

115TH CONGRESS
2D SESSION

H. R. 7171

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

IN THE HOUSE OF REPRESENTATIVES

NOVEMBER 27, 2018

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 2019”.

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 “biomanufacturing” means the
7 manufacturing of products using biological manufac-
8 turing technologies;

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

17 (3) the term “Program” means the National
18 Engineering Biology Research and Development
19 Program established under section 4.

20 **SEC. 4. NATIONAL ENGINEERING BIOLOGY RESEARCH AND**
21 **DEVELOPMENT PROGRAM.**

22 (a) IN GENERAL.—The President, acting through the
23 Office of Science and Technology Policy, shall implement
24 a National Engineering Biology Research and Develop-
25 ment Program to advance societal well-being, national se-

1 curity, and economic productivity and competitiveness
2 through—

3 (1) advancing areas of research at the intersec-
4 tion of the biological, physical, and information
5 sciences and engineering, including research on the
6 microbiome;

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

11 (3) expanding the number of researchers, edu-
12 cators, and students with engineering biology train-
13 ing;

14 (4) accelerating the translation and commer-
15 cialization of engineering biology research and devel-
16 opment by the private sector; and

17 (5) improving the interagency planning and co-
18 ordination of Federal Government activities related
19 to engineering biology.

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

22 (1) sustained support for engineering biology
23 research and development through—

24 (A) grants to individual investigators and
25 interdisciplinary teams of investigators;

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

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

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

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

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

18 (A) identifying precompetitive research op-
19 portunities;

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

23 (C) connecting researchers, graduate stu-
24 dents, and postdoctoral fellows with entrepre-

1 neurship education and training opportunities;
2 and

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

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

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

21 (1) supporting research, including in the social
22 sciences, and other activities addressing ethical,
23 legal, environmental, and other appropriate societal
24 issues related to engineering biology, including inte-
25 grating research on such topics with the research

1 and development in engineering biology, and ensuring
2 that the results of such research are widely disseminated,
3 including through interdisciplinary engineering biology research centers described in subsection (b)(1); and

6 (2) ensuring, through the agencies and departments that participate in the Program, that public
7 input and outreach are integrated into the Program
8 by the convening of regular and ongoing public discussions through mechanisms such as citizen panels,
9 consensus conferences, and educational events, as
10 appropriate.

13 (e) INTERAGENCY COMMITTEE.—The President, acting through the Office of Science and Technology Policy,
14 shall designate an interagency committee on engineering
15 biology, which shall include representatives from the Office
16 of Science and Technology Policy, the National Science
17 Foundation, the Department of Energy, the National Aeronautics and Space Administration, the National Institute
18 of Standards and Technology, the Environmental Protection Agency, and any other agency that the President considers appropriate (in this section referred to as the
19 “interagency committee”). The Director of the Office of
20 Science and Technology Policy shall select a chairperson
21 from among the members of the Interagency Committee.

1 The Interagency Committee shall oversee the planning,
2 management, 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 that—

13 (A) guides the activities of the Program
14 for purposes of meeting the goals and priorities
15 established under (and updated pursuant to)
16 paragraph (2); and

17 (B) describes—

18 (i) the Program's support for long-
19 term funding for interdisciplinary engineer-
20 ing biology research and development;

21 (ii) the Program's support for edu-
22 cation and public outreach activities;

23 (iii) the Program's support for re-
24 search and other activities on ethical, legal,
25 environmental, and other appropriate soci-

1 etal issues related to engineering biology;
2 and

3 (iv) how the Program will move re-
4 sults out of the laboratory and into appli-
5 cation for the benefit of society and United
6 States competitiveness;

7 (4) propose an annually coordinated interagency
8 budget for the Program that is intended to ensure—

9 (A) the maintenance of a robust engineer-
10 ing biology research and development portfolio;
11 and

12 (B) that the balance of funding across the
13 Program is sufficient to meet the goals and pri-
14 orities established for the Program;

15 (5) develop a plan to utilize Federal programs,
16 such as the Small Business Innovation Research
17 Program and the Small Business Technology Trans-
18 fer Program, in support of the activities described in
19 subsection (b)(4); and

20 (6) in carrying out this section, take into con-
21 sideration the recommendations of the advisory com-
22 mittee established under section 5, the results of the
23 workshop convened under section 6, existing reports
24 on related topics, and the views of academic, State,
25 industry, and other appropriate groups.

1 (f) ANNUAL REPORT.—The interagency committee
2 established under subsection (e) shall prepare an annual
3 report, to be submitted to the Committee on Science,
4 Space, and Technology of the House of Representatives
5 and the Committee on Commerce, Science, and Transpor-
6 tation of the Senate not later than 90 days after submis-
7 sion of the President’s annual budget request, that in-
8 cludes—

9 (1) the Program budget for the fiscal year to
10 which such budget request applies, and for the then
11 current fiscal year, including a breakout of spending
12 for each agency participating in the Program, and
13 for the development and acquisition of any research
14 facilities and instrumentation; and

15 (2) an assessment of how Federal agencies are
16 implementing the plan described in subsection
17 (e)(5), and a description of the amount and number
18 of Small Business Innovation Research and Small
19 Business Technology Transfer awards made in sup-
20 port of the Program.

21 **SEC. 5. ADVISORY COMMITTEE.**

22 (a) IN GENERAL.—The President, acting through the
23 Office of Science and Technology Policy, shall designate
24 or establish an advisory committee on engineering biology
25 research and development (in this section referred to as

1 the “advisory committee”) to be composed of not fewer
2 than 12 members, including representatives of research
3 and academic institutions, industry, and nongovernmental
4 entities, who are qualified to provide advice on the Pro-
5 gram.

6 (b) ASSESSMENT.—The advisory committee shall as-
7 sess—

8 (1) progress made in implementing the Pro-
9 gram;

10 (2) the need to revise the Program;

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

13 (4) whether the Program priorities and goals
14 developed by the Interagency Committee are helping
15 to maintain United States leadership in engineering
16 biology;

17 (5) the management, coordination, implementa-
18 tion, and activities of the Program; and

19 (6) whether ethical, legal, environmental, and
20 other appropriate societal issues are adequately ad-
21 dressed by the Program.

22 (c) REPORTS.—Beginning not later than 3 years
23 after the date of enactment of this Act, and not less fre-
24 quently than once every 5 years thereafter, the advisory
25 committee shall submit to the President, the Committee

1 on Science, Space, and Technology of the House of Rep-
2 resentatives, and the Committee on Commerce, Science,
3 and Transportation of the Senate, a report on—

4 (1) the findings of the advisory committee’s as-
5 sessment under subsection (b); and

6 (2) the advisory committee’s recommendations
7 for ways to improve the Program.

8 (d) APPLICATION OF FEDERAL ADVISORY COM-
9 MITTEE ACT.—Section 14 of the Federal Advisory Com-
10 mittee Act (5 U.S.C. App.) shall not apply to the Advisory
11 Committee.

12 **SEC. 6. EXTERNAL REVIEW OF ETHICAL, LEGAL, ENVIRON-**
13 **MENTAL, AND SOCIETAL ISSUES.**

14 (a) IN GENERAL.—Not later than 12 months after
15 the date of enactment of this Act, the Director of the Na-
16 tional Science Foundation shall enter into an agreement
17 with the National Academies to convene a workshop to
18 review the ethical, legal, environmental, and other appro-
19 priate societal issues related to engineering biology re-
20 search and development. The goals of the workshop shall
21 be to—

22 (1) assess the current research on such issues;

23 (2) evaluate the research gaps relating to such
24 issues; and

1 (3) provide recommendations on how the Pro-
2 gram can address the research needs identified.

3 (b) REPORT TO CONGRESS.—Not later than 2 years
4 after the date of enactment of this Act, the Director of
5 the National Science Foundation shall transmit to the
6 Committee on Science, Space, and Technology of the
7 House of Representatives and the Committee on Com-
8 merce, Science, and Transportation of the Senate a sum-
9 mary report containing the findings of the workshop con-
10 vened under this section.

11 **SEC. 7. AGENCY ACTIVITIES.**

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

14 (1) support basic research at the intersection of
15 the biological, physical, and information sciences and
16 engineering, including research on the microbiome,
17 through individual grants and through interdisdisci-
18 nary research centers;

19 (2) support research on the environmental and
20 social effects of engineering biology;

21 (3) provide research instrumentation support
22 for engineering biology disciplines; and

23 (4) award grants, on a competitive basis, to en-
24 able institutions to support graduate students and

1 postdoctoral fellows who perform some of their engi-
2 neering biology research in an industry setting.

3 (b) DEPARTMENT OF COMMERCE.—As part of the
4 Program, the Director of the National Institute of Stand-
5 ards and Technology shall—

6 (1) establish a bioscience research program to
7 advance the development of standard reference ma-
8 terials and measurements and to create new data
9 tools, techniques, and processes necessary to advance
10 engineering biology and biomanufacturing;

11 (2) provide access to user facilities with ad-
12 vanced or unique equipment, services, materials, and
13 other resources to industry, institutions of higher
14 education, nonprofit organizations, and government
15 agencies to perform research and testing; and

16 (3) provide technical expertise to inform the de-
17 velopment of guidelines and safeguards for new
18 products, processes, and systems of engineering biol-
19 ogy.

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

22 (1) conduct and support basic research, devel-
23 opment, demonstration, and commercial application
24 activities in engineering biology disciplines, including
25 in the areas of synthetic biology, advanced biofuel

1 development, biobased materials, and environmental
2 remediation; and

3 (2) provide access to user facilities with ad-
4 vanced or unique equipment, services, materials, and
5 other resources, as appropriate, to industry, institu-
6 tions of higher education, nonprofit organizations,
7 and government agencies to perform research and
8 testing.

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

12 (1) conduct and support basic and applied re-
13 search in engineering biology fields, including in the
14 field of synthetic biology, the microbiome, and re-
15 lated to Earth and space sciences, aeronautics, space
16 technology, and space exploration and experimen-
17 tation, consistent with the priorities established in
18 the National Academies' decadal surveys; and

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

23 (e) ENVIRONMENTAL PROTECTION AGENCY.—As
24 part of the Program, the Environmental Protection Agen-

- 1 cy shall support research on how products, processes, and
- 2 systems of engineering biology will affect the environment.

