I

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.

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

SECTION 1. SHORT TITLE.

This Act may be cited as the ''Engineering Biology Research and Development Act of 2019''.

SEC. 2. FINDINGS.

The Congress makes the following findings:

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

ucts, processes, and systems that improve societal well-being, strengthen national security, and contribute to the economy.

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

(3) Long-term research and development is necessary to create breakthroughs in engineering biology. Such research and development requires government investment as the benefits are too distant or uncertain for industry to support alone.

(4) The Federal Government can play an important role by facilitating the development of tools and technologies to further advance engineering biology, including multiple user facilities that the Federal Government is uniquely able to support.

(5) Since other countries are investing significant resources in engineering biology, the United States is at risk of losing its competitive lead in this emerging area if it does not invest the necessary resources and have a national strategy.

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

and planning processes, drive technology transfer, and help ensure optimal returns on the Federal investment.

SEC. 3. DEFINITIONS.

In this Act—

(1) the term ''biomanufacturing'' means the manufacturing of products using biological manufacturing technologies;

(2) the term ''engineering biology'' means the science and engineering of cellular and molecular processes to advance fundamental understanding of complex natural systems, including the microbiome, and to develop new and advance existing products, processes, and systems that will contribute significantly to societal well-being, national security, and the economy;

(3) the term ''Program'' means the National Engineering Biology Research and Development Program established under section 4.

SEC. 4. NATIONAL ENGINEERING BIOLOGY RESEARCH AND DEVELOPMENT PROGRAM.

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

curity, and economic productivity and competitiveness through—

(1) advancing areas of research at the intersection of the biological, physical, and information sciences and engineering, including research on the microbiome;

(2) supporting social science research that advances the field of engineering biology and contributes to the adoption of new products, processes, and technologies;

(3) expanding the number of researchers, educators, and students with engineering biology training;

(4) accelerating the translation and commercialization of engineering biology research and development by the private sector; and

(5) improving the interagency planning and coordination of Federal Government activities related to engineering biology.

(b) PROGRAM ACTIVITIES.—The activities of the Program shall include—

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

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

(B) projects funded under joint solicitations by a collaboration of no fewer than two agencies participating in the Program; and

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

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

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

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

(A) identifying precompetitive research opportunities;

(B) facilitating public-private partnerships in engineering biology research and development;

(C) connecting researchers, graduate students, and postdoctoral fellows with entrepre-

neurship education and training opportunities; and

(D) supporting proof of concept activities and the formation of startup companies including through programs such as the Small Business Innovation Research Program and the Small Business Technology Transfer Program.

(c) EXPANDING PARTICIPATION.—The Program shall include, to the maximum extent practicable, outreach to primarily undergraduate and minority-serving institutions about Program opportunities, and shall encourage the development of research collaborations between research-intensive universities and primarily undergraduate and minority-serving institutions.

(d) ETHICAL, LEGAL, ENVIRONMENTAL, AND SOCIETAL ISSUES.—Program activities shall take into account ethical, legal, environmental, and other appropriate societal issues, including the need for safeguards and monitoring systems to protect society against the unintended release of engineered materials produced, by—

(1) supporting research, including in the social sciences, and other activities addressing ethical, legal, environmental, and other appropriate societal issues related to engineering biology, including integrating research on such topics with the research

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

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

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

The Interagency Committee shall oversee the planning, management, and coordination of the Program. The Interagency Committee shall—

(1) provide for interagency coordination of Federal engineering biology research, development, and other activities undertaken pursuant to the Program;

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

(3) develop, not later than 12 months after the date of enactment of this Act, and update every 5 years, a strategic plan that—

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

(B) describes—

(i) the Program's support for long-term funding for interdisciplinary engineering biology research and development;

(ii) the Program's support for education and public outreach activities;

(iii) the Program's support for research and other activities on ethical, legal, environmental, and other appropriate soci-

etal issues related to engineering biology; and

(iv) how the Program will move results out of the laboratory and into application for the benefit of society and United States competitiveness;

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

(A) the maintenance of a robust engineering biology research and development portfolio; and

(B) that the balance of funding across the Program is sufficient to meet the goals and priorities established for the Program;

(5) develop a plan to utilize Federal programs, such as the Small Business Innovation Research Program and the Small Business Technology Transfer Program, in support of the activities described in subsection (b)(4); and

(6) in carrying out this section, take into consideration the recommendations of the advisory committee established under section 5, the results of the workshop convened under section 6, existing reports on related topics, and the views of academic, State, industry, and other appropriate groups.

(f) ANNUAL REPORT.—The interagency committee established under subsection (e) shall prepare an annual report, to be submitted to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate not later than 90 days after submission of the President's annual budget request, that includes—

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

(2) an assessment of how Federal agencies are implementing the plan described in subsection (e)(5), and a description of the amount and number of Small Business Innovation Research and Small Business Technology Transfer awards made in support of the Program.

SEC. 5. ADVISORY COMMITTEE.

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

the ''advisory committee'') to be composed of not fewer than 12 members, including representatives of research and academic institutions, industry, and nongovernmental entities, who are qualified to provide advice on the Program.

(b) ASSESSMENT.—The advisory committee shall assess—

(1) progress made in implementing the Program;

(2) the need to revise the Program;

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

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

(5) the management, coordination, implementation, and activities of the Program; and

(6) whether ethical, legal, environmental, and other appropriate societal issues are adequately addressed by the Program.

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

on Science, Space, and Technology of the House of Representatives, and the Committee on Commerce, Science, and Transportation of the Senate, a report on—

(1) the findings of the advisory committee's assessment under subsection (b); and

(2) the advisory committee's recommendations for ways to improve the Program.

(d) APPLICATION OF FEDERAL ADVISORY COMMITTEE ACT.—Section 14 of the Federal Advisory Committee Act (5 U.S.C. App.) shall not apply to the Advisory Committee.

SEC. 6. EXTERNAL REVIEW OF ETHICAL, LEGAL, ENVIRONMENTAL, AND SOCIETAL ISSUES.

(a) IN GENERAL.—Not later than 12 months after the date of enactment of this Act, the Director of the National Science Foundation shall enter into an agreement with the National Academies to convene a workshop to review the ethical, legal, environmental, and other appropriate societal issues related to engineering biology research and development. The goals of the workshop shall be to—

(1) assess the current research on such issues;

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

(3) provide recommendations on how the Program can address the research needs identified.

(b) REPORT TO CONGRESS.—Not later than 2 years after the date of enactment of this Act, the Director of the National Science Foundation shall transmit to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate a summary report containing the findings of the workshop convened under this section.

SEC. 7. AGENCY ACTIVITIES.

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

(1) support basic research at the intersection of the biological, physical, and information sciences and engineering, including research on the microbiome, through individual grants and through interdisciplinary research centers;

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

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

(4) award grants, on a competitive basis, to enable institutions to support graduate students and

postdoctoral fellows who perform some of their engineering biology research in an industry setting.

(b) DEPARTMENT OF COMMERCE.—As part of the Program, the Director of the National Institute of Standards and Technology shall—

(1) establish a bioscience research program to advance the development of standard reference materials and measurements and to create new data tools, techniques, and processes necessary to advance engineering biology and biomanufacturing;

(2) provide access to user facilities with advanced or unique equipment, services, materials, and other resources to industry, institutions of higher education, nonprofit organizations, and government agencies to perform research and testing; and

(3) provide technical expertise to inform the development of guidelines and safeguards for new products, processes, and systems of engineering biology.

(c) DEPARTMENT OF ENERGY.—As part of the Program, the Secretary of Energy shall—

(1) conduct and support basic research, development, demonstration, and commercial application activities in engineering biology disciplines, including in the areas of synthetic biology, advanced biofuel

development, biobased materials, and environmental remediation; and

(2) provide access to user facilities with advanced or unique equipment, services, materials, and other resources, as appropriate, to industry, institutions of higher education, nonprofit organizations, and government agencies to perform research and testing.

(d) NATIONAL AERONAUTICS AND SPACE ADMINISTRATION.—As part of the Program, the National Aeronautics and Space Administration shall—

(1) conduct and support basic and applied research in engineering biology fields, including in the field of synthetic biology, the microbiome, and related to Earth and space sciences, aeronautics, space technology, and space exploration and experimentation, consistent with the priorities established in the National Academies' decadal surveys; and

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

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

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

○