility en-  
22 ergy service contracts, alternative financing, and expense  
23 funding, as appropriate.

24 (c) DEFINITION.—The term “Office of Science lab-  
25 oratory” means a subset of National Laboratories as de-  
26 fined in section 2(3) of the Energy Policy Act of 2005

1 (42 U.S.C. 15801) consisting of subparagraphs (A), (B),  
 2 (C), (D), (F), (K), (L), (M), (P), and (Q).

3 **SEC. 611. AUTHORIZATION OF APPROPRIATIONS.**

4 There are authorized to be appropriated to the Sec-  
 5 retary for the activities of the Office of Science—

6 (1) \$5,339,794,000 for fiscal year 2016;

7 (2) \$5,606,783,700 for fiscal year 2017;

8 (3) \$5,887,122,885 for fiscal year 2018;

9 (4) \$6,181,479,029 for fiscal year 2019; and

10 (5) \$6,490,552,981 for fiscal year 2020.

11 **Subtitle B—ARPA-E**

12 **SEC. 621. SHORT TITLE.**

13 This subtitle may be cited as the “ARPA-E Reau-  
 14 thorization Act of 2015”.

15 **SEC. 622. ARPA-E AMENDMENTS.**

16 Section 5012 of the America COMPETES Act (42  
 17 U.S.C. 16538) is amended—

18 (1) by redesignating subsection (n) as sub-  
 19 section (o) and inserting after subsection (m) the  
 20 following new subsection:

21 “(n) PROTECTION OF PROPRIETARY INFORMA-  
 22 TION.—The following categories of information collected  
 23 by the Advanced Research Projects Agency-Energy from  
 24 recipients of financial assistance awards shall be consid-  
 25 ered privileged and confidential and not subject to disclo-

1 sure pursuant to section 552 of title 5, United States  
2 Code:

3 “(1) Plans for commercialization of technologies  
4 developed under the award, including business plans,  
5 technology to market plans, market studies, and cost  
6 and performance models.

7 “(2) Investments provided to an awardee from  
8 third parties, such as venture capital, hedge fund, or  
9 private equity firms, including amounts and percent-  
10 age of ownership of the awardee provided in return  
11 for such investments.

12 “(3) Additional financial support that the  
13 awardee plans to invest or has invested into the  
14 technology developed under the award, or that the  
15 awardee is seeking from third parties.

16 “(4) Revenue from the licensing or sale of new  
17 products or services resulting from the research con-  
18 ducted under the award.”; and

19 (2) in paragraph (2) of subsection (o), as so re-  
20 designated by paragraph (1) of this section, by—

21 (A) striking “and” at the end of subpara-  
22 graph (D);

23 (B) striking the period at the end of sub-  
24 paragraph (E) and inserting a semicolon; and

25 (C) adding at the end the following:



1 “(F) \$325,000,000 for fiscal year 2016;  
2 “(G) \$341,250,000 for fiscal year 2017;  
3 “(H) \$358,312,500 for fiscal year 2018;  
4 “(I) \$376,228,125 for fiscal year 2019;  
5 and  
6 “(J) \$395,039,531 for fiscal year 2020.”.

## 7 **Subtitle C—Energy Innovation**

### 8 **SEC. 641. ENERGY INNOVATION HUBS.**

#### 9 (a) AUTHORIZATION OF PROGRAM.—

10 (1) IN GENERAL.—The Secretary of Energy  
11 shall carry out a program to enhance the Nation’s  
12 economic, environmental, and energy security by  
13 making awards to consortia for establishing and op-  
14 erating Energy Innovation Hubs to conduct and  
15 support, whenever practicable at one centralized lo-  
16 cation, multidisciplinary, collaborative research, de-  
17 velopment, demonstration, and commercial applica-  
18 tion of advanced energy technologies.

19 (2) TECHNOLOGY DEVELOPMENT FOCUS.—The  
20 Secretary shall designate for each Hub a unique ad-  
21 vanced energy technology focus.

22 (3) COORDINATION.—The Secretary shall en-  
23 sure the coordination of, and avoid unnecessary du-  
24 plication of, the activities of Hubs with those of  
25 other Department of Energy research entities, in-

1 including the National Laboratories, the Advanced Re-  
2 search Projects Agency-Energy, Energy Frontier Re-  
3 search Centers, and within industry.

4 (b) CONSORTIA.—

5 (1) ELIGIBILITY.—To be eligible to receive an  
6 award under this section for the establishment and  
7 operation of a Hub, a consortium shall—

8 (A) be composed of no fewer than 2 quali-  
9 fying entities; and

10 (B) operate subject to an agreement en-  
11 tered into by its members that documents—

12 (i) the proposed partnership agree-  
13 ment, including the governance and man-  
14 agement structure of the Hub;

15 (ii) measures to enable cost-effective  
16 implementation of the program under this  
17 section;

18 (iii) a proposed budget, including fi-  
19 nancial contributions from non-Federal  
20 sources;

21 (iv) a plan for managing intellectual  
22 property rights; and

23 (v) an accounting structure that en-  
24 ables the Secretary to ensure that the con-

1                   sortium has complied with the require-  
2                   ments of this section.

3                   (2) APPLICATION.—A consortium seeking to es-  
4                   tablish and operate a Hub under this section, acting  
5                   through a prime applicant, shall transmit to the Sec-  
6                   retary an application at such time, in such form,  
7                   and accompanied by such information as the Sec-  
8                   retary shall require, including a detailed description  
9                   of the elements of the consortium agreement re-  
10                  quired under paragraph (1)(B). If the consortium  
11                  members will not be located at one centralized loca-  
12                  tion, such application shall include a communica-  
13                  tions plan that ensures close coordination and inte-  
14                  gration of the Hub’s activities.

15                  (c) SELECTION AND SCHEDULE.—The Secretary  
16                  shall select consortia for awards for the establishment and  
17                  operation of Hubs through competitive selection processes.  
18                  In selecting consortia, the Secretary shall consider the in-  
19                  formation a consortium must disclose according to sub-  
20                  section (b), as well as any existing facilities a consortium  
21                  will provide for Hub activities. Awards made to a Hub  
22                  shall be for a period not to exceed 5 years, after which  
23                  the award may be renewed, subject to a rigorous merit  
24                  review. A Hub already in existence on the date of enact-  
25                  ment of this Act may continue to receive support for a

1 period of 5 years beginning on the date of establishment  
2 of that Hub.

3 (d) HUB OPERATIONS.—

4 (1) IN GENERAL.—Each Hub shall conduct or  
5 provide for multidisciplinary, collaborative research,  
6 development, demonstration, and, where appropriate,  
7 commercial application of advanced energy tech-  
8 nologies within the technology development focus  
9 designated under subsection (a)(2). Each Hub  
10 shall—

11 (A) encourage collaboration and commu-  
12 nication among the member qualifying entities  
13 of the consortium and awardees by conducting  
14 activities whenever practicable at one central-  
15 ized location;

16 (B) develop and publish on the Depart-  
17 ment of Energy’s website proposed plans and  
18 programs;

19 (C) submit an annual report to the Sec-  
20 retary summarizing the Hub’s activities, includ-  
21 ing detailing organizational expenditures, and  
22 describing each project undertaken by the Hub;  
23 and

24 (D) monitor project implementation and  
25 coordination.

1 (2) CONFLICTS OF INTEREST.—

2 (A) PROCEDURES.—Hubs shall maintain  
3 conflict of interest procedures, consistent with  
4 those of the Department of Energy, to ensure  
5 that employees and consortia designees for Hub  
6 activities who are in decisionmaking capacities  
7 disclose all material conflicts of interest.

8 (B) DISQUALIFICATION AND REVOCATION.—The Secretary may disqualify an appli-  
9 cation or revoke funds distributed to a Hub if  
10 the Secretary discovers a failure to comply with  
11 conflict of interest procedures established under  
12 subparagraph (A).  
13

14 (3) PROHIBITION ON CONSTRUCTION.—

15 (A) IN GENERAL.—No funds provided pur-  
16 suant to this section may be used for construc-  
17 tion of new buildings or facilities for Hubs.  
18 Construction of new buildings or facilities shall  
19 not be considered as part of the non-Federal  
20 share of a Hub cost-sharing agreement.

21 (B) TEST BED AND RENOVATION EXCEP-  
22 TION.—Nothing in this subsection shall prohibit  
23 the use of funds provided pursuant to this sec-  
24 tion, or non-Federal cost share funds, for re-  
25 search or for the construction of a test bed or

1           renovations to existing buildings or facilities for  
2           the purposes of research if the Secretary deter-  
3           mines that the test bed or renovations are lim-  
4           ited to a scope and scale necessary for the re-  
5           search to be conducted.

6           (e) TERMINATION.—Consistent with the existing au-  
7           thorities of the Department, the Secretary may terminate  
8           an underperforming Hub for cause during the perform-  
9           ance period.

10          (f) DEFINITIONS.—For purposes of this section:

11           (1) ADVANCED ENERGY TECHNOLOGY.—The  
12           term “advanced energy technology” means—

13           (A) an innovative technology—

14           (i) that produces energy from solar,  
15           wind, geothermal, biomass, tidal, wave,  
16           ocean, or other renewable energy resources;

17           (ii) that produces nuclear energy;

18           (iii) for carbon capture and sequestra-  
19           tion;

20           (iv) that enables advanced vehicles,  
21           vehicle components, and related tech-  
22           nologies that result in significant energy  
23           savings;

24           (v) that generates, transmits, distrib-  
25           utes, utilizes, or stores energy more effi-

ciently than conventional technologies, in-  
cluding through Smart Grid technologies;  
or

(vi) that enhances the energy inde-  
pendence and security of the United States  
by enabling improved or expanded supply  
and production of domestic energy re-  
sources, including coal, oil, and natural  
gas;

(B) research, development, demonstration,  
and commercial application activities necessary  
to ensure the long-term, secure, and sustainable  
supply of energy critical elements; or

(C) another innovative energy technology  
area identified by the Secretary.

(2) ENERGY CRITICAL ELEMENT.—The term  
“energy critical element” means any of a class of  
chemical elements that have a high risk of a supply  
disruption and are critical to one or more new, en-  
ergy-related technologies such that a shortage of  
such element would significantly inhibit large-scale  
deployment of technologies that produce, transmit,  
store, or conserve energy.

(3) HUB.—The term “Hub” means an Energy  
Innovation Hub established or operating in accord-

1       ance with this section, including any Energy Innova-  
2       tion Hub existing as of the date of enactment of this  
3       Act.

4           (4) QUALIFYING ENTITY.—The term “quali-  
5       fying entity” means—

6           (A) an institution of higher education;

7           (B) an appropriate State or Federal entity,  
8       including the Department of Energy Federally  
9       Funded Research and Development Centers;

10          (C) a nongovernmental organization with  
11       expertise in advanced energy technology re-  
12       search, development, demonstration, or com-  
13       mercial application; or

14          (D) any other relevant entity the Secretary  
15       considers appropriate.

16   **SEC. 642. PARTICIPATION IN THE INNOVATION CORPS PRO-**  
17       **GRAM.**

18       (a) AGREEMENT.—The Secretary of Energy shall  
19       enter into an agreement with the Director of the National  
20       Science Foundation to enable researchers funded by the  
21       Department of Energy to participate in the Innovation  
22       Corps program authorized by section 307.

23       (b) AUTHORIZATION.—The Secretary of Energy may  
24       also establish a Department of Energy Innovation Corps  
25       program, modeled after the National Science Foundation



1 Innovation Corps program, to incorporate experts from  
2 the Department of Energy National Laboratories in the  
3 training curriculum of the program.

4 **SEC. 643. TECHNOLOGY TRANSFER.**

5 (a) REPORT.—Not later than 1 year after the date  
6 of enactment of this Act, and annually thereafter, the Sec-  
7 retary of Energy shall transmit to the Committee on  
8 Science, Space, and Technology of the House of Rep-  
9 resentatives and the Committee on Energy and Natural  
10 Resources of the Senate a report which shall include—

11 (1) an assessment of the Department’s current  
12 ability to carry out the goals of section 1001 of the  
13 Energy Policy Act of 2005 (42 U.S.C. 16391), in-  
14 cluding an assessment of the role and effectiveness  
15 of the Director of the Office of Technology Transi-  
16 tions; and

17 (2) recommended departmental policy changes  
18 and legislative changes to section 1001 of the En-  
19 ergy Policy Act of 2005 (42 U.S.C. 16391) to im-  
20 prove the Department’s ability to successfully trans-  
21 fer new energy technologies to the private sector.

22 (b) AMENDMENTS.—Section 1001 of the Energy Pol-  
23 icy Act of 2005 (42 U.S.C. 16391) is amended—

24 (1) in subsection (e), by striking “for commer-  
25 cial purposes” and inserting “of any sort for com-

1       mercial purposes, including energy technologies not  
2       currently supported by the Department of Energy”;

3               (2) by redesignating subsections (f) and (g) as  
4       subsections (h) and (i), respectively; and

5               (3) by inserting after subsection (e) the fol-  
6       lowing new subsections:

7       “(f) AGREEMENTS FOR COMMERCIALIZING TECH-  
8       NOLOGY PILOT PROGRAM.—

9               “(1) IN GENERAL.—The Secretary shall carry  
10       out the Agreements for Commercializing Technology  
11       pilot program of the Department, as announced by  
12       the Secretary on December 8, 2011, in accordance  
13       with this subsection.

14              “(2) TERMS.—Each agreement entered into  
15       pursuant to the pilot program referred to in para-  
16       graph (1) shall provide to the contractor of the ap-  
17       plicable National Laboratory, to the maximum ex-  
18       tent determined to be appropriate by the Secretary,  
19       increased authority to negotiate contract terms, such  
20       as intellectual property rights, payment structures,  
21       performance guarantees, and multiparty collabora-  
22       tions.

23              “(3) ELIGIBILITY.—

24                “(A) IN GENERAL.—Any director of a Na-  
25       tional Laboratory may enter into an agreement

1           pursuant to the pilot program referred to in  
2           paragraph (1).

3           “(B) AGREEMENTS WITH NON-FEDERAL  
4           ENTITIES.—To carry out subparagraph (A) and  
5           subject to subparagraph (C), the Secretary shall  
6           permit the directors of the National Labora-  
7           tories to execute agreements with a non-Federal  
8           entity, including a non-Federal entity already  
9           receiving Federal funding that will be used to  
10          support activities under agreements executed  
11          pursuant to subparagraph (A), provided that  
12          such funding is solely used to carry out the pur-  
13          poses of the Federal award.

14          “(C) RESTRICTION.—The requirements of  
15          chapter 18 of title 35, United States Code  
16          (commonly known as the ‘Bayh-Dole Act’) shall  
17          apply if—

18                 “(i) the agreement is a funding agree-  
19                 ment (as that term is defined in section  
20                 201 of that title); and

21                 “(ii) at least 1 of the parties to the  
22                 funding agreement is eligible to receive  
23                 rights under that chapter.

24          “(4) SUBMISSION TO SECRETARY.—Each af-  
25          fected director of a National Laboratory shall sub-

1 mit to the Secretary, with respect to each agreement  
2 entered into under this subsection—

3 “(A) a summary of information relating to  
4 the relevant project;

5 “(B) the total estimated costs of the  
6 project;

7 “(C) estimated commencement and com-  
8 pletion dates of the project; and

9 “(D) other documentation determined to  
10 be appropriate by the Secretary.

11 “(5) CERTIFICATION.—The Secretary shall re-  
12 quire the contractor of the affected National Labora-  
13 tory to certify that each activity carried out under  
14 a project for which an agreement is entered into  
15 under this subsection—

16 “(A) is not in direct competition with the  
17 private sector; and

18 “(B) does not present, or minimizes, any  
19 apparent conflict of interest, and avoids or neu-  
20 tralizes any actual conflict of interest, as a re-  
21 sult of the agreement under this subsection.

22 “(6) EXTENSION.—The pilot program referred  
23 to in paragraph (1) shall be extended until October  
24 31, 2017.

25 “(7) REPORTS.—

1           “(A) OVERALL ASSESSMENT.—Not later  
2           than 60 days after the date described in para-  
3           graph (6), the Secretary, in coordination with  
4           directors of the National Laboratories, shall  
5           submit to the Committee on Science, Space,  
6           and Technology of the House of Representa-  
7           tives and the Committee on Energy and Nat-  
8           ural Resources of the Senate a report that—

9                   “(i) assesses the overall effectiveness  
10                  of the pilot program referred to in para-  
11                  graph (1);

12                  “(ii) identifies opportunities to im-  
13                  prove the effectiveness of the pilot pro-  
14                  gram;

15                  “(iii) assesses the potential for pro-  
16                  gram activities to interfere with the re-  
17                  sponsibilities of the National Laboratories  
18                  to the Department; and

19                  “(iv) provides a recommendation re-  
20                  garding the future of the pilot program.

21           “(B) TRANSPARENCY.—The Secretary, in  
22           coordination with directors of the National Lab-  
23           oratories, shall submit to the Committee on  
24           Science, Space, and Technology of the House of  
25           Representatives and the Committee on Energy

1           and Natural Resources of the Senate an annual  
2           report that accounts for all incidences of, and  
3           provides a justification for, non-Federal entities  
4           using funds derived from a Federal contract or  
5           award to carry out agreements pursuant to this  
6           subsection.

7           “(g) INCLUSION OF TECHNOLOGY MATURATION IN  
8   AUTHORIZED TECHNOLOGY TRANSFER ACTIVITIES.—The  
9   Secretary shall permit the directors of the National Lab-  
10   oratories to use funds authorized to support technology  
11   transfer, following the standard practices of the Depart-  
12   ment, to carry out technology maturation activities to  
13   identify and improve potential commercial application op-  
14   portunities and demonstrate applications of research and  
15   technologies arising from National Laboratory activities.”.

16          (c) DELEGATION OF AUTHORITY FOR TECHNOLOGY  
17   TRANSFER AGREEMENTS.—

18           (1) AUTHORITY.—The Secretary of Energy  
19   shall delegate to directors of the National Labora-  
20   tories signature authority for any technology trans-  
21   fer agreement with a total cost of not more than  
22   \$500,000, including both National Laboratory con-  
23   tributions and the project recipient cost share con-  
24   tribution, if such an agreement falls within the scope

1 of a strategic plan for the National Laboratory that  
2 has been approved by the Department.

3 (2) AGREEMENTS INCLUDED.—The agreements  
4 to which this subsection applies include—

5 (A) Cooperative Research and Develop-  
6 ment Agreements; and

7 (B) non-Federal Work for Others Agree-  
8 ments.

9 (3) AVAILABILITY OF RECORDS.—

10 (A) Not later than 7 days after the date on  
11 which the director of a National Laboratory en-  
12 ters into an agreement under this subsection,  
13 such director shall submit to the Secretary of  
14 Energy for monitoring and review all records of  
15 the National Laboratory relating to the agree-  
16 ment.

17 (B) Not later than 30 days after the date  
18 on which the director of a specific National  
19 Laboratory enters into an agreement under this  
20 subsection, the Secretary may terminate the  
21 agreement and the authority of any director of  
22 such National Laboratory to enter into agree-  
23 ments under this subsection if—

24 (i) all records of the National Labora-  
25 tory relating to the agreement have not

1           been transmitted to the Secretary in ac-  
2           cordance with subparagraph (A); or

3                   (ii) the Secretary determines that this  
4           agreement is inconsistent with the mission  
5           of the Department.

6           (4) LIMITATION.—This subsection does not  
7           apply to any agreement with a majority foreign-  
8           owned company.

9           (5) SUNSET.—

10                   (A) IN GENERAL.—This subsection shall  
11           apply only during the 4-year period beginning  
12           on the date of enactment of this Act.

13                   (B) ASSESSMENT.—Not later than the  
14           date that is 180 days prior to the last day of  
15           the period described in subparagraph (A), the  
16           Secretary shall submit to the Committee on  
17           Science, Space, and Technology of the House of  
18           Representatives and the Committee on Energy  
19           and Natural Resources of the Senate an assess-  
20           ment of the effectiveness of the authority pro-  
21           vided to the directors of the National Labora-  
22           tories under this subsection to accelerate the  
23           development of new technologies, and an assess-  
24           ment of any incidences of potential misuse of  
25           this authority in the opinion of the Secretary.



1 **SEC. 644. FUNDING COMPETITIVENESS FOR INSTITUTIONS**  
2 **OF HIGHER EDUCATION AND OTHER NON-**  
3 **PROFIT INSTITUTIONS.**

4 Section 988(b) of the Energy Policy Act of 2005 (42  
5 U.S.C. 16352(b)) is amended—

6 (1) in paragraph (1), by striking “Except as  
7 provided in paragraphs (2) and (3)” and inserting  
8 “Except as provided in paragraphs (2), (3), and  
9 (4)”; and

10 (2) by adding at the end the following:

11 “(4) EXEMPTION FOR INSTITUTIONS OF HIGH-  
12 ER EDUCATION AND OTHER NONPROFIT INSTITU-  
13 TIONS.—

14 “(A) IN GENERAL.—Paragraph (1) shall  
15 not apply to a research or development activity  
16 performed by an institution of higher education  
17 or nonprofit institution (as defined in section 4  
18 of the Stevenson-Wydler Technology Innovation  
19 Act of 1980 (15 U.S.C. 3703)).

20 “(B) TERMINATION DATE.—The exemp-  
21 tion under subparagraph (A) shall apply during  
22 the 6-year period beginning on the date of en-  
23 actment of this paragraph.”.

1 **SEC. 645. UNDER SECRETARY FOR SCIENCE AND ENERGY.**

2 (a) IN GENERAL.—Section 202(b) of the Department  
3 of Energy Organization Act (42 U.S.C. 7132(b)) is  
4 amended—

5 (1) by striking “Under Secretary for Science”  
6 each place it appears and inserting “Under Sec-  
7 retary for Science and Energy”; and

8 (2) in paragraph (4)—

9 (A) in subparagraph (F), by striking  
10 “and” at the end;

11 (B) in subparagraph (G), by striking the  
12 period at the end and inserting a semicolon;  
13 and

14 (C) by inserting after subparagraph (G)  
15 the following:

16 “(H) establish appropriate linkages be-  
17 tween offices under the jurisdiction of the  
18 Under Secretary; and

19 “(I) perform such functions and duties as  
20 the Secretary shall prescribe, consistent with  
21 this section.”.

22 (b) CONFORMING AMENDMENTS.—

23 (1) Section 3164(b)(1) of the Department of  
24 Energy Science Education Enhancement Act (42  
25 U.S.C. 7381a(b)(1)) is amended by striking “Under

1 Secretary for Science” and inserting “Under Sec-  
2 retary for Science and Energy”.

3 (2) Section 641(h)(2) of the United States En-  
4 ergy Storage Competitiveness Act of 2007 (42  
5 U.S.C. 17231(h)(2)) is amended by striking “Under  
6 Secretary for Science” and inserting “Under Sec-  
7 retary for Science and Energy”.

8 **SEC. 646. SPECIAL HIRING AUTHORITY FOR SCIENTIFIC,**  
9 **ENGINEERING, AND PROJECT MANAGEMENT**  
10 **PERSONNEL.**

11 (a) IN GENERAL.—The Under Secretary shall have  
12 the authority to—

13 (1) make appointments of scientific, engineer-  
14 ing, and professional personnel, without regard to  
15 civil service laws, to assist the Department in meet-  
16 ing specific project or research needs;

17 (2) fix the basic pay of any employee appointed  
18 under this section at a rate to be determined by the  
19 Under Secretary at rates not in excess of the Execu-  
20 tive Schedule (EX–II) without regard to the civil  
21 service laws; and

22 (3) pay any employee appointed under this sec-  
23 tion payments in addition to basic pay, except that  
24 the total amount of additional payments paid to an  
25 employee under this subsection for any 12-month pe-

1        riod shall not exceed the least of the following  
2        amounts:

3                (A) \$25,000.

4                (B) The amount equal to 25 percent of the  
5        annual rate of basic pay of that employee.

6                (C) The amount of the limitation that is  
7        applicable for a calendar year under section  
8        5307(a)(1) of title 5, United States Code.

9        (b) TERM.—

10                (1) IN GENERAL.—The term of any employee  
11        appointed under this section shall not exceed 3  
12        years.

13                (2) TERMINATION.—The Under Secretary shall  
14        have the authority to terminate any employee ap-  
15        pointed under this section at any time based on per-  
16        formance or changing project or research needs of  
17        the Department.

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