

have both expertise in research related to the security of computer systems and knowledge of the vulnerabilities of existing computer systems. The Director shall designate such individuals as program managers.

**(2) Managers may be employees**

Program managers designated under paragraph (1) may be new or existing employees of the Institute or individuals on assignment at the Institute under the Intergovernmental Personnel Act of 1970 [42 U.S.C. 4701 et seq.], except that individuals on assignment at the Institute under the Intergovernmental Personnel Act of 1970 shall not directly manage such employees.

**(3) Manager responsibility**

Program managers designated under paragraph (1) shall be responsible for—

(A) establishing and publicizing the broad research goals for the program;

(B) soliciting applications for specific research projects to address the goals developed under subparagraph (A);

(C) selecting research projects for support under the program from among applications submitted to the Institute, following consideration of—

(i) the novelty and scientific and technical merit of the proposed projects;

(ii) the demonstrated capabilities of the individual or individuals submitting the applications to successfully carry out the proposed research;

(iii) the impact the proposed projects will have on increasing the number of computer security researchers;

(iv) the nature of the participation by for-profit entities and the extent to which the proposed projects address the concerns of industry; and

(v) other criteria determined by the Director, based on information specified for inclusion in applications under subsection (c); and

(D) monitoring the progress of research projects supported under the program.

**(4) Reports**

The Director shall report to the Senate Committee on Commerce, Science, and Transportation and the House of Representatives Committee on Science annually on the use and responsibility of individuals on assignment at the Institute under the Intergovernmental Personnel Act of 1970 [42 U.S.C. 4701 et seq.] who are performing duties under subsection (d).

**(e) Review of program**

**(1) Periodic review**

The Director shall periodically review the portfolio of research awards monitored by each program manager designated in accordance with subsection (d). In conducting those reviews, the Director shall seek the advice of the Computer System Security<sup>1</sup> and Privacy Advisory Board, established under section 278g-4 of this title, on the appropriateness of the research goals and on the quality and utility of research projects managed by program managers in accordance with subsection (d).

**(2) Comprehensive 5-year review**

The Director shall also contract with the National Research Council for a comprehensive review of the program established under subsection (a) during the 5th year of the program. Such review shall include an assessment of the scientific quality of the research conducted, the relevance of the research results obtained to the goals of the program established under subsection (d)(3)(A), and the progress of the program in promoting the development of a substantial academic research community working at the leading edge of knowledge in the field. The Director shall submit to Congress a report on the results of the review under this paragraph no later than 6 years after the initiation of the program.

**(f) Definitions**

In this section:

**(1) Computer system**

The term “computer system” has the meaning given that term in section 278g-3(d)(1)<sup>2</sup> of this title.

**(2) Institution of higher education**

The term “institution of higher education” has the meaning given that term in section 1001(a) of title 20.

(Mar. 3, 1901, ch. 872, §22, as added Pub. L. 107-305, §8(a)(2), Nov. 27, 2002, 116 Stat. 2375.)

**Editorial Notes**

REFERENCES IN TEXT

Section 278g-3 of this title, referred to in subsecs. (a)(2) and (f)(1), was amended generally by Pub. L. 107-296, title X, §1003, Nov. 25, 2002, 116 Stat. 2269, and, as so amended, did not contain a subsec. (d) defining “computer system” or a subsec. (f). A later amendment by Pub. L. 113-274, title II, §204(1), Dec. 18, 2014, 128 Stat. 2980, redesignated subsec. (e) of section 278g-3 of this title, relating to definitions, as subsec. (f).

The Intergovernmental Personnel Act of 1970, referred to in subsec. (d)(2), (4), is Pub. L. 91-648, Jan. 5, 1971, 84 Stat. 1909, as amended, which enacted sections 3371 to 3376 of Title 5, Government Organization and Employees, and chapter 62 (§4701 et seq.) of Title 42, The Public Health and Welfare, amended section 1304 of Title 5 and section 246 of Title 42, repealed sections 1881 to 1888 of Title 7, Agriculture, and section 869b of Title 20, Education, and enacted provisions set out as notes under section 3371 of Title 5. For complete classification of this Act to the Code, see Short Title note set out under section 4701 of Title 42 and Tables.

PRIOR PROVISIONS

A prior section 22 of act Mar. 3, 1901, ch. 872, was renumbered section 32 and is classified to section 278q of this title.

**Statutory Notes and Related Subsidiaries**

CHANGE OF NAME

Committee on Science of House of Representatives changed to Committee on Science and Technology of House of Representatives by House Resolution No. 6, One Hundred Tenth Congress, Jan. 5, 2007. Committee on Science and Technology of House of Representatives changed to Committee on Science, Space, and Technology of House of Representatives by House Resolution No. 5, One Hundred Twelfth Congress, Jan. 5, 2011.

**§ 278h-1. Standards for artificial intelligence**

**(a) Mission**

The Institute shall—

(1) advance collaborative frameworks, standards, guidelines, and associated methods and techniques for artificial intelligence;

(2) support the development of a risk-mitigation framework for deploying artificial intelligence systems;

(3) support the development of technical standards and guidelines that promote trustworthy artificial intelligence systems; and

(4) support the development of technical standards and guidelines by which to test for bias in artificial intelligence training data and applications.

**(b) Supporting activities**

The Director of the National Institute of Standards and Technology may—

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

(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 standardize data into forms useful for training artificial intelligence systems and the use of common, open licenses;

(D) safety and robustness of artificial intelligence systems, including assurance, verification, validation, security, control, and the ability for artificial intelligence systems to withstand unexpected inputs and adversarial attacks;

(E) auditing mechanisms and benchmarks for accuracy, transparency, verifiability, and safety assurance for artificial intelligence systems;

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

(G) model documentation, including performance metrics and constraints, measures of fairness, training and testing processes, and results;

(H) system documentation, including connections and dependences within and between systems, and complications that may arise from such connections; and

(I) all other areas deemed by the Director to be critical to the development and deployment of trustworthy artificial intelligence;

(2) produce curated, standardized, representative, high-value, secure, aggregate, and privacy protected data sets for artificial intelligence research, development, and use;

(3) support one or more institutes as described in section 9431(b) of this title for the purpose of advancing measurement science, voluntary consensus standards, and guidelines for trustworthy artificial intelligence systems;

(4) support and strategically engage in the development of voluntary consensus standards, including international standards, through open, transparent, and consensus-based processes; and

(5) enter into and perform such contracts, including cooperative research and development arrangements and grants and cooperative agreements or other transactions, as may be necessary in the conduct of the work of the National Institute of Standards and Technology and on such terms as the Director considers appropriate, in furtherance of the purposes of this division.<sup>1</sup>

**(c) Risk management framework**

Not later than 2 years after January 1, 2021, the Director shall work to develop, and periodically update, in collaboration with other public and private sector organizations, including the National Science Foundation and the Department of Energy, a voluntary risk management framework for trustworthy artificial intelligence systems. The framework shall—

(1) identify and provide standards, guidelines, best practices, methodologies, procedures and processes for—

(A) developing trustworthy artificial intelligence systems;

(B) assessing the trustworthiness of artificial intelligence systems; and

(C) mitigating risks from artificial intelligence systems;

(2) establish common definitions and characterizations for aspects of trustworthiness, including explainability, transparency, safety, privacy, security, robustness, fairness, bias, ethics, validation, verification, interpretability, and other properties related to artificial intelligence systems that are common across all sectors;

(3) provide case studies of framework implementation;

(4) align with international standards, as appropriate;

(5) incorporate voluntary consensus standards and industry best practices; and

(6) not prescribe or otherwise require the use of specific information or communications technology products or services.

**(d) Participation in standard setting organizations**

**(1) Requirement**

The Institute shall participate in the development of standards and specifications for artificial intelligence.

**(2) Purpose**

The purpose of this participation shall be to ensure—

(A) that standards promote artificial intelligence systems that are trustworthy; and

(B) that standards relating to artificial intelligence reflect the state of technology and are fit-for-purpose and developed in transparent and consensus-based processes that are open to all stakeholders.

**(e) Data sharing best practices**

Not later than 1 year after January 1, 2021, the Director shall, in collaboration with other public and private sector organizations, develop guidance to facilitate the creation of voluntary

<sup>1</sup> See References in Text note below.

data sharing arrangements between industry, federally funded research centers, and Federal agencies for the purpose of advancing artificial intelligence research and technologies, including options for partnership models between government entities, industry, universities, and nonprofits that incentivize each party to share the data they collected.

**(f) Best practices for documentation of data sets**

Not later than 1 year after January 1, 2021, the Director shall, in collaboration with other public and private sector organizations, develop best practices for datasets used to train artificial intelligence systems, including—

- (1) standards for metadata that describe the properties of datasets, including—
  - (A) the origins of the data;
  - (B) the intent behind the creation of the data;
  - (C) authorized uses of the data;
  - (D) descriptive characteristics of the data, including what populations are included and excluded from the datasets; and
  - (E) any other properties as determined by the Director; and
- (2) standards for privacy and security of datasets with human characteristics.

**(g) Authorization of appropriations**

There are authorized to be appropriated to the National Institute of Standards and Technology to carry out this section—

- (1) \$64,000,000 for fiscal year 2021;
- (2) \$70,400,000 for fiscal year 2022;
- (3) \$77,440,000 for fiscal year 2023;
- (4) \$85,180,000 for fiscal year 2024; and
- (5) \$93,700,000 for fiscal year 2025.

(Mar. 3, 1901, ch. 872, §22A, as added Pub. L. 116-283, div. E, title LIII, §5301, Jan. 1, 2021, 134 Stat. 4536.)

**Editorial Notes**

REFERENCES IN TEXT

This division, referred to in subsec. (b)(5), probably means div. E of Pub. L. 116-283, Jan. 1, 2021, 134 Stat. 4523, which is classified principally to chapter 119 of this title.

**§ 278i. Reports to Congress**

**(a) Information to Congress on Institute activities**

The Director shall keep the Committee on Commerce, Science, and Transportation of the Senate and the Committee on Science, Space, and Technology of the House of Representatives fully and currently informed with regard to all of the activities of the Institute.

**(b) Justification for changes in policies and fees**

The Director shall justify in writing all changes in policies regarding fees for standard reference materials and calibration services occurring after June 30, 1987, including a description of the anticipated impact of any proposed changes on demand for and anticipated revenues from the materials and services. Changes in policy and fees shall not be effective unless and until the Director has submitted the proposed schedule and justification to the Congress and 30

days on which both Houses of Congress are in session have elapsed since such submission, except that the requirement of this sentence shall not apply with respect to adjustments which are based solely on changes in the costs of raw materials or of producing and delivering standard reference materials or calibration services.

(Mar. 3, 1901, ch. 872, §23, as added Pub. L. 100-418, title V, §5114(2), Aug. 23, 1988, 102 Stat. 1432; amended Pub. L. 110-69, title III, §3004, Aug. 9, 2007, 121 Stat. 590; Pub. L. 114-329, title II, §204(a)(1)(B)(i), Jan. 6, 2017, 130 Stat. 2998.)

**Editorial Notes**

AMENDMENTS

2017—Subsecs. (c), (d). Pub. L. 114-329 struck out subsecs. (c) and (d) which required the Director to submit to Congress a 3-year programmatic planning document for the Institute and annual updates.

2007—Subsecs. (c), (d). Pub. L. 110-69 added subsecs. (c) and (d).

**Statutory Notes and Related Subsidiaries**

CHANGE OF NAME

Committee on Science, Space, and Technology of House of Representatives treated as referring to Committee on Science of House of Representatives by section 1(a) of Pub. L. 104-14, set out as a note preceding section 21 of Title 2, The Congress. Committee on Science of House of Representatives changed to Committee on Science and Technology of House of Representatives by House Resolution No. 6, One Hundred Tenth Congress, Jan. 5, 2007. Committee on Science and Technology of House of Representatives changed to Committee on Science, Space, and Technology of House of Representatives by House Resolution No. 5, One Hundred Twelfth Congress, Jan. 5, 2011.

**§ 278j. Studies by National Research Council**

The Director may periodically contract with the National Research Council for advice and studies to assist the Institute to serve United States industry and science. The subjects of such advice and studies may include—

- (1) the competitive position of the United States in key areas of manufacturing and emerging technologies and research activities which would enhance that competitiveness;
- (2) potential activities of the Institute, in cooperation with industry and the States, to assist in the transfer and dissemination of new technologies for manufacturing and quality assurance; and
- (3) identification and assessment of likely barriers to widespread use of advanced manufacturing technology by the United States workforce, including training and other initiatives which could lead to a higher percentage of manufacturing jobs of United States companies being located within the borders of our country.

(Mar. 3, 1901, ch. 872, §24, as added Pub. L. 100-418, title V, §5114(2), Aug. 23, 1988, 102 Stat. 1432.)

**§ 278k. Hollings Manufacturing Extension Partnership**

**(a) Definitions**

In this section: