

116TH CONGRESS  
2D SESSION

# S. 3734

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

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IN THE SENATE OF THE UNITED STATES

MAY 14, 2020

Mrs. GILLIBRAND (for herself, Mr. MARKEY, Mr. RUBIO, and Mr. GARDNER) introduced the following bill; which was read twice and referred to the Committee on Commerce, Science, and Transportation

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## A BILL

To provide for a coordinated Federal research initiative 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 “Bioeconomy Research  
5 and Development Act of 2020”.

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 a workforce  
5 with a diverse and unique set of skills combining the  
6 biological, physical, chemical, 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 many of the benefits are too dis-  
12 tant or uncertain for industry to support alone.

13 (4) Research is necessary to inform evidence-  
14 based governance of engineering biology and to sup-  
15 port the growth of the engineering biology industry.

16 (5) The Federal Government has an obligation  
17 to ensure that ethical, legal, environmental, safety,  
18 security, and societal implications of its science and  
19 technology research and investment follows policies  
20 of responsible innovation and fosters public trans-  
21 parency.

22 (6) The Federal Government can play an im-  
23 portant role by facilitating the development of tools  
24 and technologies to further advance engineering biol-  
25 ogy, including user facilities, by facilitating public-

1 private partnerships, by supporting risk research,  
2 and by facilitating the commercial application in the  
3 United States of research funded by the Federal  
4 Government.

5 (7) The United States led the development of  
6 the science and engineering techniques that created  
7 the field of engineering biology, but due to increas-  
8 ing international competition, the United States is  
9 at risk of losing its competitive advantage if does not  
10 invest the necessary resources and have a national  
11 strategy.

12 (8) A National Engineering Biology Initiative  
13 can serve to establish new research directions and  
14 technology goals, improve interagency coordination  
15 and planning processes, drive technology transfer to  
16 the private sector, and help ensure optimal returns  
17 on the Federal investment.

18 **SEC. 3. DEFINITIONS.**

19 In this Act:

20 (1) **BIOMANUFACTURING.**—The term “bio-  
21 manufacturing” means the utilization of biological  
22 systems to develop new and advance existing prod-  
23 ucts, tools, and processes at commercial scale.

24 (2) **ENGINEERING BIOLOGY.**—The term “engi-  
25 neering biology” means the application of engineer-

1 ing design principles and practices to biological sys-  
2 tems, including molecular and cellular systems, to  
3 advance fundamental understanding of complex nat-  
4 ural systems and to enable novel or optimize func-  
5 tions and capabilities.

6 (3) INITIATIVE.—The term “Initiative” means  
7 the National Engineering Biology Research and De-  
8 velopment Initiative established under section 4.

9 (4) OMICS.—The term “omics” refers to the  
10 collective technologies used to explore the roles, rela-  
11 tionships, and actions of the various types of mol-  
12 ecules that make up the cells of an organism.

13 **SEC. 4. NATIONAL ENGINEERING BIOLOGY RESEARCH AND**  
14 **DEVELOPMENT INITIATIVE.**

15 (a) IN GENERAL.—The President, acting through the  
16 Office of Science and Technology Policy, shall implement  
17 a National Engineering Biology Research and Develop-  
18 ment Initiative to advance societal well-being, national se-  
19 curity, sustainability, and economic productivity and com-  
20 petitiveness through—

21 (1) advancing areas of research at the intersec-  
22 tion of the biological, physical, chemical, data, and  
23 computational sciences and engineering to accelerate  
24 scientific understanding and technological innovation  
25 in engineering biology;

1           (2) advancing areas of biomanufacturing re-  
2           search to optimize, standardize, scale, and deliver  
3           new products and solutions;

4           (3) supporting social and behavioral sciences  
5           and economics research that advances the field of  
6           engineering biology and contributes to the develop-  
7           ment and public understanding of new products,  
8           processes, and technologies;

9           (4) improving the understanding of engineering  
10          biology of the scientific and lay public and sup-  
11          porting greater evidence-based public discourse  
12          about its benefits and risks;

13          (5) supporting risk research, including under  
14          subsection (d);

15          (6) supporting the development of novel tools  
16          and technologies to accelerate scientific under-  
17          standing and technological innovation in engineering  
18          biology;

19          (7) expanding the number of researchers, edu-  
20          cators, and students with engineering biology train-  
21          ing, including from traditionally underrepresented  
22          and underserved populations;

23          (8) accelerating the translation and commer-  
24          cialization of engineering biology research and devel-  
25          opment by the private sector; and

1           (9) improving the interagency planning and co-  
2           ordination of Federal Government activities related  
3           to engineering biology.

4           (b) INITIATIVE ACTIVITIES.—The activities of the  
5 Initiative shall include—

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

8                   (A) grants to individual investigators and  
9                   teams of investigators, including interdis-  
10                   ciplinary teams;

11                   (B) projects funded under joint solici-  
12                   tations by a collaboration of no fewer than two  
13                   agencies participating in the Initiative; and

14                   (C) interdisciplinary research centers that  
15                   are organized to investigate basic research  
16                   questions, carry out technology development  
17                   and demonstration activities, and increase un-  
18                   derstanding of how to scale up engineering biol-  
19                   ogy processes, including biomanufacturing;

20           (2) sustained support for databases and related  
21           tools, including—

22                   (A) support for curated genomics,  
23                   epigenomics, and all other relevant omics data-  
24                   bases, including plant and microbial databases,

1 that are available to researchers to carry out  
2 engineering biology research;

3 (B) development of standards for such  
4 databases, including for curation, interoper-  
5 ability, and protection of privacy and security;

6 (C) support for the development of com-  
7 putational tools, including artificial intelligence  
8 tools, that can accelerate research and innova-  
9 tion using such databases; and

10 (D) an inventory and assessment of all  
11 Federal Government omics databases to identify  
12 opportunities for consolidation and inform in-  
13 vestment in such databases as critical infra-  
14 structure for the engineering biology research  
15 enterprise;

16 (3) sustained support for the development, opti-  
17 mization, and validation of novel tools and tech-  
18 nologies to enable the dynamic study of molecular  
19 processes in situ, including through—

20 (A) research conducted at Federal labora-  
21 tories;

22 (B) grants to investigators at institutions  
23 of higher education and other nonprofit re-  
24 search institutions; and

1 (C) through the Small Business Innovation  
2 Research Program and the Small Business  
3 Technology Transfer Program, as described in  
4 section 9 of the Small Business Act (15 U.S.C.  
5 638);

6 (4) education and training of undergraduate  
7 and graduate students in engineering biology, in bio-  
8 manufacturing, in bioprocess engineering, and in  
9 areas of computational science applied to engineer-  
10 ing biology and in the related ethical, legal, environ-  
11 mental, safety, security, and other societal issues;

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

15 (6) 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 Initiative  
9   shall include, to the maximum extent practicable, outreach  
10 to primarily undergraduate and minority-serving institu-  
11 tions about Initiative opportunities, and shall encourage  
12 the development of research collaborations between re-  
13 search-intensive universities and primarily undergraduate  
14 and minority-serving institutions.

15           (d) ETHICAL, LEGAL, ENVIRONMENTAL, SAFETY,  
16 SECURITY, AND SOCIETAL ISSUES.—Initiative activities  
17 shall take into account ethical, legal, environmental, safe-  
18 ty, security, and other appropriate societal issues by—

19                   (1) supporting research, including in the social  
20           sciences, and other activities addressing ethical,  
21           legal, environmental, and other appropriate societal  
22           issues related to engineering biology, including inte-  
23           grating research on such topics with the research  
24           and development in engineering biology, and ensur-  
25           ing that the results of such research are widely dis-

1       seminated, including through interdisciplinary engi-  
2       neering biology research centers described in sub-  
3       section (b)(1);

4               (2) supporting research and other activities re-  
5       lated to the safety and security implications of engi-  
6       neering biology, including outreach to increase  
7       awareness among Federal researchers and federally  
8       funded researchers at institutions of higher edu-  
9       cation about potential safety and security implica-  
10      tions of engineering biology research, as appropriate;

11              (3) ensuring that input from Federal and non-  
12      Federal experts on the ethical, legal, environmental,  
13      safety, security, and other appropriate societal issues  
14      related to engineering biology is integrated into the  
15      Initiative; and

16              (4) ensuring, through the agencies and depart-  
17      ments that participate in the Initiative, that public  
18      input and outreach are integrated into the Initiative  
19      by the convening of regular and ongoing public dis-  
20      cussions through mechanisms such as workshops,  
21      consensus conferences, and educational events, as  
22      appropriate.

23 **SEC. 5. INITIATIVE COORDINATION.**

24       (a) INTERAGENCY COMMITTEE.—The President, act-  
25      ing through the Office of Science and Technology Policy,

1 shall designate an interagency committee to coordinate en-  
2 gineering biology, which shall be co-chaired by the Office  
3 of Science and Technology Policy, and include representa-  
4 tives from the National Science Foundation, the Depart-  
5 ment of Energy, the Department of Defense, the National  
6 Aeronautics and Space Administration, the National Insti-  
7 tute of Standards and Technology, the Environmental  
8 Protection Agency, the Department of Agriculture, the  
9 National Institutes of Health, the Bureau of Economic  
10 Analysis, and any other agency that the President con-  
11 siders appropriate (in this section referred to as the  
12 “interagency committee”). The Director of the Office of  
13 Science and Technology Policy shall select an additional  
14 co-chairperson from among the members of the Inter-  
15 agency Committee. The Interagency Committee shall over-  
16 see the planning, management, and coordination of the  
17 Initiative. The Interagency Committee shall—

18           (1) provide for interagency coordination of Fed-  
19           eral engineering biology research, development, and  
20           other activities undertaken pursuant to the Initia-  
21           tive;

22           (2) establish and periodically update goals and  
23           priorities for the Initiative;

24           (3) develop, not later than 12 months after the  
25           date of enactment of this Act, and update every 3

1 years, a strategic plan submitted to the Committee  
2 on Science, Space, and Technology of the House of  
3 Representatives and the Committee on Commerce,  
4 Science, and Transportation of the Senate that—

5 (A) guides the activities of the Initiative  
6 for purposes of meeting the goals and priorities  
7 established under (and updated pursuant to)  
8 paragraph (2); and

9 (B) describes—

10 (i) the Initiative's support for long-  
11 term funding for interdisciplinary engineer-  
12 ing biology research and development;

13 (ii) the Initiative's support for edu-  
14 cation and public outreach activities;

15 (iii) the Initiative's support for re-  
16 search and other activities on ethical, legal,  
17 environmental, safety, security, and other  
18 appropriate societal issues related to engi-  
19 neering biology including—

20 (I) an applied biorisk manage-  
21 ment research plan;

22 (II) recommendations for inte-  
23 grating security into biological data  
24 access and international reciprocity  
25 agreements; and

- 1 (III) an evaluation of existing  
2 biosecurity governance policies, guid-  
3 ance, and directives for the purposes  
4 of creating a unified, adaptable, evi-  
5 dence-based framework to respond to  
6 emerging biosecurity challenges cre-  
7 ated by advances in engineering biol-  
8 ogy;
- 9 (iv) how the Initiative will move re-  
10 sults out of the laboratory and into appli-  
11 cation for the benefit of society and United  
12 States competitiveness; and
- 13 (v) how the Initiative will measure  
14 and track the contributions of engineering  
15 biology to United States economic growth  
16 and other societal indicators;
- 17 (4) develop a national genomic sequencing  
18 strategy to ensure engineering biology research fully  
19 leverages plant, animal, and microbe biodiversity to  
20 enhance long-term innovation and competitiveness in  
21 engineering biology in the United States;
- 22 (5) propose an annually coordinated interagency  
23 budget for the Initiative that is intended to ensure—

1 (A) the maintenance of a robust engineer-  
2 ing biology research and development portfolio;  
3 and

4 (B) that the balance of funding across the  
5 Initiative is sufficient to meet the goals and pri-  
6 orities established for the Program;

7 (6) develop a plan to utilize Federal programs,  
8 such as the Small Business Innovation Research  
9 Program and the Small Business Technology Trans-  
10 fer Program as described in section 9 of the Small  
11 Business Act (15 U.S.C. 638), in support of the ac-  
12 tivities described in section 4(b)(3); and

13 (7) in carrying out this section, take into con-  
14 sideration the recommendations of the advisory com-  
15 mittee established under section 6, the results of the  
16 workshop convened under section 7, existing reports  
17 on related topics, and the views of academic, State,  
18 industry, and other appropriate groups.

19 (b) ANNUAL REPORT.—Beginning with fiscal year  
20 2020, not later than 90 days after submission of the Presi-  
21 dent’s annual budget request and each fiscal year there-  
22 after, the interagency committee shall prepare and submit  
23 to the Committee on Science, Space, and Technology of  
24 the House of Representatives and the Committee on Com-

1 merce, Science, and Transportation of the Senate a report  
2 that includes—

3 (1) a summarized agency budget in support of  
4 the Initiative for the fiscal year to which such budg-  
5 et request applies, and for the then current fiscal  
6 year, including a breakout of spending for each  
7 agency participating in the Program and for the de-  
8 velopment and acquisition of any research facilities  
9 and instrumentation; and

10 (2) an assessment of how Federal agencies are  
11 implementing the plan described in subsection  
12 (a)(3), including—

13 (A) a description of the amount and num-  
14 ber of awards made under the Small Business  
15 Innovation Research Program and the Small  
16 Business Technology Transfer Program (as de-  
17 scribed in section 9 of the Small Business Act  
18 (15 U.S.C. 638)) in support of the Initiative;  
19 and

20 (B) a description of the amount and num-  
21 ber of projects funded under joint solicitations  
22 by a collaboration of no fewer than 2 agencies  
23 participating in the Initiative.

24 (c) INITIATIVE OFFICE.—

1           (1) IN GENERAL.—The President shall establish  
2 an Initiative Coordination Office, with a Director  
3 and full-time staff, which shall—

4           (A) provide technical and administrative  
5 support to the interagency committee and the  
6 advisory committee established under section 6;

7           (B) serve as the point of contact on Fed-  
8 eral engineering biology activities for govern-  
9 ment organizations, academia, industry, profes-  
10 sional societies, State governments, interested  
11 citizen groups, and others to exchange technical  
12 and programmatic information;

13           (C) oversee interagency coordination of the  
14 Initiative, including by encouraging and sup-  
15 porting joint agency solicitation and selection of  
16 applications for funding of activities under the  
17 Initiative;

18           (D) conduct public outreach, including dis-  
19 semination of findings and recommendations of  
20 the advisory committee established under sec-  
21 tion 6, as appropriate;

22           (E) serve as the coordinator of ethical,  
23 legal, environmental, safety, security, and other  
24 appropriate societal input; and



1 (F) promote access to, and early applica-  
2 tion of, the technologies, innovations, and ex-  
3 pertise derived from Initiative activities to agen-  
4 cy missions and systems across the Federal  
5 Government, and to United States industry, in-  
6 cluding startup companies.

7 (2) FUNDING.—The Director of the Office of  
8 Science and Technology Policy shall develop an esti-  
9 mate of the funds necessary to carry out the activi-  
10 ties of the Initiative Coordination Office, including  
11 an estimate of how much each participating agency  
12 described in subsection (a) will contribute to such  
13 funds, and submit such estimate to Congress no  
14 later than 90 days after the enactment of this Act.

15 (3) TERMINATION.—The Initiative Coordination  
16 Office established under this subsection shall termi-  
17 nate on the date that is 10 years after the date of  
18 the enactment of this Act, unless a determination is  
19 made by the President that such Office is necessary  
20 to meet the economic or national security goals of  
21 the Program.

22 **SEC. 6. ADVISORY COMMITTEE.**

23 (a) IN GENERAL.—The President, acting through the  
24 Office of Science and Technology Policy, shall designate  
25 or establish an advisory committee on engineering biology

1 research and development (in this section referred to as  
2 the “advisory committee”) to be composed of not fewer  
3 than 12 members, including representatives of research  
4 and academic institutions, industry, and nongovernmental  
5 entities, who are qualified to provide advice on the Initia-  
6 tive.

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

9 (1) the current state of United States competi-  
10 tiveness in engineering biology, including the scope  
11 and scale of United States investments in engineer-  
12 ing biology research and development in the inter-  
13 national context;

14 (2) current market barriers to commercializa-  
15 tion of engineering biology products, processes, and  
16 tools in the United States;

17 (3) progress made in implementing the Initia-  
18 tive;

19 (4) the need to revise the Initiative;

20 (5) the balance of activities and funding across  
21 the Initiative;

22 (6) whether the strategic plan developed or up-  
23 dated by the interagency committee established  
24 under section 5 is helping to maintain United States  
25 leadership in engineering biology;

1           (7) the management, coordination, implementa-  
2           tion, and activities of the Initiative; and

3           (8) whether ethical, legal, environmental, safety,  
4           security, and other appropriate societal issues are  
5           adequately addressed by the Initiative.

6           (c) REPORTS.—Beginning not later than 2 years  
7           after the date of enactment of this Act, and not less fre-  
8           quently than once every 3 years thereafter, the advisory  
9           committee shall submit to the President, the Committee  
10          on Science, Space, and Technology of the House of Rep-  
11          resentatives, and the Committee on Commerce, Science,  
12          and Transportation of the Senate, a report on—

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

15           (2) the advisory committee’s recommendations  
16           for ways to improve the Initiative.

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

21       **SEC. 7. EXTERNAL REVIEW OF ETHICAL, LEGAL, ENVIRON-**  
22                               **MENTAL, SAFETY, SECURITY, AND SOCIETAL**  
23                               **ISSUES.**

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

1 Science Foundation shall seek to enter into an agreement  
2 with the National Academies of Sciences, Engineering,  
3 and Medicine to conduct a review, and make recommenda-  
4 tions with respect to, the ethical, legal, environmental,  
5 safety, security, and other appropriate societal issues re-  
6 lated to engineering biology research and development.

7 The review shall include—

8 (1) an assessment of the current research on  
9 such issues;

10 (2) a description of the research gaps relating  
11 to such issues;

12 (3) recommendations on how the Initiative can  
13 address the research needs identified pursuant to  
14 paragraph (2); and

15 (4) recommendations on how engineering biol-  
16 ogy researchers can best incorporate considerations  
17 of ethical, legal, environmental, safety, security, and  
18 other societal issues into the development of research  
19 proposals and the conduct of research.

20 (b) REPORT TO CONGRESS.—The agreement entered  
21 into under subsection (a) shall require the National Acad-  
22 emies of Sciences, Engineering, and Medicine to, not later  
23 than 2 years after the date of the enactment of this Act—

24 (1) submit to the Committee on Science, Space,  
25 and Technology of the House of Representatives and

1 the Committee on Commerce, Science, and Trans-  
2 portation of the Senate a report containing the find-  
3 ings and recommendations of the review conducted  
4 under subsection (a); and

5 (2) make a copy of such report available on a  
6 publicly accessible website.

7 (c) ALTERNATE CONTRACT SCIENTIFIC ORGANIZA-  
8 TION.—

9 (1) IN GENERAL.—If the Director is unable to  
10 enter into an agreement described in subsection (a)  
11 with the National Academy of Sciences before the  
12 date specified in such subsection on terms acceptable  
13 to the Director, the Director shall seek to enter into  
14 such an agreement with another appropriate sci-  
15 entific organization that—

16 (A) is not part of the Government;

17 (B) operates as a not-for-profit entity; and

18 (C) has expertise and objectivity com-  
19 parable to that of the National Academy of  
20 Sciences.

21 (2) TREATMENT.—If the Director enters into  
22 an agreement with another organization as described  
23 in paragraph (1), any reference in this subsection to  
24 the National Academy of Sciences shall be treated as  
25 a reference to the other organization.

1 **SEC. 8. AGENCY ACTIVITIES.**

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

4 (1) support basic research in engineering biol-  
5 ogy through individual grants and through inter-  
6 disciplinary research centers;

7 (2) support research on the environmental,  
8 legal, ethical, and social implications of engineering  
9 biology;

10 (3) provide support for research instrumenta-  
11 tion for engineering biology disciplines, including  
12 support for research, development, optimization and  
13 validation of novel technologies to enable the dy-  
14 namic study of molecular processes in situ;

15 (4) support curriculum development and re-  
16 search experiences for secondary, undergraduate,  
17 and graduate students in engineering biology and  
18 biomanufacturing; and

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

23 (b) DEPARTMENT OF COMMERCE.—As part of the  
24 Initiative, the Director of the National Institute of Stand-  
25 ards and Technology shall—

1           (1) establish a bioscience research program to  
2           advance the development of standard reference ma-  
3           terials and measurements and to create new data  
4           tools, techniques, and processes necessary to advance  
5           engineering biology and biomanufacturing;

6           (2) provide access to user facilities with ad-  
7           vanced or unique equipment, services, materials, and  
8           other resources to industry, institutions of higher  
9           education, nonprofit organizations, and government  
10          agencies to perform research and testing; and

11          (3) provide technical expertise to inform the po-  
12          tential development of guidelines or safeguards for  
13          new products, processes, and systems of engineering  
14          biology.

15          (c) DEPARTMENT OF ENERGY.—As part of the Ini-  
16          tiative, the Secretary of Energy shall—

17               (1) conduct and support research, development,  
18               demonstration, and commercial application activities  
19               in engineering biology, including in the areas of syn-  
20               thetic biology, advanced biofuel development,  
21               biobased materials, and environmental remediation;

22               (2) support the development, optimization and  
23               validation of novel, scalable tools and technologies to  
24               enable the dynamic study of molecular processes in  
25               situ; and

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

7           (d) DEPARTMENT OF DEFENSE.—As part of the Ini-  
8           tiative, the Secretary of Defense shall—

9           (1) conduct and support research and develop-  
10          ment in engineering biology and associated data and  
11          information sciences;

12          (2) support curriculum development and re-  
13          search experiences in engineering biology and associ-  
14          ated data and information sciences across the mili-  
15          tary education system, to include service academies,  
16          professional military education, and military grad-  
17          uate education; and

18          (3) assess risks of potential national security  
19          and economic security threats relating to engineering  
20          biology.

21          (e) NATIONAL AERONAUTICS AND SPACE ADMINIS-  
22          TRATION.—As part of the Initiative, the National Aero-  
23          nautics and Space Administration shall—

24          (1) conduct and support basic and applied re-  
25          search in engineering biology, including in synthetic



1 biology, and related to Earth and space sciences,  
2 aeronautics, space technology, and space exploration  
3 and experimentation, consistent with the priorities  
4 established in the National Academies' decadal sur-  
5 veys; and

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

10 (f) DEPARTMENT OF AGRICULTURE.—As part of the  
11 Initiative, the Secretary of Agriculture shall—

12 (1) support research and development in engi-  
13 neering biology, including in synthetic biology and  
14 biomaterials;

15 (2) award grants through the National Institute  
16 of Food and Agriculture; and

17 (3) support development conducted by the Agri-  
18 cultural Research Service.

19 (g) ENVIRONMENTAL PROTECTION AGENCY.—As  
20 part of the Initiative, the Environmental Protection Agen-  
21 cy shall support research on how products, processes, and  
22 systems of engineering biology will affect or can protect  
23 the environment.

24 (h) DEPARTMENT OF HEALTH AND HUMAN SERV-  
25 ICES.—

1           (1) NATIONAL INSTITUTES OF HEALTH.—As  
2 part of the Initiative, the Director of the National  
3 Institutes of Health shall—

4           (A) support research and development to  
5 advance the understanding and application of  
6 engineering biology for human health, including  
7 in synthetic biology, cell and tissue engineering,  
8 computational biology, and artificial intel-  
9 ligence;

10          (B) support and accelerate the application  
11 of biomedical research and technologies through  
12 cross-disciplinary collaboration and training  
13 programs;

14          (C) support research on ethical, legal, safe-  
15 ty, and societal implications of emerging bio-  
16 technologies; and

17          (D) award grants on a competitive basis,  
18 that enable institutions to support graduate  
19 students and postdoctoral fellows who perform  
20 some of their engineering biology research  
21 across multiple disciplinary departments.

22           (2) FOOD AND DRUG ADMINISTRATION.—As  
23 part of the Initiative, the Commissioner of Food and  
24 Drugs shall—

1           (A) support research and evaluation of  
2 safety, potency, and efficacy of novel biologic  
3 products and biomanufacturing technologies;  
4 and

5           (B) ensure the timely development of  
6 screening methods to evaluate safety and secu-  
7 rity of new biological products and processes.

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