

116TH CONGRESS  
2D SESSION

# H. R. 6216

To establish the National Artificial Intelligence Initiative, and for other purposes.

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## IN THE HOUSE OF REPRESENTATIVES

MARCH 12, 2020

Ms. JOHNSON of Texas (for herself, Mr. LUCAS, Mr. MCNERNEY, Mr. OLSON, Mr. LIPINSKI, and Mr. WEBER of Texas) introduced the following bill; which was referred to the Committee on Science, Space, and Technology

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## A BILL

To establish the National Artificial Intelligence Initiative,  
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       “National Artificial Intelligence Initiative Act of 2020”.

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

Sec. 1. Short title; table of contents.  
Sec. 2. Findings.  
Sec. 3. Definitions.

TITLE I—NATIONAL ARTIFICIAL INTELLIGENCE INITIATIVE

- Sec. 101. National Artificial Intelligence Initiative.
- Sec. 102. National Artificial Intelligence Initiative Office.
- Sec. 103. Coordination by Interagency Committee.
- Sec. 104. National Artificial Intelligence Advisory Committee.
- Sec. 105. National Academies artificial intelligence impact study on workforce.
- Sec. 106. GAO report on computational needs.

## TITLE II—NATIONAL ARTIFICIAL INTELLIGENCE RESEARCH INSTITUTES

- Sec. 201. National Artificial Intelligence Research Institutes.

## TITLE III—NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY ARTIFICIAL INTELLIGENCE ACTIVITIES

- Sec. 301. National Institute of Standards and Technology activities.

## TITLE IV—NATIONAL SCIENCE FOUNDATION ARTIFICIAL INTELLIGENCE ACTIVITIES

- Sec. 401. Artificial intelligence research and education.

## TITLE V—DEPARTMENT OF ENERGY ARTIFICIAL INTELLIGENCE RESEARCH PROGRAM

- Sec. 501. Department of Energy Artificial Intelligence Research Program.

### 1 **SEC. 2. FINDINGS.**

2 Congress finds the following:

3 (1) Artificial intelligence is a tool that has the  
4 potential to change and possibly transform every  
5 sector of the United States economy and society.

6 (2) The Federal Government should continue to  
7 play an important role advancing research, develop-  
8 ment, standards, and education activities in artificial  
9 intelligence through coordination and collaboration  
10 between government, academia, and the private sec-  
11 tor to leverage the intellectual, physical, and digital  
12 resources of each stakeholder.

13 (3) The Federal Government lacks clear under-  
14 standing of the capabilities of artificial intelligence

1 and its potential to affect various social and eco-  
2 nomic sectors, including ethical concerns, national  
3 security implications, and workforce impacts.

4 (4) Researchers from academia, Federal labora-  
5 tories, and much of the private sector have limited  
6 access to many high-quality datasets, computing re-  
7 sources, or real-world testing environments to design  
8 and deploy safe and trustworthy artificial intel-  
9 ligence systems.

10 (5) There is a lack of standards and  
11 benchmarking for artificial intelligence systems that  
12 academia and the public and private sectors can use  
13 to evaluate the performance of these systems before  
14 and after deployment.

15 (6) Artificial intelligence is increasingly becom-  
16 ing a highly interdisciplinary field with expertise re-  
17 quired from a diverse range of scientific and other  
18 scholarly disciplines that traditionally work inde-  
19 pendently and continue to face cultural and institu-  
20 tional barriers to large scale collaboration.

21 (7) Current Federal investments and funding  
22 mechanisms are largely insufficient to incentivize  
23 and support the large-scale interdisciplinary and  
24 public-private collaborations that will be required to

1 advance trustworthy artificial intelligence systems in  
2 the United States.

3 (8) The United States education pipeline for ar-  
4 tificial intelligence fields faces significant challenges.  
5 Not only does the artificial intelligence research field  
6 lack the gender and racial diversity of the American  
7 population as a whole, but it is failing to both retain  
8 researchers and adequately support educators to  
9 meet the demands of the next generation of students  
10 studying artificial intelligence.

11 (9) In order to help drive forward advances in  
12 trustworthy artificial intelligence across all sectors  
13 and to the benefit of all Americans, the Federal  
14 Government must provide sufficient resources and  
15 use its convening power to facilitate the growth of  
16 artificial intelligence human capital, research, and  
17 innovation capacity in academia and other nonprofit  
18 research organizations, companies of all sizes and  
19 across all sectors, and within the Federal Govern-  
20 ment.

21 **SEC. 3. DEFINITIONS.**

22 In this Act:

23 (1) **ADVISORY COMMITTEE.**—The term “Advi-  
24 sory Committee” means the National Artificial Intel-

1       ligence Advisory Committee established under sec-  
2       tion 104(a).

3               (2) AGENCY HEAD.—The term “agency head”  
4       means the head of any Executive agency (as defined  
5       in section 105 of title 5, United States Code) other  
6       than the Department of Defense.

7               (3) ARTIFICIAL INTELLIGENCE.—The term “ar-  
8       tificial intelligence” means a machine-based system  
9       that can, for a given set of human-defined objectives,  
10      make predictions, recommendations or decisions in-  
11      fluencing real or virtual environments. Artificial in-  
12      telligence systems use machine and human-based in-  
13      puts to—

14                   (A) perceive real and virtual environments;

15                   (B) abstract such perceptions into models  
16      through analysis in an automated manner; and

17                   (C) use model inference to formulate op-  
18      tions for information or action.

19               (4) INITIATIVE.—The term “Initiative” means  
20      the National Artificial Intelligence Initiative estab-  
21      lished under section 101(a).

22               (5) INITIATIVE OFFICE.—The term “Initiative  
23      Office” means the National Artificial Intelligence  
24      Initiative Office established under section 102(a).

1           (6) INSTITUTE.—The term “Institute” means  
2           an Artificial Intelligence Research Institute de-  
3           scribed in section 201(b)(1).

4           (7) INTERAGENCY COMMITTEE.—The term  
5           “Interagency Committee” means the interagency  
6           committee established under section 103(a).

7           (8) K-12 EDUCATION.—The term “K-12 edu-  
8           cation” means elementary school and secondary edu-  
9           cation, as such terms are defined in section 8101 of  
10          the Elementary and Secondary Education Act of  
11          1965 (20 U.S.C. 7801).

12          (9) MACHINE LEARNING.—The term “machine  
13          learning” means an application of artificial intel-  
14          ligence that is characterized by providing systems  
15          the ability to automatically learn and improve on the  
16          basis of data or experience, without being explicitly  
17          programmed.

## 18       **TITLE I—NATIONAL ARTIFICIAL** 19       **INTELLIGENCE INITIATIVE**

### 20       **SEC. 101. NATIONAL ARTIFICIAL INTELLIGENCE INITIA-** 21       **TIVE.**

22          (a) ESTABLISHMENT; PURPOSES.—The President  
23          shall establish and implement an initiative to be known  
24          as the “National Artificial Intelligence Initiative”. The  
25          purposes of the Initiative shall be to—

1           (1) ensure continued United States leadership  
2           in artificial intelligence research and development;

3           (2) lead the world in the development and use  
4           of trustworthy artificial intelligence systems in the  
5           public and private sectors;

6           (3) maximize the benefits of artificial intel-  
7           ligence systems for all American people; and

8           (4) prepare the present and future United  
9           States workforce for the integration of artificial in-  
10          telligence systems across all sectors of the economy  
11          and society.

12          (b) INITIATIVE ACTIVITIES.—In carrying out the Ini-  
13          tiative, the President, acting through the Initiative Office,  
14          the Interagency Committee, and agency heads as the  
15          President considers appropriate, shall carry out activities  
16          that include the following:

17               (1) Sustained, consistent, and coordinated sup-  
18               port for artificial intelligence research and develop-  
19               ment through grants, cooperative agreements,  
20               testbeds, and access to data and computing re-  
21               sources.

22               (2) Support for the development of voluntary  
23               standards, best practices, and benchmarks for the  
24               development and use of trustworthy artificial intel-  
25               ligence systems.

1           (3) Support for educational programs at all lev-  
2           els, in both formal and informal learning environ-  
3           ments, to prepare the American workforce and the  
4           general public to be able to use and interact with ar-  
5           tificial intelligence systems, as well as adapt to the  
6           potentially transformative impact of artificial intel-  
7           ligence on society and the economy.

8           (4) Support for interdisciplinary research, edu-  
9           cation, and training programs for students and re-  
10          searchers that promote learning in the methods and  
11          systems used in artificial intelligence and foster  
12          interdisciplinary perspectives and collaborations  
13          among subject matter experts in relevant fields, in-  
14          cluding computer science, mathematics, statistics,  
15          engineering, social sciences, psychology, behavioral  
16          science, ethics, security, legal scholarship, and other  
17          disciplines that will be necessary to advance artificial  
18          intelligence research and development responsibly.

19          (5) Support for partnerships to leverage knowl-  
20          edge, computing resources, access to open datasets,  
21          and other resources from industry, government, non-  
22          profit organizations, Federal laboratories, State pro-  
23          grams, and institutions of higher education to ad-  
24          vance activities under the Initiative.



1           (6) Interagency planning and coordination of  
2       Federal artificial intelligence research, development,  
3       demonstration, standards engagement, and other ac-  
4       tivities under the Initiative.

5           (7) Outreach to diverse stakeholders, including  
6       citizen groups and industry, to ensure public input  
7       is taken into account in the activities of the Initia-  
8       tive.

9           (8) Leveraging existing Federal investments to  
10      advance objectives of the Initiative.

11          (9) Support for a network of interdisciplinary  
12      artificial intelligence research institutes, as described  
13      in section 201(b)(7)(B).

14          (10) Support opportunities for international co-  
15      operation with strategic allies, as appropriate, on the  
16      research and development, assessment, and re-  
17      sources for trustworthy artificial intelligence systems  
18      and the development of voluntary consensus stand-  
19      ards for those systems.

20   **SEC. 102. NATIONAL ARTIFICIAL INTELLIGENCE INITIATIVE**  
21                   **OFFICE.**

22          (a) IN GENERAL.—The Director of the Office of  
23      Science and Technology Policy shall establish or designate,  
24      and appoint a director of, an office to be known as the  
25      “National Artificial Intelligence Initiative Office” to carry

1 out the responsibilities described in subsection (b) with re-  
2 spect to the Initiative. The Initiative Office shall have suf-  
3 ficient staff to carry out such responsibilities, including  
4 staff detailed from the Federal departments and agencies  
5 described in section 103(c).

6 (b) RESPONSIBILITIES.—The Director of the Initia-  
7 tive Office shall—

8 (1) provide technical and administrative support  
9 to the Interagency Committee and the Advisory  
10 Committee;

11 (2) serve as the point of contact on Federal ar-  
12 tificial intelligence activities for Federal departments  
13 and agencies, industry, academia, nonprofit organi-  
14 zations, professional societies, State governments,  
15 and such other persons as the Initiative Office con-  
16 sider appropriate to exchange technical and pro-  
17 grammatic information;

18 (3) conduct regular public outreach to diverse  
19 stakeholders, including through the convening of  
20 conferences and educational events, the publication  
21 of information about significant Initiative activities  
22 on a publicly available website, and the dissemina-  
23 tion of findings and recommendations of the Advi-  
24 sory Committee, as appropriate; and

1           (4) promote access to and early adoption of the  
2           technologies, innovations, lessons learned, and exper-  
3           tise derived from Initiative activities to agency mis-  
4           sions and systems across the Federal Government,  
5           and to industry, including startup companies.

6           (c) **FUNDING ESTIMATE.**—The Director of the Office  
7           of Science and Technology Policy shall develop an estimate  
8           of the funds necessary to carry out the activities of the  
9           Initiative Coordination Office, including an estimate of  
10          how much each participating Federal department and  
11          agency described in section 103(c) will contribute to such  
12          funds, and submit such estimate to Congress not later  
13          than 90 days after the enactment of this Act. The Director  
14          shall update this estimate each year based on participating  
15          agency investments in artificial intelligence.

16   **SEC. 103. COORDINATION BY INTERAGENCY COMMITTEE.**

17          (a) **INTERAGENCY COMMITTEE.**—The Director of the  
18          Office of Science and Technology Policy, acting through  
19          the National Science and Technology Council, shall estab-  
20          lish or designate an Interagency Committee to coordinate  
21          Federal programs and activities in support of the Initia-  
22          tive.

23          (b) **Co-CHAIRS.**—The Interagency Committee shall  
24          be co-chaired by the Director of the Office of Science and  
25          Technology Policy and, on an annual rotating basis, a rep-

1 representative from the National Institute of Standards and  
2 Technology, the National Science Foundation, or the De-  
3 partment of Energy, as selected by the Director of the  
4 Office of Science and Technology Policy.

5 (c) AGENCY PARTICIPATION.—The Committee shall  
6 include representatives from—

7 (1) the National Institute of Standards and  
8 Technology;

9 (2) the National Science Foundation;

10 (3) the Department of Energy;

11 (4) the National Aeronautics and Space Admin-  
12 istration;

13 (5) the Department of Defense;

14 (6) the Defense Advanced Research Projects  
15 Agency;

16 (7) the Department of Commerce;

17 (8) the Office of the Director of National Intel-  
18 ligence;

19 (9) the Office of Management and Budget;

20 (10) the Office of Science and Technology Pol-  
21 icy;

22 (11) the Department of Health and Human  
23 Services;

24 (12) the Department of Education;

25 (13) the Department of Labor;

- 1 (14) the Department of the Treasury;
- 2 (15) the General Services Administration;
- 3 (16) the Department of Transportation;
- 4 (17) the Department of State;
- 5 (18) the Department of Veterans Affairs; and
- 6 (19) any other Federal agency as considered
- 7 appropriate by the Director of the Office of Science
- 8 and Technology Policy.

9 (d) RESPONSIBILITIES.—The Interagency Committee  
10 shall—

11 (1) provide for interagency coordination of Fed-  
12 eral artificial intelligence research, development, and  
13 demonstration activities, development of voluntary  
14 consensus standards and guidelines for research, de-  
15 velopment, testing, and adoption of ethically devel-  
16 oped, safe, and trustworthy artificial intelligence sys-  
17 tems, and education and training activities and pro-  
18 grams of Federal departments and agencies under-  
19 taken pursuant to the Initiative;

20 (2) not later than 2 years after the date of the  
21 enactment of this Act, develop a strategic plan for  
22 artificial intelligence (to be updated not less than  
23 every 3 years) that—

1 (A) establishes goals, priorities, and  
2 metrics for guiding and evaluating the Initia-  
3 tive’s activities; and

4 (B) describes how the agencies carrying  
5 out the Initiative will—

6 (i) determine and prioritize areas of  
7 artificial intelligence research, develop-  
8 ment, and demonstration requiring Federal  
9 Government leadership and investment;

10 (ii) support long-term funding for  
11 interdisciplinary artificial intelligence re-  
12 search, development, demonstration, edu-  
13 cation and public outreach activities;

14 (iii) support research and other activi-  
15 ties on ethical, legal, environmental, safety,  
16 security, and other appropriate societal  
17 issues related to artificial intelligence;

18 (iv) provide or facilitate the avail-  
19 ability of curated, standardized, secure,  
20 representative, and privacy-protected data  
21 sets for artificial intelligence research and  
22 development;

23 (v) provide or facilitate the necessary  
24 computing, networking, and data facilities

1 for artificial intelligence research and de-  
2 velopment;

3 (vi) reduce barriers to transferring ar-  
4 tificial intelligence systems from the lab-  
5 oratory into application for the benefit of  
6 society and United States competitiveness;

7 (vii) support and coordinate the net-  
8 work of artificial intelligence research insti-  
9 tutes described in section 201(b)(7)(B);  
10 and

11 (viii) in consultation with the Council  
12 of Economic Advisers, measure and track  
13 the contributions of artificial intelligence to  
14 United States economic growth and other  
15 societal indicators;

16 (3) propose an annually coordinated interagency  
17 budget for the Initiative to the Office of Manage-  
18 ment and Budget that is intended to ensure that the  
19 balance of funding across the Initiative is sufficient  
20 to meet the goals and priorities established for the  
21 Initiative; and

22 (4) in carrying out this section, take into con-  
23 sideration the recommendations of the Advisory  
24 Committee, existing reports on related topics, and

1 the views of academic, State, industry, and other ap-  
2 propriate groups.

3 (e) ANNUAL REPORT.—For each fiscal year begin-  
4 ning with fiscal year 2022, not later than 90 days after  
5 submission of the President’s annual budget request for  
6 such fiscal year, the Interagency Committee shall prepare  
7 and submit to the Committee on Science, Space, and  
8 Technology of the House of Representatives and the Com-  
9 mittee on Commerce, Science, and Transportation of the  
10 Senate a report that includes—

11 (1) a summarized budget in support of the Ini-  
12 tiative for such fiscal year and the preceding fiscal  
13 year, including a disaggregation of spending for each  
14 Federal agency participating in the Initiative and for  
15 the development and acquisition of any research fa-  
16 cilities and instrumentation; and

17 (2) an assessment of how Federal agencies are  
18 implementing the plan described in subsection  
19 (d)(2), and a description of those efforts.

20 **SEC. 104. NATIONAL ARTIFICIAL INTELLIGENCE ADVISORY**  
21 **COMMITTEE.**

22 (a) IN GENERAL.—The Secretary of Energy shall, in  
23 consultation with the Director of the Office of Science and  
24 Technology Policy, establish an advisory committee to be



1 known as the “National Artificial Intelligence Advisory  
2 Committee”.

3 (b) QUALIFICATIONS.—The Advisory Committee  
4 shall consist of members, appointed by the Secretary of  
5 Energy, who are representing broad and interdisciplinary  
6 expertise and perspectives, including from academic insti-  
7 tutions, companies across diverse sectors, nonprofit and  
8 civil society entities, and Federal laboratories, that are  
9 qualified to provide advice and information on science and  
10 technology research, development, ethics, standards, edu-  
11 cation, technology transfer, commercial application, secu-  
12 rity, and economic competitiveness related to artificial in-  
13 telligence.

14 (c) MEMBERSHIP CONSIDERATION.—In selecting the  
15 members of the Advisory Committee, the Secretary of En-  
16 ergy may seek and give consideration to recommendations  
17 from the Congress, industry, nonprofit organizations, the  
18 scientific community (including the National Academy of  
19 Sciences, scientific professional societies, and academic in-  
20 stitutions), the defense community, and other appropriate  
21 organizations.

22 (d) DUTIES.—The Advisory Committee shall advise  
23 the President and the Initiative Office on matters related  
24 to the Initiative, including recommendations related to—

1           (1) the current state of United States competi-  
2           tiveness and leadership in artificial intelligence, in-  
3           cluding the scope and scale of United States invest-  
4           ments in artificial intelligence research and develop-  
5           ment in the international context;

6           (2) the progress made in implementing the Ini-  
7           tiative, including a review of the degree to which the  
8           Initiative has achieved the goals under the metrics  
9           established by the Interagency Committee under sec-  
10          tion 103(d)(2);

11          (3) the state of the science around artificial in-  
12          telligence, including progress towards artificial gen-  
13          eral intelligence;

14          (4) the need to update the Initiative;

15          (5) the balance of activities and funding across  
16          the Initiative;

17          (6) whether the strategic plan developed or up-  
18          dated by the Interagency Committee established  
19          under section 103(d)(2) is helping to maintain  
20          United States leadership in artificial intelligence;

21          (7) the management, coordination, and activi-  
22          ties of the Initiative;

23          (8) whether ethical, legal, safety, security, and  
24          other appropriate societal issues are adequately ad-  
25          dressed by the Initiative; and

1           (9) opportunities for international cooperation  
2       with strategic allies on artificial intelligence research  
3       activities and standards development.

4       (e) REPORTS.—Not later than 1 year after the date  
5       of the enactment of this Act, and not less frequently than  
6       once every 3 years thereafter, the Advisory Committee  
7       shall submit to the President, the Committee on Science,  
8       Space, and Technology of the House of Representatives,  
9       and the Committee on Commerce, Science, and Transpor-  
10      tation of the Senate, a report on the Advisory Committee’s  
11      findings and recommendations under subsection (d).

12      (f) TRAVEL EXPENSES OF NON-FEDERAL MEM-  
13      BERS.—Non-Federal members of the Advisory Committee,  
14      while attending meetings of the Advisory Committee or  
15      while otherwise serving at the request of the head of the  
16      Advisory Committee away from their homes or regular  
17      places of business, may be allowed travel expenses, includ-  
18      ing per diem in lieu of subsistence, as authorized by sec-  
19      tion 5703 of title 5, United States Code, for individuals  
20      in the Government serving without pay. Nothing in this  
21      subsection shall be construed to prohibit members of the  
22      Advisory Committee who are officers or employees of the  
23      United States from being allowed travel expenses, includ-  
24      ing per diem in lieu of subsistence, in accordance with ex-  
25      isting law.

1 (g) FACA EXEMPTION.—The Secretary of Energy  
2 shall charter the Advisory Committee in accordance with  
3 the Federal Advisory Committee Act (5 U.S.C. App.), ex-  
4 cept that the Advisory Committee shall be exempt from  
5 section 14 of such Act.

6 **SEC. 105. NATIONAL ACADEMIES ARTIFICIAL INTEL-**  
7 **LIGENCE IMPACT STUDY ON WORKFORCE.**

8 (a) IN GENERAL.—Not later than 90 days after the  
9 date of the enactment of this Act, the National Science  
10 Foundation shall enter into a contract with the National  
11 Research Council of the National Academies of Sciences,  
12 Engineering, and Medicine to conduct a study of the cur-  
13 rent and future impact of artificial intelligence on the  
14 workforce of the United States across sectors.

15 (b) CONTENTS.—The study shall address—

16 (1) workforce impacts across sectors caused by  
17 the increased adoption of artificial intelligence, auto-  
18 mation, and other related trends;

19 (2) workforce needs and employment opportuni-  
20 ties generated by the increased adoption of artificial  
21 intelligence across sectors;

22 (3) research gaps and data needed to better un-  
23 derstand and track both workforce impacts and  
24 workforce needs and opportunities generated by

1 adoption of artificial intelligence systems across sec-  
2 tors; and

3 (4) recommendations to address the challenges  
4 and opportunities described in paragraphs (1), (2),  
5 and (3).

6 (c) STAKEHOLDERS.—In conducting the study, the  
7 National Academies of Sciences, Engineering, and Medi-  
8 cine shall seek input from a wide range of stakeholders  
9 in the public and private sectors.

10 (d) REPORT TO CONGRESS.—The contract entered  
11 into under subsection (a) shall require the National Acad-  
12 emies of Sciences, Engineering, and Medicine, not later  
13 than 2 years after the date of the enactment of this Act,  
14 to—

15 (1) submit to the Committee on Science, Space,  
16 and Technology of the House of Representatives and  
17 the Committee on Commerce, Science, and Trans-  
18 portation of the Senate a report containing the find-  
19 ings and recommendations of the study conducted  
20 under subsection (a); and

21 (2) make a copy of such report available on a  
22 publicly accessible website.

23 **SEC. 106. GAO REPORT ON COMPUTATIONAL NEEDS.**

24 (a) IN GENERAL.—Not later than 1 year after the  
25 date of the enactment of this Act, the Comptroller General

1 of the United States shall conduct a study of artificial in-  
2 telligence computer hardware and computing required in  
3 order to maintain U.S. leadership in artificial intelligence  
4 research and development. The Comptroller General  
5 shall—

6           (1) assess the composition of civilian computing  
7       resources supported by the Federal Government at  
8       universities and Federal Laboratories, including pro-  
9       grams with laboratory computing, high performance  
10      computing, cloud computing, quantum computing,  
11      edge computing, and other computing resources;

12          (2) evaluate projected needs for computing con-  
13      sumption and performance required by the public  
14      and private sector for the training, auditing, valida-  
15      tion, testing, and use of artificial intelligence over  
16      the next five years; and

17          (3) offer recommendations to meet these pro-  
18      jected needs.

19 **TITLE II—NATIONAL ARTIFICIAL**  
20 **INTELLIGENCE RESEARCH IN-**  
21 **STITUTES**

22 **SEC. 201. NATIONAL ARTIFICIAL INTELLIGENCE RESEARCH**  
23 **INSTITUTES.**

24       (a) IN GENERAL.—As part of the Initiative, the Di-  
25      rector of the National Science Foundation shall establish

1 a program to award financial assistance for the planning,  
2 establishment, and support of Institutes (as described in  
3 subsection (b)(2)) in accordance with this section.

4 (b) FINANCIAL ASSISTANCE TO ESTABLISH AND  
5 SUPPORT NATIONAL ARTIFICIAL INTELLIGENCE RE-  
6 SEARCH INSTITUTES.—

7 (1) IN GENERAL.—Under the Initiative, the  
8 Secretary of Energy, the Secretary of Commerce,  
9 the Director of the National Science Foundation,  
10 and every other agency head may award financial  
11 assistance to an eligible entity, or consortia thereof,  
12 as determined by an agency head, to establish and  
13 support an Institute.

14 (2) ARTIFICIAL INTELLIGENCE INSTITUTES.—  
15 An Institute described in this subsection is an artifi-  
16 cial intelligence research institute that—

17 (A) is focused on—

18 (i) a particular economic or social sec-  
19 tor, including health, education, manufac-  
20 turing, agriculture, security, energy, and  
21 environment, and includes a component  
22 that addresses the ethical, societal, safety,  
23 and security implications relevant to the  
24 application of artificial intelligence in that  
25 sector; or

1 (ii) a cross-cutting challenge for artificial intelligence systems, including trustworthiness, or foundational science;

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3  
4 (B) requires partnership among public and private organizations, including, as appropriate, Federal agencies, research universities, community colleges, nonprofit research organizations, Federal laboratories, State, local, and tribal governments, and industry (or consortia thereof);

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11 (C) has the potential to create an innovation ecosystem, or enhance existing ecosystems, to translate Institute research into applications and products, as appropriate to the topic of each Institute;

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15  
16 (D) supports interdisciplinary research and development across multiple institutions and organizations involved in artificial intelligence research and related disciplines, including physics, engineering, mathematical sciences, computer and information science, robotics, biological and cognitive sciences, material science, social and behavioral sciences, cybersecurity, and technology ethics;



1           (E) supports interdisciplinary education  
2           activities, including curriculum development, re-  
3           search experiences, and faculty professional de-  
4           velopment across two-year, undergraduates,  
5           masters, and doctoral level programs; and

6           (F) supports workforce development in ar-  
7           tificial intelligence related disciplines in the  
8           United States, including broadening participa-  
9           tion of underrepresented communities.

10          (3) USE OF FUNDS.—Financial assistance  
11          awarded under paragraph (1) may be used by an In-  
12          stitute for—

13               (A) managing and making available to re-  
14               searchers accessible, curated, standardized, se-  
15               cure, and privacy protected data sets from the  
16               public and private sectors for the purposes of  
17               training and testing artificial intelligence sys-  
18               tems and for research using artificial intel-  
19               ligence systems, pursuant to section 301(b) and  
20               301(c);

21               (B) developing and managing testbeds for  
22               artificial intelligence systems, including sector-  
23               specific test beds, designed to enable users to  
24               evaluate artificial intelligence systems prior to  
25               deployment;

1 (C) conducting research and education ac-  
2 tivities involving artificial intelligence systems  
3 to solve challenges with social, economic, health,  
4 scientific, and national security implications;

5 (D) providing or brokering access to com-  
6 puting resources, networking, and data facilities  
7 for artificial intelligence research and develop-  
8 ment relevant to the Institute's research goals;

9 (E) providing technical assistance to users,  
10 including software engineering support, for arti-  
11 ficial intelligence research and development rel-  
12 evant to the Institute's research goals;

13 (F) engaging in outreach and engagement  
14 to broaden participation in artificial intelligence  
15 research and workforce; and

16 (G) such other activities that an agency  
17 head, whose agency's missions contribute to or  
18 are affected by artificial intelligence, considers  
19 consistent with the purposes described in sec-  
20 tion 101(a).

21 (4) DURATION.—

22 (A) INITIAL PERIODS.—An award of finan-  
23 cial assistance under paragraph (1) shall be  
24 awarded for an initial period of 5 years.

1 (B) EXTENSION.—An established Institute  
2 may apply for, and the agency head may grant,  
3 extended funding for periods of 5 years on a  
4 merit-reviewed basis using the merit review cri-  
5 teria of the sponsoring agency.

6 (5) APPLICATION FOR FINANCIAL ASSIST-  
7 ANCE.—

8 (A) IN GENERAL.—A person or group of  
9 persons seeking financial assistance under para-  
10 graph (1) shall submit to an agency head an  
11 application at such time, in such manner, and  
12 containing such information as the agency head  
13 may require.

14 (B) REQUIREMENTS.—An application sub-  
15 mitted under subparagraph (A) for an Institute  
16 shall, at a minimum, include the following:

17 (i) A plan for the Institute to in-  
18 clude—

19 (I) the proposed goals and activi-  
20 ties of the Institute;

21 (II) how the Institute will form  
22 partnerships with other research insti-  
23 tutions, industry, and nonprofits to le-  
24 verage expertise in artificial intel-  
25 ligence and access to data, including

1 non-governmental data and computing  
2 resources;

3 (III) how the institute will sup-  
4 port long-term and short-term edu-  
5 cation and workforce development in  
6 artificial intelligence, including broad-  
7 ening participation of underrep-  
8 resented communities; and

9 (IV) a plan for how the Institute  
10 will transition from planning into op-  
11 erations.

12 (ii) A description of the anticipated  
13 sources and nature of any non-Federal  
14 contributions, including privately held data  
15 sets, computing resources, and other types  
16 of in-kind support.

17 (iii) A description of the anticipated  
18 long-term impact of such Institute.

19 (6) COMPETITIVE, MERIT REVIEW.—In award-  
20 ing financial assistance under paragraph (1), the  
21 agency head shall—

22 (A) use a competitive, merit review process  
23 that includes peer review by a diverse group of  
24 individuals with relevant expertise from both  
25 the private and public sectors; and

1 (B) ensure the focus areas of the Institute  
2 do not substantially duplicate the efforts of any  
3 other Institute.

4 (7) COLLABORATION.—

5 (A) IN GENERAL.—In awarding financial  
6 assistance under paragraph (1), an agency head  
7 may collaborate with Federal departments and  
8 agencies whose missions contribute to or are af-  
9 fected by artificial intelligence systems, includ-  
10 ing the agencies outlined in section 103(c).

11 (B) COORDINATING NETWORK.—The Di-  
12 rector of the National Science Foundation shall  
13 establish a network of Institutes receiving fi-  
14 nancial assistance under this subsection, to be  
15 known as the “Artificial Intelligence Leadership  
16 Network”, to coordinate cross-cutting research  
17 and other activities carried out by the Insti-  
18 tutes.

19 (C) FUNDING.—The head of an agency  
20 may request, accept, and provide funds from  
21 other Federal departments and agencies, State,  
22 United States territory, local, or tribal govern-  
23 ment agencies, private sector for-profit entities,  
24 and nonprofit entities, to be available to the ex-  
25 tent provided by appropriations Acts, to support

an Institute’s activities. The head of an agency may not give any special consideration to any agency or entity in return for a donation.

## **TITLE III—NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY ARTIFICIAL INTELLIGENCE ACTIVITIES**

### **SEC. 301. NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY ACTIVITIES.**

(a) IN GENERAL.—As part of the Initiative, the Director of the National Institute of Standards and Technology shall—

(1) support measurement research and development of best practices and voluntary standards for trustworthy artificial intelligence systems, including for—

(A) privacy and security, including for datasets used to train or test artificial intelligence systems and software and hardware used in artificial intelligence systems;

(B) advanced computer chips and hardware designed for artificial intelligence systems;

(C) data management and techniques to increase the usability of data, including strategies to systematically clean, label, and stand-

1           ardize data into forms useful for training artifi-  
2           cial intelligence systems and the use of com-  
3           mon, open licenses;

4           (D) safety and robustness of artificial in-  
5           telligence systems, including assurance,  
6           verification, validation, security, control, and  
7           the ability for artificial intelligence systems to  
8           withstand unexpected inputs and adversarial at-  
9           tacks;

10          (E) auditing mechanisms and benchmarks  
11          for accuracy, transparency, verifiability, and  
12          safety assurance for artificial intelligence sys-  
13          tems;

14          (F) applications of machine learning and  
15          artificial intelligence systems to improve other  
16          scientific fields and engineering; and

17          (G) all other areas deemed by the Director  
18          to be critical to the development and deploy-  
19          ment of trustworthy artificial intelligence;

20          (2) produce curated, standardized, representa-  
21          tive, secure, and privacy protected data sets for arti-  
22          ficial intelligence research, development, and use,  
23          prioritizing data for high-value, high-risk research;

1           (3) support one or more institutes as described  
2           in section 201(a) of this Act for the purpose of ad-  
3           vancing the field of artificial intelligence;

4           (4) support and strategically engage in the de-  
5           velopment of voluntary consensus standards, includ-  
6           ing international standards, through open, trans-  
7           parent, and consensus-based processes; and

8           (5) enter into and perform such contracts, in-  
9           cluding cooperative research and development ar-  
10          rangements and grants and cooperative agreements  
11          or other transactions, as may be necessary in the  
12          conduct of the work of the National Institute of  
13          Standards and Technology and on such terms as the  
14          Director considers appropriate, in furtherance of the  
15          purposes of this Act.

16       (b) RISK MANAGEMENT FRAMEWORK.—Not later  
17       than 2 years after the date of the enactment of this Act,  
18       the Director shall work to develop, and periodically up-  
19       date, in collaboration with other public and private sector  
20       organizations, including the National Science Foundation  
21       and the Department of Energy, a voluntary risk manage-  
22       ment framework for the trustworthiness of artificial intel-  
23       ligence systems. The framework shall—

24           (1) identify and provide standards, guidelines,  
25           best practices, methodologies, procedures, and proc-



1       esses for assessing the trustworthiness of, and miti-  
2       gating risks to, artificial intelligence systems;

3           (2) establish common definitions and character-  
4       izations for aspects and levels of trustworthiness, in-  
5       cluding explainability, transparency, safety, privacy,  
6       security, robustness, fairness, bias, ethics, validation,  
7       verification, and other properties related to artificial  
8       intelligence systems that are common across all sec-  
9       tors;

10          (3) provide guidance and implementation steps  
11       for risk management of artificial intelligence sys-  
12       tems;

13          (4) provide sector-specific case studies of imple-  
14       mentation of the framework;

15          (5) align with voluntary consensus standards,  
16       including international standards, to the fullest ex-  
17       tent possible;

18          (6) incorporate voluntary consensus standards  
19       and industry best practices; and

20          (7) not prescribe or otherwise require—

21                (A) the use of specific solutions; or

22                (B) the use of specific information or com-  
23       munications technology products or services.

24       (c) DATA SHARING BEST PRACTICES.—Not later  
25       than 1 year after the date of enactment of this Act, the

1 Director shall, in collaboration with other public and pri-  
2 vate sector organizations, develop guidance to facilitate  
3 the creation of voluntary data sharing arrangements be-  
4 tween industry, federally funded research centers, and  
5 Federal agencies for the purpose of advancing artificial  
6 intelligence research and technologies, including—

7 (1) options for partnership models between gov-  
8 ernment entities, industry, universities, and non-  
9 profits that incentivize each party to share the data  
10 they collected; and

11 (2) best practices for datasets involving human  
12 characteristics, including—

13 (A) standards for metadata that describe  
14 the properties of datasets, including—

15 (i) how the data was collected;

16 (ii) what populations are included and  
17 excluded from the datasets; and

18 (iii) any other properties as deter-  
19 mined by the Director; and

20 (B) standards for privacy and security of  
21 datasets with human characteristics.

22 (d) STAKEHOLDER OUTREACH.—In carrying out the  
23 activities under this subsection, the Director shall—

24 (1) solicit input from university researchers,  
25 private sector experts, relevant Federal agencies,

1 Federal laboratories, State and local governments,  
 2 civil society groups, and other relevant stakeholders;

3 (2) solicit input from experts in relevant fields  
 4 of social science, technology ethics, and law; and

5 (3) provide opportunity for public comment on  
 6 guidelines and best practices developed as part of  
 7 the Initiative, as appropriate.

8 (e) AUTHORIZATION OF APPROPRIATIONS.—There  
 9 are authorized to be appropriated to the National Institute  
 10 of Standards and Technology to carry out this sub-  
 11 section—

12 (1) \$64,000,000 for fiscal year 2021;

13 (2) \$70,400,000 for fiscal year 2022;

14 (3) \$77,440,000 for fiscal year 2023;

15 (4) \$85,180,000 for fiscal year 2024; and

16 (5) \$93,700,000 for fiscal year 2025.

17 **TITLE IV—NATIONAL SCIENCE**  
 18 **FOUNDATION ARTIFICIAL IN-**  
 19 **TELLIGENCE ACTIVITIES**

20 **SEC. 401. ARTIFICIAL INTELLIGENCE RESEARCH AND EDU-**  
 21 **CATION.**

22 (a) IN GENERAL.—As part of the Initiative, the Di-  
 23 rector of the National Science Foundation shall fund re-  
 24 search and education activities in artificial intelligence sys-  
 25 tems and related fields, including competitive awards or

1 grants to institutions of higher education or eligible non-  
2 profit organizations (or consortia thereof).

3 (b) USES OF FUNDS.—In carrying out the activities  
4 under subsection (a), the Director of the National Science  
5 Foundation shall—

6 (1) support research, including interdisciplinary  
7 research on artificial intelligence systems and related  
8 areas;

9 (2) support collaborations among researchers  
10 across disciplines, including between social scientists  
11 and computer and data scientists, to advance re-  
12 search critical to the development and deployment of  
13 trustworthy artificial intelligence systems, including  
14 support for interdisciplinary research relating ad-  
15 vances in artificial intelligence to changes in the fu-  
16 ture workplace, in a social and economic context;

17 (3) use the existing programs of the National  
18 Science Foundation, in collaboration with other Fed-  
19 eral departments and agencies, as appropriate to—

20 (A) improve the teaching and learning of  
21 artificial intelligence systems at all levels of  
22 education; and

23 (B) increase participation in artificial intel-  
24 ligence related fields, including by individuals  
25 identified in sections 33 and 34 of the Science

1           and Engineering Equal Opportunity Act (42  
2           U.S.C. 1885a, 1885b);

3           (4) engage with institutions of higher edu-  
4           cation, research communities, industry, Federal lab-  
5           oratories, nonprofit organizations, State and local  
6           governments, and potential users of information pro-  
7           duced under this section, including through the con-  
8           vening of workshops and conferences, to leverage the  
9           collective body of knowledge across disciplines rel-  
10          evant to artificial intelligence, facilitate new collabo-  
11          rations and partnerships, and identify emerging re-  
12          search needs;

13          (5) support partnerships among institutions of  
14          higher education and industry that facilitate collabo-  
15          rative research, personnel exchanges, and workforce  
16          development with respect to artificial intelligence  
17          systems;

18          (6) ensure adequate access to research and edu-  
19          cation infrastructure with respect to artificial intel-  
20          ligence systems, including through the development  
21          of new computing resources and partnership with  
22          the private sector for the provision of cloud-based  
23          computing services;

24          (7) conduct prize competitions, as appropriate,  
25          pursuant to section 24 of the Stevenson-Wydler

1 Technology Innovation Act of 1980 (15 U.S.C.  
2 3719);

3 (8) coordinate research efforts funded through  
4 existing programs across the directorates of the Na-  
5 tional Science Foundation;

6 (9) provide guidance on data sharing by grant-  
7 ees to public and private sector organizations con-  
8 sistent with the standards and guidelines developed  
9 under section 301(c); and

10 (10) evaluate opportunities for international  
11 collaboration with strategic allies on artificial intel-  
12 ligence research and development.

13 (c) ARTIFICIAL INTELLIGENCE RESEARCH  
14 GRANTS.—

15 (1) IN GENERAL.—The Director shall award  
16 grants for research on artificial intelligence systems.  
17 Research areas may include—

18 (A) artificial intelligence systems, including  
19 machine learning, computer vision, robotics,  
20 and hardware for accelerating artificial intel-  
21 ligence systems;

22 (B) artificial intelligence-enabled systems;

23 (C) fields and research areas that will con-  
24 tribute to the advancement of artificial intel-  
25 ligence systems, including information theory,

1 causal and statistical inference, data mining, in-  
2 formation extraction, human-robot interaction,  
3 and intelligent interfaces;

4 (D) fields and research areas that increase  
5 understanding of human characteristics relevant  
6 to artificial intelligence systems, including com-  
7 putational neuroscience, reasoning and rep-  
8 resentation, speech and language, multi-agent  
9 systems, intelligent interfaces, human-artificial  
10 intelligence cooperation, and artificial intel-  
11 ligence-augmented human problem solving;

12 (E) fields and research areas that increase  
13 understanding of learning, adaptability, and re-  
14 silience beyond the human cognitive model, in-  
15 cluding topics in developmental biology, zoology,  
16 botany, morphological computation, and  
17 organismal systems;

18 (F) fields and research areas that will con-  
19 tribute to the development and deployment of  
20 trustworthy artificial intelligence systems, in-  
21 cluding—

22 (i) algorithmic explainability;

23 (ii) methods to assess, characterize,  
24 and reduce bias in datasets and artificial  
25 intelligence systems; and

1 (iii) safety and robustness of artificial  
2 intelligence systems, including assurance,  
3 verification, validation, security, and con-  
4 trol;

5 (G) privacy and security, including for  
6 datasets used for the training and inference of  
7 artificial intelligence systems, and software and  
8 hardware used in artificial intelligence systems;

9 (H) fields and research areas that address  
10 the application of artificial intelligence systems  
11 to scientific discovery and societal challenges;

12 (I) societal, ethical, safety, education,  
13 workforce, and security implications of artificial  
14 intelligence systems, including social impact of  
15 artificial intelligence systems on different  
16 groups within society, especially historically  
17 marginalized groups; and

18 (J) qualitative and quantitative forecasting  
19 of future capabilities, applications, and impacts.

20 (2) ENGINEERING SUPPORT.—In soliciting pro-  
21 posals for funding under this section, the Director  
22 shall permit applicants to include in their proposed  
23 budgets funding for software engineering support to  
24 assist with the proposed research.

25 (3) ETHICS.—



1 (A) SENSE OF CONGRESS.—It is the sense  
2 of Congress that—

3 (i) a number of emerging areas of re-  
4 search, including artificial intelligence,  
5 have potential ethical, social, safety, and  
6 security implications that might be appar-  
7 ent as early as the basic research stage;

8 (ii) the incorporation of ethical, social,  
9 safety, and security considerations into the  
10 research design and review process for  
11 Federal awards may help mitigate poten-  
12 tial harms before they happen;

13 (iii) the National Science Founda-  
14 tion's intent to enter into an agreement  
15 with the National Academies of Sciences,  
16 Engineering, and Medicine to conduct a  
17 study and make recommendations with re-  
18 spect to governance of research in emerg-  
19 ing technologies is a positive step toward  
20 accomplishing this goal; and

21 (iv) the National Science Foundation  
22 should continue to work with stakeholders  
23 to understand and adopt policies that pro-  
24 mote best practices for governance of re-

1 search in emerging technologies at every  
2 stage of research.

3 (B) ETHICS STATEMENTS.—

4 (i) IN GENERAL.—Not later than 18  
5 months after the date of enactment of this  
6 Act, the Director shall amend grant pro-  
7 posal instructions to include a requirement  
8 for an ethics statement to be included as  
9 part of any proposal for funding prior to  
10 making the award. Such statement shall be  
11 considered by the Director in the review of  
12 proposals, taking into consideration any  
13 relevant input from the peer-reviewers for  
14 the proposal, and shall factor into award  
15 decisions as deemed necessary by the Di-  
16 rector.

17 (ii) CONTENTS.—Such statements  
18 may include, as appropriate—

19 (I) the potential societal benefits  
20 of the research;

21 (II) any foreseeable or quantifi-  
22 able risks to society, including how  
23 the research could enable products,  
24 technologies, or other outcomes that

1 could intentionally or unintentionally  
2 cause significant societal harm; and

3 (III) how technical or social solu-  
4 tions can mitigate such risks and, as  
5 appropriate, a plan to implement such  
6 mitigation measures.

7 (iii) GUIDANCE.—The Director shall  
8 issue clear guidance on what constitutes a  
9 foreseeable or quantifiable risk described in  
10 clause (ii)(II), and to the extent practical  
11 harmonize this policy with existing ethical  
12 policies or related requirements for human  
13 subjects.

14 (iv) ANNUAL REPORTS.—The Director  
15 shall encourage grantees to update their  
16 ethics statements as appropriate as part of  
17 the annual reports required by all grantees  
18 under the grant terms and conditions.

19 (d) EDUCATION.—

20 (1) IN GENERAL.—The Director of the National  
21 Science Foundation shall award grants for education  
22 programs at the K-12, community college, under-  
23 graduate, graduate, postdoctoral, adult learning, and  
24 retraining stages of education that—

1           (A) support the development of a diverse  
2 workforce pipeline for science and technology  
3 with respect to artificial intelligence systems;

4           (B) increase awareness of ethical, social,  
5 safety, and security implications of artificial in-  
6 telligence systems; and

7           (C) promote the widespread understanding  
8 of artificial intelligence principles and methods  
9 to create an educated workforce and general  
10 public able to use products enabled by artificial  
11 intelligence systems and adapt to future societal  
12 and economic changes caused by artificial intel-  
13 ligence systems.

14       (2) USE OF FUNDS.—Grants awarded under  
15 this section for education activities referred to in  
16 paragraph (1) may be used for—

17           (A) K-12, undergraduate, and community  
18 college curriculum development and other edu-  
19 cational tools and methods in artificial intel-  
20 ligence related fields;

21           (B) curriculum development in the field of  
22 technology ethics;

23           (C) support for informal education activi-  
24 ties for K-12 students to engage with artificial  
25 intelligence systems;

1 (D) efforts to achieve equitable access to  
2 K-12 artificial intelligence education for popu-  
3 lations and geographic areas traditionally  
4 underrepresented in the artificial intelligence  
5 field;

6 (E) training and professional development  
7 programs, including innovative pre-service and  
8 in-service programs, in artificial intelligence and  
9 related fields for K-12 teachers;

10 (F) efforts to improve the retention rate  
11 for researchers focusing on artificial intelligence  
12 systems at institutions of higher learning and  
13 other nonprofit research institutions;

14 (G) outreach programs to educate the gen-  
15 eral public about the uses of artificial intel-  
16 ligence and its societal implications;

17 (H) assessments of activities conducted  
18 under this subsection; and

19 (I) any other relevant activities the Direc-  
20 tor determines will accomplish the aim de-  
21 scribed in paragraph (1).

22 (3) ARTIFICIAL INTELLIGENCE TRAINEESHIPS  
23 AND FELLOWSHIPS.—

24 (A) ARTIFICIAL INTELLIGENCE  
25 TRAINEESHIPS.—

1 (i) IN GENERAL.—The Director of the  
2 National Science Foundation shall award  
3 grants to institutions of higher education  
4 to establish traineeship programs for grad-  
5 uate students who pursue artificial intel-  
6 ligence-related research leading to a mas-  
7 ters or doctorate degree by providing fund-  
8 ing and other assistance, and by providing  
9 graduate students opportunities for re-  
10 search experiences in government or indus-  
11 try related to the students’ artificial intel-  
12 ligence studies.

13 (ii) USE OF FUNDS.—An institution  
14 of higher education shall use grant funds  
15 provided under clause (i) for the purposes  
16 of—

17 (I) providing traineeships to stu-  
18 dents who are pursuing research in  
19 artificial intelligence leading to a mas-  
20 ters or doctorate degree;

21 (II) paying tuition and fees for  
22 students receiving traineeships who  
23 are citizens, nationals, or lawfully ad-  
24 mitted permanent resident aliens of  
25 the United States;

1 (III) creating and requiring  
2 courses or training programs in tech-  
3 nology ethics for students receiving  
4 traineeships;

5 (IV) creating opportunities for  
6 research in technology ethics for stu-  
7 dents receiving traineeships;

8 (V) establishing scientific intern-  
9 ship programs for students receiving  
10 traineeships in artificial intelligence at  
11 for-profit institutions, nonprofit re-  
12 search institutions, or government lab-  
13 oratories; and

14 (VI) other costs associated with  
15 the administration of the program.

16 (B) ARTIFICIAL INTELLIGENCE FELLOW-  
17 SHIPS.—The Director of the National Science  
18 Foundation shall award fellowships to masters  
19 and doctoral students and postdoctoral re-  
20 searchers at institutions of higher education  
21 who are pursuing degrees or research in artifi-  
22 cial intelligence and related fields, including in  
23 the field of technology ethics. In making such  
24 awards, the Director shall—

1                   (i) ensure recipients of artificial intel-  
2                   ligence fellowships are citizens, nationals,  
3                   or lawfully admitted permanent resident  
4                   aliens of the United States; and

5                   (ii) conduct outreach, including  
6                   through formal solicitations, to solicit pro-  
7                   posals from students and postdoctoral re-  
8                   searchers seeking to carry out research in  
9                   aspects of technology ethics with relevance  
10                  to artificial intelligence systems.

11           (e) AUTHORIZATION OF APPROPRIATIONS.—There  
12   are authorized to be appropriated to the National Science  
13   Foundation to carry out this section—

- 14           (1) \$868,000,000 for fiscal year 2021;  
15           (2) \$911,400,000 for fiscal year 2022;  
16           (3) \$956,970,000 for fiscal year 2023;  
17           (4) \$1,004,820,000 for fiscal year 2024; and  
18           (5) \$1,055,060,000 for fiscal year 2025.



1 **TITLE V—DEPARTMENT OF EN-**  
2 **ERGY ARTIFICIAL INTEL-**  
3 **LIGENCE RESEARCH PRO-**  
4 **GRAM**

5 **SEC. 501. DEPARTMENT OF ENERGY ARTIFICIAL INTEL-**  
6 **LIGENCE RESEARCH PROGRAM.**

7 (a) IN GENERAL.—The Secretary shall carry out a  
8 cross-cutting research and development program to ad-  
9 vance artificial intelligence tools, systems, capabilities, and  
10 workforce needs and to improve the reliability of artificial  
11 intelligence methods and solutions relevant to the mission  
12 of the Department. In carrying out this program, the Sec-  
13 retary shall coordinate across all relevant offices and pro-  
14 grams at the Department, including the Office of Science,  
15 the Office of Energy Efficiency and Renewable Energy,  
16 the Office of Nuclear Energy, the Office of Fossil Energy,  
17 the Office of Electricity, the Office of Cybersecurity, En-  
18 ergy Security, and Emergency Response, the Advanced  
19 Research Projects Agency-Energy, and any other relevant  
20 office determined by the Secretary.

21 (b) RESEARCH AREAS.—In carrying out the program  
22 under subsection (a), the Secretary shall award financial  
23 assistance to eligible entities to carry out research projects  
24 on topics including—

1           (1) the application of artificial intelligence sys-  
2           tems to improve large-scale simulations of natural  
3           and other phenomena;

4           (2) the study of applied mathematics, computer  
5           science, and statistics, including foundations of  
6           methods and systems of artificial intelligence, causal  
7           and statistical inference, and the development of al-  
8           gorithms for artificial intelligence systems;

9           (3) the analysis of existing large-scale datasets  
10          from science and engineering experiments and sim-  
11          ulations, including energy simulations and other pri-  
12          orities at the Department as determined by the Sec-  
13          retary using artificial intelligence tools and tech-  
14          niques;

15          (4) the development of operation and control  
16          systems that enhance automated, intelligent deci-  
17          sionmaking capabilities;

18          (5) the development of advanced computing  
19          hardware and computer architecture tailored to arti-  
20          ficial intelligence systems, including the codesign of  
21          networks and computational hardware;

22          (6) the development of standardized datasets  
23          for emerging artificial intelligence research fields  
24          and applications, including methods for addressing  
25          data scarcity; and

1           (7) the development of trustworthy artificial in-  
2           telligence systems, including—

3                   (A) algorithmic explainability;

4                   (B) analytical methods for identifying and  
5                   mitigating bias in artificial intelligence systems;  
6                   and

7                   (C) safety and robustness, including assur-  
8                   ance, verification, validation, security, and con-  
9                   trol.

10          (c) TECHNOLOGY TRANSFER.—In carrying out the  
11          program under subsection (a), the Secretary shall support  
12          technology transfer of artificial intelligence systems for the  
13          benefit of society and United States economic competitive-  
14          ness.

15          (d) FACILITY USE AND UPGRADES.—In carrying out  
16          the program under subsection (a), the Secretary shall—

17                   (1) make available high-performance computing  
18                   infrastructure at national laboratories;

19                   (2) make any upgrades necessary to enhance  
20                   the use of existing computing facilities for artificial  
21                   intelligence systems, including upgrades to hard-  
22                   ware;

23                   (3) establish new computing capabilities nec-  
24                   essary to manage data and conduct high perform-

1       ance computing that enables the use of artificial in-  
2       telligence systems; and

3           (4) maintain and improve, as needed, net-  
4       working infrastructure, data input and output mech-  
5       anisms, and data analysis, storage, and service capa-  
6       bilities.

7       (e) ETHICS.—

8           (1) IN GENERAL.—Not later than 18 months  
9       after the date of enactment of this Act, the Sec-  
10      retary shall amend grant proposal instructions to in-  
11      clude a requirement for an ethics statement to be in-  
12      cluded as part of any proposal for funding prior to  
13      making the award. Such statement shall be consid-  
14      ered by the Secretary in the review of proposals, tak-  
15      ing into consideration any relevant input from the  
16      peer-reviewers for the proposal, and shall factor into  
17      award decisions as deemed necessary by the Sec-  
18      retary. Such statements may include, as appro-  
19      priate—

20           (A) the potential societal benefits of the re-  
21      search;

22           (B) any foreseeable or quantifiable risks to  
23      society, including how the research could enable  
24      products, technologies, or other outcomes that

1           could intentionally or unintentionally cause sig-  
2           nificant societal harm; and

3           (C) how technical or social solutions can  
4           mitigate such risks and, as appropriate, a plan  
5           to implement such mitigation measures.

6           (2) GUIDANCE.—The Secretary shall issue clear  
7           guidance on what constitutes risks as described in  
8           section (1)(B), and to the extent practical harmonize  
9           this policy with existing ethical policies or related re-  
10          quirements for human subjects.

11          (3) ANNUAL REPORTS.—The Secretary shall  
12          encourage awardees to update their ethics state-  
13          ments as appropriate as part of the annual reports  
14          required by all awardees under the grant terms and  
15          conditions.

16          (f) RISK MANAGEMENT.—The Secretary shall review  
17          agency policies for risk management in artificial intel-  
18          ligence related projects and issue as necessary policies and  
19          principles that are consistent with the framework devel-  
20          oped under section 301(b).

21          (g) DATA PRIVACY AND SHARING.—The Secretary  
22          shall review agency policies for data sharing with other  
23          public and private sector organizations and issue as nec-  
24          essary policies and principles that are consistent with the  
25          standards and guidelines submitted under section 301(c).

1 In addition, the Secretary shall establish a streamlined  
2 mechanism for approving research projects or partner-  
3 ships that require sharing sensitive public or private data  
4 with the Department.

5 (h) PARTNERSHIPS WITH OTHER FEDERAL AGEN-  
6 CIES.—The Secretary may request, accept, and provide  
7 funds from other Federal departments and agencies,  
8 State, United States territory, local, or Tribal government  
9 agencies, private sector for-profit entities, and nonprofit  
10 entities, to be available to the extent provided by appro-  
11 priations Acts, to support a research project or partner-  
12 ship carried out under this section. The Secretary may not  
13 give any special consideration to any agency or entity in  
14 return for a donation.

15 (i) STAKEHOLDER ENGAGEMENT.—In carrying out  
16 the activities authorized in this section, the Secretary  
17 shall—

18 (1) collaborate with a range of stakeholders in-  
19 cluding small businesses, institutes of higher edu-  
20 cation, industry, and the National Laboratories;

21 (2) leverage the collective body of knowledge  
22 from existing artificial intelligence and machine  
23 learning research; and

1           (3) engage with other Federal agencies, re-  
2           search communities, and potential users of informa-  
3           tion produced under this section.

4           (j) AUTHORIZATION OF APPROPRIATIONS.—There  
5           are authorized to be appropriated to the Department to  
6           carry out this section—

7                   (1) \$200,000,000 for fiscal year 2021;

8                   (2) \$214,000,000 for fiscal year 2022;

9                   (3) \$228,980,000 for fiscal year 2023;

10                  (4) \$245,000,000 for fiscal year 2024; and

11                  (5) \$262,160,000 for fiscal year 2025.

12           (k) DEFINITIONS.—In this section:

13                   (1) SECRETARY.—The term “Secretary” means  
14           the Secretary of Energy.

15                   (2) DEPARTMENT.—The term “Department”  
16           means the Department of Energy.

17                   (3) NATIONAL LABORATORY.—The term “na-  
18           tional laboratory” has the meaning given such term  
19           in section 2 of the Energy Policy Act of 2005 (42  
20           U.S.C. 15801).

21                   (4) ELIGIBLE ENTITIES.—The term “eligible  
22           entities” means—

23                           (A) an institution of higher education;

24                           (B) a National Laboratory;

25                           (C) a Federal research agency;

- 1 (D) a State research agency;
- 2 (E) a nonprofit research organization;
- 3 (F) a private sector entity; or
- 4 (G) a consortium of 2 or more entities de-
- 5 scribed in subparagraph (A) through (F).

