

114TH CONGRESS
1ST SESSION

H. R. 591

To provide for a coordinated Federal research program to ensure continued United States leadership in engineering biology.

IN THE HOUSE OF REPRESENTATIVES

JANUARY 28, 2015

Ms. EDDIE BERNICE JOHNSON of Texas (for herself and Mr. SENSENBRENNER) introduced the following bill; which was referred to the Committee on Science, Space, and Technology

A BILL

To provide for a coordinated Federal research program to ensure continued United States leadership in engineering biology.

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

3 **SECTION 1. SHORT TITLE.**

4 This Act may be cited as the “Engineering Biology
5 Research and Development Act of 2015”.

6 **SEC. 2. FINDINGS.**

7 The Congress makes the following findings:

8 (1) Cellular and molecular processes may be
9 used, mimicked, or redesigned to develop new prod-

1 ucts, processes, and systems that improve societal
2 well-being, strengthen national security, and con-
3 tribute to the economy.

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

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

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

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

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

1 and planning processes, drive technology transfer,
2 and help ensure optimal returns on the Federal in-
3 vestment.

4 **SEC. 3. DEFINITIONS.**

5 In this Act—

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

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

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

18 (4) the term “Interagency Committee” means
19 the interagency committee designated under section
20 4(e); and

21 (5) the term “Program” means the National
22 Engineering Biology Research and Development
23 Program established under section 4.

1 **SEC. 4. NATIONAL ENGINEERING BIOLOGY RESEARCH AND**
2 **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); 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 Act, and update every 5
12 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 goal described in sub-
13 section (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 6, 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. 5. 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. 6. EXTERNAL REVIEW OF ETHICAL, LEGAL, ENVIRON-**
2 **MENTAL, 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. 7. 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.

