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(Original Signature of Member)

117TH CONGRESS
1ST SESSION

# H. R. _____

To reauthorize the National Institute of Standards and Technology, and for other purposes.

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IN THE HOUSE OF REPRESENTATIVES

Ms. Stevens of Michigan introduced the following bill; which was referred to the Committee on _____

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# A BILL

To reauthorize the National Institute of Standards and Technology, and for other purposes.

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

**SECTION 1. SHORT TITLE.**

(a) SHORT TITLE.—This Act may be cited as the ''National Institute of Standards and Technology For the Future Act of 2021''.

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

**SEC. 2. DEFINITIONS.**

In this Act:

(1) DIRECTOR.—The term ''Director'' means the Director of the National Institute of Standards and Technology.

(2) FRAMEWORK.—The term ''Framework'' means the Framework for Improving Critical Infrastructure Cybersecurity developed by the National Institute of Standards and Technology and referred to in Executive Order 13800 issued on May 11, 2017 (82 Fed. Reg. 22391 et seq.).

(3) HISTORICALLY BLACK COLLEGES AND UNIVERSITIES.—The term ''historically Black colleges

and universities'' has the same meaning given to the term ''part B institutions'' in section 322 of the Higher Education Act of 1965 (20 U.S.C. 1061).

(4) INSTITUTE.—The term ''Institute'' means the National Institute of Standards and Technology.

(5) INSTITUTION OF HIGHER EDUCATION.—The term ''institution of higher education'' has the meaning given such term in section 101 of the Higher Education Act of 1965 (20 U.S.C. 1001).

(6) INTERNATIONAL STANDARDS ORGANIZATION.—The term ''International Standards Organization'' has the meaning given such term in section 451 of the Trade Agreements Act of 1979 (19 U.S.C. 2571).

(7) MINORITY SERVING INSTITUTION.—The term ''minority-serving institution'' means a Hispanic-serving institution, an Alaska Native-serving institution, a Native Hawaiian-serving institutions, a Predominantly Black Institution, an Asian American and Native American Pacific Islander-serving institution, or a Native American-serving nontribal institution as described in section 371 of the Higher Education Act of 1965 (20 U.S.C. 1067q(a)).

(8) SECRETARY.—The term ''Secretary'' means the Secretary of Commerce.

(9) TECHNICAL STANDARDS.—The term ''technical standard'' has the meaning given such term in section 12(d)(5) of the National Technology Transfer and Advancement Act of 1995.

# TITLE I—APPROPRIATIONS

**SEC. 101. AUTHORIZATION OF APPROPRIATIONS.**

(a) FISCAL YEAR 2022.—

(1) IN GENERAL.—There are authorized to be appropriated to the Secretary of Commerce $1,267,070,000 for the National Institute of Standards and Technology for fiscal year 2022.

(2) SPECIFIC ALLOCATIONS.—Of the amount authorized by paragraph (1)—

(A) $915,570,000 shall be for scientific and technical research and services laboratory activities, of which $9,000,000 may be transferred to the Working Capital Fund;

(B) $140,000,000 shall be for the construction and maintenance of facilities, of which $80,000,000 shall be for Safety, Capacity, Maintenance, and Major Repairs; and

(C) $211,500,000 shall be for industrial technology services activities, of which $155,000,000 shall be for the Manufacturing Extension Partnership program under sections

25 and 26 of the National Institute of Standards and Technology Act (15 U.S.C. 278k and 278l) and $56,500,000 shall be for the Network for Manufacturing Innovation Program under section 34 of the National Institute of Standards and Technology Act (15 U.S.C. 278s).

(b) FISCAL YEAR 2023.—

(1) IN GENERAL.—There are authorized to be appropriated to the Secretary of Commerce $1,335,200,000 for the National Institute of Standards and Technology for fiscal year 2023.

(2) SPECIFIC ALLOCATIONS.—Of the amount authorized by paragraph (1)—

(A) $979,100,000 shall be for scientific and technical research and services laboratory activities, of which $10,000,000 may be transferred to the Working Capital Fund;

(B) $140,000,000 shall be for the construction and maintenance of facilities, of which $80,000,000 shall be for Safety, Capacity, Maintenance, and Major Repairs, including $20,000,000 for IT infrastructure; and

(C) $216,200,000 shall be for industrial technology services activities, of which $159,700,000 shall be for the Manufacturing

Extension Partnership program under sections 25 and 26 of the National Institute of Standards and Technology Act (15 U.S.C. 278k and 278l) and $56,500,000 shall be for the Network for Manufacturing Innovation Program under section 34 of the National Institute of Standards and Technology Act (15 U.S.C. 278s).

(c) FISCAL YEAR 2024.—

(1) IN GENERAL.—There are authorized to be appropriated to the Secretary of Commerce $1,408,520,000 for the National Institute of Standards and Technology for fiscal year 2024.

(2) SPECIFIC ALLOCATIONS.—Of the amount authorized by paragraph (1)—

(A) $1,047,600,000 shall be for scientific and technical research and services laboratory activities, of which $12,000,000 may be transferred to the Working Capital Fund;

(B) $140,000,000 shall be for the construction and maintenance of facilities, of which $80,000,000 shall be for Safety, Capacity, Maintenance, and Major Repairs, including $20,000,000 for IT infrastructure; and

(C) $220,900,000 shall be for industrial technology services activities, of which

$164,400,000 shall be for the Manufacturing Extension Partnership program under sections 25 and 26 of the National Institute of Standards and Technology Act (15 U.S.C. 278k and 278l) and $56,500,000 shall be for the Network for Manufacturing Innovation Program under section 34 of the National Institute of Standards and Technology Act (15 U.S.C. 278s).

(d) FISCAL YEAR 2025.—

(1) IN GENERAL.—There are authorized to be appropriated to the Secretary of Commerce $1,486,800,000 for the National Institute of Standards and Technology for fiscal year 2025.

(2) SPECIFIC ALLOCATIONS.—Of the amount authorized by paragraph (1)—

(A) $1,120,900,000 shall be for scientific and technical research and services laboratory activities, of which $15,000,000 may be transferred to the Working Capital Fund;

(B) $140,000,000 shall be for the construction and maintenance of facilities, of which $80,000,000 shall be for Safety, Capacity, Maintenance, and Major Repairs, including $20,000,000 for IT infrastructure; and

(C) $225,900,000 shall be for industrial technology services activities, of which $169,400,000 shall be for the Manufacturing Extension Partnership program under sections 25 and 26 of the National Institute of Standards and Technology Act (15 U.S.C. 278k and 278l) and $56,500,000 shall be for the Network for Manufacturing Innovation Program under section 34 of the National Institute of Standards and Technology Act (15 U.S.C. 278s).

(e) FISCAL YEAR 2026.—

(1) IN GENERAL.—There are authorized to be appropriated to the Secretary of Commerce $1,570,340,000 for the National Institute of Standards and Technology for fiscal year 2026.

(2) SPECIFIC ALLOCATIONS.—Of the amount authorized by paragraph (1)—

(A) $1,199,400,000 shall be for scientific and technical research and services laboratory activities, of which $18,000,000 may be transferred to the Working Capital Fund;

(B) $140,000,000 shall be for the construction and maintenance of facilities, of which $80,000,000 shall be for Safety, Capacity,

Maintenance, and Major Repairs, including $20,000,000 for IT infrastructure; and

(C) $231,000,000 shall be for industrial technology services activities, of which $174,500,000 shall be for the Manufacturing Extension Partnership program under sections 25 and 26 of the National Institute of Standards and Technology Act (15 U.S.C. 278k and 23 278l) and $56,500,000 shall be for the Network for Manufacturing Innovation Program under section 34 of the National Institute of Standards and Technology Act (15 U.S.C. 278s).

# TITLE II—MEASUREMENT RESEARCH

**SEC. 201. ENGINEERING BIOLOGY AND BIOMETROLOGY.**

(a) IN GENERAL.—The Director shall—

(1) support basic measurement science, technology research for engineering biology, biomanufacturing, and biometrology to advance—

(A) measurement technologies to support foundational understanding of the mechanisms of conversion of DNA information into cellular function, including both the natural and engineered production of biomolecules;

(B) technologies for measurement of such biomolecular components and for complex engineered biological systems;

(C) new data tools, techniques, and processes to improve engineering biology, biomanufacturing, and biometrology research; and

(D) all other areas deemed by the Director to be critical to the development and deployment of engineering biology, biomanufacturing and biometrology;

(2) support activities to inform and expand the development of measurements infrastructure needed to develop technical standards to establish interoperability and facilitate commercial development of biomolecular measurement technology and engineering biology applications;

(3) convene industry, institutions of higher education, nonprofit organizations, Federal laboratories, and other Federal agencies engaged in engineering biology research and development to develop coordinated technical roadmaps for authoritative measurement of the molecular components of the cell;

(4) provide access to user facilities with advanced or unique equipment, services, materials, and other resources to industry, institutions of higher

education, nonprofit organizations, and government agencies to perform research and testing;

(5) establish or expand collaborative partnerships or consortia with other Federal agencies engaged in engineering biology research and development, institutions of higher education, Federal laboratories, and industry to advance engineering biology applications; and

(6) support graduate and post graduate research and training in biometrology, biomanufacturing, and engineering biology.

(b) DEFINITIONS.—For purposes of this section, the term ''Engineering Biology'' means the application of engineering design principles and practices to biological systems, including molecular and cellular systems, to advance fundamental understanding of complex natural systems and to enable novel or optimize functions and capabilities.

(c) RULE OF CONSTRUCTION.—Nothing in this section shall be construed to alter the policies, processes, or practices of individual Federal agencies in effect on the day before the date of the enactment of this Act relating to the conduct of biomedical research and advanced development, including the solicitation and review of extramural research proposals.

(d) CONTROLS.—In carrying out activities authorized by this section, the Secretary shall ensure proper security controls are in place to protect sensitive information, as appropriate.

**SEC. 202. GREENHOUSE GAS MEASUREMENT RESEARCH.**

(a) GREENHOUSE GAS MEASUREMENT PROGRAM.—

(1) IN GENERAL.—The Director, in consultation with the Administrator of the National Oceanic and Atmospheric Administration and the Administrator of the Environmental Protection Agency, shall carry out a measurement research program to inform the development of best practices, benchmarks, methodologies, procedures, and technical standards for the measurement of greenhouse gas emissions and to assess and improve the performance of greenhouse gas measurement systems.

(2) ACTIVITIES.—In carrying out such a program, the Director may—

(A) conduct research and testing to improve the accuracy, efficacy, and reliability of the measurement of greenhouse gas emissions;

(B) conduct research to create novel measurement technologies and techniques for the measurement of greenhouse gases;

(C) convene and engage with relevant Federal agencies and stakeholders to establish common definitions and characterizations for the measurement of greenhouse gas emissions;

(D) conduct outreach and coordination to share technical expertise with relevant industry and non-industry stakeholders and standards development organizations to assist such entities in the development of best practices and technical standards for greenhouse gas measurements; and

(E) in coordination with the Administrator of the National Oceanic and Atmospheric Administration and the Administrator of the Environmental Protection Agency, develop such standard reference materials as the Director determines is necessary to further the development of such technical standards.

(3) TEST BEDS.—In coordination with the private sector, institutions of higher education, state and local governments, the National Oceanic and Atmospheric Administration, the Environmental Protection Agency, and other Federal agencies as appropriate, the Director may continue to develop and manage testbeds to advance measurement research

and standards development for greenhouse gas emissions.

(4) GREENHOUSE GAS MEASUREMENT CENTER OF EXCELLENCE.—

(A) IN GENERAL.—The Director, in collaboration with the Administrator of the National Oceanic and Atmospheric Administration, the Administrator of the Environmental Protection Agency, and the heads of other Federal agencies, as appropriate, shall award to an institution of higher education or an eligible nonprofit organization (or a consortium thereof), on a merit-reviewed, competitive basis, funds to establish a Center of Excellence in Greenhouse Gas Measurement.

(B) COLLABORATIONS.—The Director shall require, as a condition of receipt of the award under this paragraph, that the activities of the Center of Excellence include collaboration among public and private organizations, including institutions of higher education, nonprofit organizations, private sector entities, and State, tribal, territorial, and local officials.

(C) PURPOSE.—The purpose of the Center of Excellence shall be to—

(i) advance measurement science, data analytics, and modeling to improve the accuracy of greenhouse gas emissions measurement, validation, and attribution;

(ii) test and evaluate the performance of existing capabilities for the measurement and validation of greenhouse gas emissions;

(iii) educate and train students in measurement science, computational science, and systems engineering research relevant to greenhouse gas measurements;

(iv) foster collaboration among academic researchers, private sector stakeholders, and State, tribal, territorial, and local officials;

(v) support Institute test beds as described in subsection (a)(3); and

(vi) collaborate with other Federal agencies to conduct outreach and coordination to share technical expertise with relevant public and private sector stakeholders, including State, tribal, territorial, and local officials, to assist such entities in measuring greenhouse gas emissions.

(D) REQUIREMENTS.—

(i) IN GENERAL.—An institution of higher education or an eligible nonprofit organization (or a consortium thereof) seeking funding under this subsection shall submit an application to the Director at such time, in such manner, and containing such information as the Director may require.

(ii) APPLICATIONS.—Each application made under clause (i) shall include a description of—

(I) how the Center will work with other research institutions, industry partners, and State and local officials to identify research, testing, and technical standards needs relevant to greenhouse gas emissions;

(II) how the Center will promote active collaboration among researchers in multiple disciplines involved in the measurement of greenhouse gas emissions; and

(III) how the Center will share technical expertise with relevant pub-

lic and private sector stakeholders, including state and local officials, to assist such entities in measuring greenhouse gas emissions.

(iii) SELECTION AND DURATION.—Each Center established under the section is authorized to carry out activities for a period of 5 years, renewable for an additional 5 years at the discretion of the Director, in consultation with other Federal agencies as appropriate.

**SEC. 203. NIST AUTHORITY FOR CYBERSECURITY AND PRIVACY ACTIVITIES.**

Section 2 of the National Institute of Standards and Technology Act (15 U.S.C. 272 et seq.) is amended—

(1) in subsection (c)—

(A) in paragraph (16), by striking the period at the end and inserting a semicolon;

(B) by redesignating paragraphs (16) through (27) as paragraphs (21) through (32), respectively; and

(C) by inserting after paragraph (15) the following:

''(16) support information security measures for the development and lifecycle of software and the

software supply chain, including development of best practices, technical standards, frameworks, methodologies, procedures, processes, and software engineering toolkits and configurations;

''(17) support information security measures, including best practices, guidelines, and technical standards, for the design, adoption and deployment of cloud computing services;

''(18) support research, development, and practical application to improve the usability of cybersecurity processes and technologies;

''(19) facilitate and support the development of a voluntary, consensus-based set of technical standards, guidelines, best practices, methodologies, procedures, and processes to cost-effectively ensure appropriate privacy protections for personally identifiable information in systems, technologies, and processes used by both the public and private sector;

''(20) support privacy measures, including best practices, guidelines, technical standards, metrology, and testbeds for the design, adoption and deployment of privacy enhancing technologies;''; and

(2) in subsection (e)(1)(A)—

(A) in clause (viii), by striking ''and'' at the end;

(B) by redesignating clause (ix) as clause (x); and

(C) by inserting after clause (viii) the following:

''(ix) conduct reviews of and create impact metrics for cybersecurity solutions and capabilities developed by the Institute for purposes of improvement; and''.

**SEC. 204. SOFTWARE SECURITY AND AUTHENTICATION.**

(a) VULNERABILITIES IN OPEN SOURCE SOFTWARE.—The Director shall assess assign severity metrics to identified vulnerabilities with open source software and produce voluntary guidance to assist the entities that maintain open source software repositories to discover and mitigate vulnerabilities.

(b) ARTIFICIAL INTELLIGENCE-ENABLED DEFENSES.—The Director shall carry out research and testing to improve the effectiveness of artificial intelligence-enabled cybersecurity, including by generating optimized data sets to train artificial intelligence defense systems and evaluating the performance of varying network architectures at strengthening network security.

(c) AUTHENTICATION OF INSTITUTE SOFTWARE.—The Director shall ensure all software released by the Institute is digitally signed and maintained to enable stake-

holders to verify its authenticity and integrity upon installation and execution.

(d) ASSISTANCE TO INSPECTORS GENERAL.—The Director shall provide technical assistance to improve the education and training of individual Federal agency Inspectors General and staff who are responsible for the annual independent evaluation they are required to perform of the information security program and practices of Federal Agencies under section 3555 of title 44, United States Code.

**SEC. 205. DIGITAL IDENTITY MANAGEMENT RESEARCH.**

Section 504 of the Cybersecurity Enhancement Act of 2014 (15 U.S.C. 7464) is amended to read as follows:

**"SEC. 504. IDENTITY MANAGEMENT RESEARCH AND DEVELOPMENT.**

"(a) IN GENERAL.—The Director shall carry out a program of research to support the development of voluntary, consensus-based technical standards, best practices, benchmarks, methodologies, metrology, testbeds, and conformance criteria for identify management, taking into account appropriate user concerns—

"(1) to improve interoperability and portability among identity management technologies;

''(2) to strengthen identity proofing and verification methods used in identity management systems;

''(3) to improve privacy protection in identity management systems through authentication and security protocols; and

''(4) to monitor and improve the accuracy, usability, and inclusivity of identity management systems.

''(b) DIGITAL IDENTITY TECHNICAL ROADMAP.—The Director, in consultation with other relevant Federal agencies and stakeholders from the private sector, shall develop and maintain a technical roadmap for digital identity management research and development focused on enabling the use and adoption of modern digital identity solutions that align with the four criteria in subsection (a).

''(c) DIGITAL IDENTITY MANAGEMENT GUIDANCE.—

''(1) IN GENERAL.—The Director shall develop, and periodically update, in collaboration with other public and private sector organizations, common definitions and voluntary guidance for digital identity management systems.

''(2) GUIDANCE.—The Guidance shall—

''(A) align with the four criteria in subsection (a), as practicable;

''(B) provide case studies of implementation of guidance;

''(C) incorporate voluntary technical standards and industry best practices; and

''(D) not prescribe or otherwise require the use of specific technology products or services.

''(3) CONSULTATION.—In carrying out this subsection, the Director shall consult with—

''(A) Federal and State agencies;

''(B) industry;

''(C) potential end-users and individuals that will use services related to digital identity verification; and

''(D) experts with relevant experience in the systems that enable digital identity verification, as determined by the Director.''.

**SEC. 206. BIOMETRICS RESEARCH AND TESTING.**

(a) IN GENERAL.—The Secretary, acting through the Director, shall establish a program to support measurement research to inform the development of best practices, benchmarks, methodologies, procedures, and voluntary technical standards for biometric identification systems, including facial recognition systems, to assess and improve the performance of such systems. In carrying out such program, the Director may—

(1) conduct research to support efforts to improve the performance of biometric identification systems, including in areas related to conformity assessment, image quality and interoperability, contactless biometric capture technologies, and human-in-the-loop biometric identification systems and processes;

(2) convene and engage with relevant stakeholders to establish common definitions and characterizations for biometric identification systems, including accuracy, fairness, bias, privacy, consent, and other properties, taking into account definitions in relevant international technical standards and other publications;

(3) carry out research and testing on a range of biometric modalities, such as fingerprints, voice, iris, face, vein, behavioral biometrics, genetics, multimodal biometrics, and emerging applications of biometric identification technology;

(4) study the use of privacy-enhancing technologies and other technical protective controls to facilitate access to public data sets for biometric research;

(5) conduct outreach and coordination to share technical expertise with relevant industry and non-

industry stakeholders and standards development organizations to assist such entities in the development of best practices and voluntary standards; and

(6) develop such standard reference artifacts as the Director determines is necessary to further the development of such technical standards.

(b) BIOMETRICS VENDOR TEST PROGRAM.—

(1) IN GENERAL.—The Secretary, acting through the Director, shall carry out a test program to provide biometrics vendors the opportunity to test biometric identification technologies across a range of modalities.

(2) ACTIVITIES.—In carrying out the program under subparagraph (A), the Director shall—

(A) conduct research and regular testing to improve and benchmark the accuracy, efficacy, and bias of biometric identification systems, including research and testing on demographic variations, capture devices, presentation attack detection, partially occluded or computer generated images, privacy and security designs and controls, template protection, de-identification, and comparison of algorithm, human, and combined algorithm-human recognition capability;

(B) develop an approach for testing software and cloud-based biometrics applications, including remote systems, in Institute test facilities;

(C) establish reference use cases for biometric applications and performance criteria for assessing each use case, including accuracy and bias metrics;

(D) produce public-facing reports of the findings from such testing for a general audience; and

(E) conduct such other activities as deemed necessary by the Director.

(3) PARTNERSHIPS WITH OTHER FEDERAL AGENCIES.—In addition to such sums as may be authorized to be appropriated or otherwise made available to carry out this section, the Director may accept funds from other Federal departments and agencies and States and local governments to carry out activities under this subsection.

**SEC. 207. FEDERAL BIOMETRIC PERFORMANCE STANDARDS.**

Section 20 of the National Institute of Standards and Technology Act (15 U.S.C. 278g–3) is amended in subsection (b)—

(1) in paragraph (2), by striking ''and'' after the semicolon;

(2) in paragraph (3), by striking the period and inserting ''; and'';

(3) by adding at the end the following:

''(4) performance standards and guidelines for high risk biometric identification systems, including facial recognition systems, accounting for various use cases, type of biometric identification systems, and relevant operational conditions.''.

**SEC. 208. PROTECTING RESEARCH FROM CYBER THEFT.**

Section 2(e)(1)(A) of the National Institute of Standards and Technology Act (15 U.S.C. 272(e)(1)(A)), as amended by section 203(2), is further amended—

(1) in clause (ix), as added by section 203(2)(C), by striking ''and'' after the semicolon;

(2) by redesignating clause (x), as redesignated by section 203(2)(B), as clause (xi); and

(3) by inserting after clause (ix), as added by section 203(2)(C), the following:

''(x) consider institutions of higher education (as defined in section 101 of the Higher Education Act of 1965 (20 U.S.C. 1001)); and''.

**SEC. 209. DISSEMINATION OF RESOURCES FOR RESEARCH INSTITUTIONS.**

(a) DISSEMINATION OF RESOURCES FOR RESEARCH INSTITUTIONS.—

(1) IN GENERAL.—Not later than one year after the date of the enactment of this Act, the Director shall, using the authorities of the Director under subsections (c)(15) and (e)(1)(A)(ix) of section 2 of the National Institute of Standards and Technology Act (15 U.S.C. 272), as amended by section 208, disseminate and make publicly available resources to help qualifying institutions identify, assess, manage, and reduce their cybersecurity risk related to conducting research.

(2) REQUIREMENTS.—The Director shall ensure that the resources disseminated pursuant to paragraph (1)—

(A) are generally applicable and usable by a wide of qualifying institutions;

(B) vary with the nature and size of the qualifying institutions, and the nature and sensitivity of the data collected or stored on the information systems or devices of the qualifying institutions;

(C) include elements that promote awareness of simple, basic controls, a workplace cy-

bersecurity culture, and third-party stakeholder relationships, to assist qualifying institutions in mitigating common cybersecurity risks;

(D) include case, examples, and scenarios studies of practical application;

(E) are technology-neutral and can be implemented using technologies that are commercial and off-the-shelf; and

(F) to the extent practicable, are based on international technical standards.

(3) NATIONAL CYBERSECURITY AWARENESS AND EDUCATION PROGRAM.—The Director shall ensure that the resources disseminated under paragraph (1) are consistent with the efforts of the Director under section 401 of the Cybersecurity Enhancement Act of 2014 (15 U.S.C. 7451).

(4) UPDATES.—The Director shall review periodically and update the resources under paragraph (1) as the Director determines appropriate.

(5) VOLUNTARY RESOURCES.—The use of the resources disseminated under paragraph (1) shall be considered voluntary.

(b) OTHER FEDERAL CYBERSECURITY REQUIREMENTS.—Nothing in this section may be construed to su-

persede, alter, or otherwise affect any cybersecurity requirements applicable to Federal agencies.

(c) DEFINITIONS.—In this section:

(1) QUALIFYING INSTITUTIONS.—The term ''qualifying institutions'' means institutions of higher education that are classified as either very-high research intensive (R1) or high research intensive (R2) status universities by the Carnegie Classification of Academic Institutions.

(2) RESOURCES.—The term ''resources'' means guidelines, tools, best practices, technical standards, methodologies, and other ways of providing information.

**SEC. 210. ADVANCED COMMUNICATIONS RESEARCH.**

The National Institute of Standards and Technology Act (15 U.S.C. 271 et seq.) is amended—

(1) by redesignating section 35 as section 36; and

(2) by inserting after section 34 the following:

**''SEC. 35. ADVANCED COMMUNICATIONS RESEARCH ACTIVITIES.**

''(a) ADVANCED COMMUNICATIONS RESEARCH.—

''(1) IN GENERAL.—The Director of the National Institute of Standards and Technology, in consultation with the Administrator of the National

Telecommunications and Information Administration, the Director of the National Science Foundation, and heads of other Federal agencies, as appropriate, shall carry out a program of measurement research to inform the development of common definitions, benchmarks, best practices, methodologies, and technical standards for advanced communications technologies.

''(2) RESEARCH AREAS.—Research areas may include—

''(A) radio frequency emissions and interference, including technologies and techniques to mitigate such emissions;

''(B) advanced antenna arrays and artificial intelligence systems capable of operating advanced antenna arrays;

''(C) artificial intelligence systems to enable internet of things networks, immersive technology, and other advanced communications technologies;

''(D) network sensing and monitoring technologies;

''(E) technologies to enable spectrum flexibility and agility;

''(F) optical and quantum communications technologies;

''(G) security of advanced communications systems and their supply chains;

''(H) public safety communications;

''(I) resilient internet of things applications for advanced manufacturing; and

''(J) other research areas deemed necessary by the Director.

''(3) TEST BEDS.—In coordination with the private sector and other Federal agencies as appropriate, the Director may develop and manage testbeds for research and development of advanced communications technologies.

''(4) OUTREACH.—In carrying out the activities under this subsection, the Director shall seek input from other Federal agencies and from private sector stakeholders, on an ongoing basis, to help inform research and development priorities, including through workshops and other multi-stakeholder activities.

''(5) TECHNICAL ROADMAPS.—In carrying out the activities under this subsection, the Director shall convene industry, institutions of higher education, nonprofit organizations, Federal laboratories, and other Federal agencies engaged in advanced

communications research and development to develop, and periodically update, coordinated technical roadmaps for advanced communications research in priority areas, such as those described in paragraph (2).

''(b) NATIONAL ADVANCED SPECTRUM AND COMMUNICATIONS TEST NETWORK.—

''(1) IN GENERAL.—The Director, in coordination with the Administrator of the National Telecommunications and Information Administration and heads of other Federal agencies, as appropriate, shall operate a national network of test facilities, including operating or coordinating the use of intellectual capacity, modeling and simulation, laboratories, test ranges and test beds, to be known as the National Advanced Spectrum and Commutations Test Network (referred to in this section as 'NASCTN').

''(2) PURPOSES.—NASCTN shall be for the purposes of—

''(A) developing methodologies for testing, measuring interference, and setting guidelines for interference;

''(B) conducting interference tests to better understand the impact of Federal and commercial spectrum activities;

''(C) conducting research and testing to improve spectrum interference tolerance, flexibility, and agility; and

''(D) other activities as deemed necessary by the Director.

''(3) PARTNERSHIPS WITH OTHER FEDERAL AGENCIES.—In addition to such sums as may be authorized to be appropriated or otherwise made available to carry out this section, the Director may accept funds from other departments and agencies of the Federal Government, and from the State and local governments, to operate the national network under this section.''.

**SEC. 211. NEUTRON SCATTERING.**

(a) STRATEGIC PLAN FOR THE INSTITUTE NEUTRON REACTOR.—The Director shall develop a strategic plan for the future of the Institute Center for Neutron Research after the current neutron reactor is decommissioned, including—

(1) a succession plan for the reactor, including a roadmap with timeline and milestones;

(2) conceptual design of a new reactor and accompanying facilities, as appropriate; and

(3) a plan to minimize disruptions to the user community during the transition.

(b) COORDINATION WITH THE DEPARTMENT OF ENERGY.—The Secretary, acting through the Director, shall coordinate with the Secretary of Energy on issues related to Federal support for neutron science, including estimation of long-term needs for research using neutron sources, and planning efforts for future facilities to meet such need.

(c) REPORT TO CONGRESS.—Not later than 18 months after the enactment of this Act, the Director shall submit to Congress the plan required under subsection (a), and shall notify Congress of any substantial updates to such plan in subsequent years.

**SEC. 212. QUANTUM INFORMATION SCIENCE.**

(a) IN GENERAL.—The Director shall continue to prioritize and carry out activities authorized in the National Quantum Initiative Act (15 U.S.C. 8801).

(b) QUANTUM RESEARCH.—Section 201(a) of the National Quantum Initiative Act (15 U.S.C. 8831) is amended—

(1) in paragraph (3), by striking ''and'' at the end;

(2) in paragraph (4), striking the period at the end and inserting a semicolon;

(3) by redesignating paragraphs (3) through (4) as paragraphs (6) through (7); and

(4) by inserting after paragraph (2) the following:

''(3) shall carry out research to facilitate the development and standardization of quantum cryptography and post-quantum classical cryptography;

''(4) shall carry out research to facilitate the development and standardization of quantum networking and communications technologies and applications, including—

''(A) quantum repeater technology;

''(B) quantum network traffic management;

''(C) quantum transduction;

''(D) long baseline entanglement and teleportation; and

''(E) such other technologies, processes, or applications as the Under Secretary considers appropriate;

''(5) shall, for quantum technologies deemed by the Director to be at a readiness level sufficient for standardization, the Director shall provide technical review and assistance to such other Federal agencies as the Director considers appropriate for the development of quantum network infrastructure standards;''.

**SEC. 213. ARTIFICIAL INTELLIGENCE.**

The Director shall continue to support the development of artificial intelligence and data science, and carry out the activities of the National Artificial Intelligence Initiative Act of 2020 authorized in division E of the National Defense Authorization Act for Fiscal Year 2021 (Public Law 116–283), including through—

(1) expanding the Institute's capabilities, including scientific staff and research infrastructure;

(2) supporting measurement research and development for advanced computer chips and hardware designed for artificial intelligence systems;

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

(4) creating a framework for managing risks associated with artificial intelligence systems; and

(5) developing and publishing cybersecurity tools, encryption methods, and best practices for artificial intelligence and data science.

# TITLE III—GENERAL ACTIVITIES

**SEC. 301. NIST FACILITIES AND CONSTRUCTION.**

(a) OWNERSHIP, OPERATION, AND LEASING OF FACILITIES.—Section 14 of the National Institute of Standards and Technology Act (15 U.S.C. 278d) is amended by adding at the end the following:

''(c) OWNERSHIP, OPERATION, AND LEASING OF FACILITIES.—Within the limits of funds which are appropriated for the Institute, the Secretary is authorized to own, operate, or lease research facilities in locations throughout the United States and its territories in furtherance of its mission, provided that no agreement is entered into to own, operate, or lease without first notifying the appropriate Congressional Committees of jurisdiction.''.

(b) FACILITIES MODERNIZATION FUND.—Section 14 of such Act (15 U.S.C. 278d), as amended by subsection (a), is further amended by adding at the end the following:

''(d) FACILITIES MODERNIZATION FUND.—

''(1) ESTABLISHMENT.—There is established in the Treasury of the United States a fund to be known as the 'NIST Facilities Modernization Fund' (hereafter in this section referred to as the 'Fund').

''(2) USE OF FUNDS.—Amounts in the Fund shall be available to Secretary, acting through the Director, for Capital Projects on the Institute's campuses for the modernization and construction of research facilities needed to conduct leading edge scientific and technical research.

''(3) CONTENTS OF FUND.—The Funds shall consist of the following amounts:

''(A) Such amounts as may be appropriated by law.

''(B) Interest earned on the balance of the Fund.

''(4) AUTHORIZATION OF FUNDS.—Of the funds authorized to be appropriated in section 302 of the National Institute of Standards and Technology For the Future Act of 2021 for the construction and renovation of facilities, $80,000,000 for each of the fiscal years 2022 through 2026 shall be provided for the Fund established in subsection (a).

''(5) CONTINUING AVAILABILITY OF FUNDS.—Amounts in the Fund are available without regard to fiscal year limitation.

''(6) NOTIFICATION TO COMMITTEES.—Upon making any obligation or expenditure of any amount in the Fund, the Secretary, through the Director, shall notify the Committee on Science, Space, and Technology of the House of Representatives, the Committee on Commerce, Science, and Transportation of the Senate, the Committee on Appropriations of the House of Representatives and the Committee on Appropriations of the Senate of the amount and purpose of the obligation or expenditure.

''(7) NIST FACILITIES MODERNIZATION AND MAINTENANCE PLAN.—

''(A) IN GENERAL.—To carry out the program authorized in subsection (a), the Secretary, acting through the Director, shall develop and submit to Congress a 5-year modernization and maintenance plan for the National Institute of Standards and Technology's campuses.

''(B) TIMING.—The modernization and maintenance plan required in paragraph (1) shall be submitted to Congress not later than 30 days after the date of enactment of the National Institute of Standards and Technology For the Future Act of 2021, and an update shall be submitted to Congress annually thereafter.

''(C) COMPONENTS.—The plan required in paragraph (1) shall include, with respect to the 5-year period beginning on the date of the submission or update, the following:

''(i) A list of Capital Construction Projects expected to be undertaken during such period, the core capabilities these facilities will provide, climate-resilience plan-

ning efforts, anticipated schedule of construction, and anticipated funding requirements.

''(ii) A list of planned utility infrastructure projects expected to be undertaken during such periods, anticipated schedule of construction, and anticipated funding requirements.

''(iii) A list of planned IT infrastructure projects expected to be undertaken during such period, anticipated schedule of construction, and anticipated funding requirements.

''(iv) A list of the deferred maintenance projects expected to be undertaken during such period, anticipated schedule of construction, anticipated funding requirements, and an evaluation of progress made in reducing the deferred maintenance backlog.''.

**SEC. 302. EDUCATIONAL OUTREACH AND SUPPORT FOR UNDERREPRESENTED COMMUNITIES.**

Section 18 of the National Institute of Standards and Technology Act (15 U.S.C. 278g-1) is amended—

(1) in subsection (a), in the second sentence—

(A) by striking ''may'' and inserting ''shall''; and

(B) by striking ''academia'' and inserting ''diverse types of institutions of higher education''; and

(2) in subsection (e)—

(A) in paragraph (4), by striking ''and'' at the end;

(B) in paragraph (5), by striking the period at the end and inserting ''; and''; and

(C) by inserting after paragraph (5) the following:

''(6) conduct outreach to and develop research collaborations with historically black colleges and universities and minority-serving institutions, including through the recruitment of students and faculty at such institutions to participate in programs developed under paragraph (3); and

''(7) carry out other activities to increase the participation of persons historically underrepresented in STEM in the Institute's programs.''.

**SEC. 303. OTHER TRANSACTIONS AUTHORITY.**

Section 2(b)(4) of the National Institute of Standards and Technology Act (15 U.S.C. 272(b)(4)) is amended to read as follows:

''(4) to 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 its work and on such terms as it may deem appropriate, in furtherance of the purposes of this Act;''.

**SEC. 304. INTERNATIONAL STANDARDS DEVELOPMENT.**

(a) INTERNATIONAL STANDARDS ENGAGEMENT.—

(1) IN GENERAL.—The Director shall lead information exchange and coordination among Federal agencies and communication from Federal agencies to the private sector of the United States to ensure effective Federal engagement in the development and use of international technical standards.

(2) REQUIREMENTS.—To support private sector-led engagement and ensure effective Federal engagement in the development and use of international technical standards, the Director shall consider—

(A) the role and needs of the Federal Government with respect to international technical standards;

(B) organizations developing international technical standards of interest to the United

States, United States representation and influence in these organizations, and key contributors for technical and leadership expertise in these organizations;

(C) support for persons with domain subject matter expertise, especially from small businesses located in the United States, to influence and engage in technical standards leadership positions, working groups and meetings;

(D) opportunities for partnerships for supporting international technical standards from across the Federal Government, federally funded research and development centers, university-affiliated research centers, institutions of higher education, industry, industry associations, nonprofit organizations, and other key contributors;

(E) support for activities to encourage the adoption of technical standards developed in the United States to be adopted by international standards organizations; and

(F) other activities determined by the Director to be necessary to support United States participation in international standards development, economic competitiveness, and national

security in the development and use of international technical standards.

(b) CAPACITY BUILDING GUIDANCE.—The Director shall support education and workforce development efforts to promote United States participation in international standards organizations. The Director shall—

(1) identify and create, as appropriate, technical standards education and training resources for interested businesses, industry associations, academia, nonprofits, Federal agencies, and other relevant standards contributors, including activities targeted at integrating standards content into undergraduate and graduate curricula in science, engineering, business, public policy, and law;

(2) conduct outreach, including to private sector leaders, to support engagement by more United States stakeholders in international technical standards development; and

(3) other activities deemed necessary by the Director to support increased engagement, influence, and leadership of United States organizations in the development of international technical standards.

(c) CAPACITY BUILDING PILOT PROGRAM.—

(1) IN GENERAL.—The Director, in coordination with the Director of the National Science Foun-

dation, the Administrator of the Small Business Administration and the heads of other relevant Federal agencies, as appropriate, shall establish a 5-year pilot program to award grants, on a merit-reviewed, competitive basis, to private sector entities, nonprofit institutions, and based in the United States to support increased participation by small business and academic interests in international standards organizations.

(2) ACTIVITIES.—In carrying out the grants established in subsection (c), the Director shall award competitive, merit-reviewed grants to covered entities to cover the reasonable costs, up to a specified ceiling set by the Director, of activities supporting increased engagement and leadership of employees of small businesses and faculty of institutions of higher education or other nonprofit research institutions with subject matter expertise in international standards organizations.

(3) AWARD CRITERIA.—The Director may only provide a grant under this section to an eligible recipient that—

(A) demonstrates deep technical standards expertise;

(B) demonstrates facility with the processes of the standards development organization in which the recipient intends to engage using grant funds;

(C) proposes a feasible set of standard deliverables to be completed over the period of the grant;

(D) explains how the recipient will fund the standards work supported by the grant if the grant funds are insufficient to cover all costs of the work; and

(E) commits personnel with appropriate expertise to engage in relevant international organizations responsible for developing technical standards over the period of the grant.

(4) ELIGIBILITY.—A small business concern (as defined in section 3 of the Small Business Act (15 U.S.C. 632) based in the United States, an institution of higher education (as defined by section 102 of the Higher Education Act of 1965 (20 U.S. C. 1002)), or a nonprofit institution as defined in section 4(5) of the Stevenson-Wydler Act (15 U.S.C. 3703) shall be eligible to receive grants under this program.

(5) PRIORITIZATION.—The Director may prioritize grants awarded under this section to eligible recipients proposals for standards development that address clearly defined current or anticipated market needs or gaps that would not be met without the grant.

(6) APPLICATION.—An eligible recipient seeking funding under subsection (c) shall submit an application to the Director at such time, in such manner, and containing such information as the Director may require.

(7) MERIT REVIEW PROCESS.—Not later than 90 days after the enactment of this Act, the Director shall establish a merit review process, including the creation of merit review panels made of experts from government and the private sector, to evaluate the application under paragraph (5) to ensure applications submitted are reviewed in a fair, competitive, transparent, and in-depth manner.

(8) CONSULTATION.—In carrying out the pilot program established under subsection (c), the Director shall consult with other Federal agencies, private sector organizations, institutions of higher education, and nonprofit organizations to help inform the pilot program, including selection criteria, appli-

cant disclosure requirements, grant amount and duration, and the merit review process.

(9) REPORT TO CONGRESS.—The Director shall brief Congress after the second year of the pilot program and each year following that includes the following:

(A) An assessment of the effectiveness of the pilot program for improving the participation of United States small businesses, United States institutions of higher education, or other nonprofit research institutions in international standards organizations, including—

(i) the type of activities supported, including leadership roles;

(ii) the international standards organizations participated in; and

(iii) the technical areas covered by the activities.

(B) If deemed effective, a plan for permanent implementation of the pilot program.

**SEC. 305. UPDATE TO MANUFACTURING EXTENSION PARTNERSHIP.**

(a) ACCEPTANCE OF FUNDS.—Section 25(l) of the National Institute of Standards and Technology Act (15 U.S.C. 278k(l)) is amended to read as follows:

''(l) ACCEPTANCE OF FUNDS.—

''(1) IN GENERAL.—In addition to such sums as may be appropriated to the Secretary and Director to operate the Program, the Secretary and Director may also accept funds from other Federal departments and agencies, as well as funds provided by the private sector pursuant to section 2(c)(7) of this Act (15 U.S.C. 272(c)(7)), to be available to the extent provided by appropriations Acts, for the purpose of strengthening United States manufacturing.

''(2) COMPETITIVE AWARDS.—Funds accepted from other Federal departments and agencies and from the private sector under paragraph (1) shall be awarded competitively by the Secretary and by the Director to Manufacturing Extension Partnership Centers, provided that the Secretary and Director may make non-competitive awards, pursuant to this section or section 25A, or as a non-competitive contract, as appropriate, if the Secretary and the Director determine that—

''(A) the manufacturing market or sector targeted is limited geographically or in scope;

''(B) the number of States (or territory, in the case of Puerto Rico) with Manufacturing Extension Partnership Centers serving manu-

facturers of such market or sector is five or fewer; and

''(C) such Manufacturing Extension Partnership Center or Centers has received a positive evaluation in the most recent evaluation conducted pursuant to subsection (g).''.

(b) INCLUSION OF CERTAIN SCHOOLS.—Section 25 of the National Institute of Standards and Technology Act (15 U.S.C. 278k) is amended—

(1) in subsection (c)—

(A) in paragraph (6), by striking ''community colleges and area career and technical education schools'' and inserting ''secondary schools (as defined in section 8101 of the Elementary and Secondary Education Act of 1965 (20 U.S.C. 7801)), community colleges, and area career and technical education schools, including those in underserved and rural communities,''; and

(B) in paragraph (7)—

(i) by striking ''and local colleges'' and inserting ''local high schools and local colleges, including those in underserved and rural communities,''; and

(ii) by inserting ''or other applied learning opportunities'' after ''apprenticeships''; and

(2) in subsection (d)(3), by striking '', community colleges, and area career and technical education schools,'' and inserting ''and local high schools, community colleges, and area career and technical education schools, including those in underserved and rural communities,''.

**SEC. 306. STANDARD TECHNICAL UPDATE.**

(a) NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY ACT UPDATES.—The National Institute of Standards and Technology Act (15 U.S.C. 271) is amended—

(1) in section 15—

(A) in subsection (b), by striking the period at the end and inserting a semicolon;

(B) in subsection (g), by striking ''and'' after the semicolon; and

(C) by striking the period at the end and inserting ''; and (i) the protection of Institute buildings and other plant facilities, equipment, and property, and of employees, associates, or visitors, located therein or associated therewith, notwithstanding any other provision of law, the

direction of such of the officers and employees of the Institute as the Secretary deems necessary in the public interest hereafter to carry firearms while in the conduct of their official duties, and the authorization of employees of contractors and subcontractors of the Institute who are engaged in the protection of property owned by the United States, and located at facilities owned by, leased, used or under the control of the United States, to carry firearms while in the conduct of their official duties, and, under regulations prescribed by the Secretary and approved by the Attorney General, the authorization of officers and employees of the Institute and of its contractors and subcontractors authorized to carry firearms hereafter to arrest without warrant for any offense against the United States committed in their presence, or for any felony cognizable under the laws of the United States if they have reasonable grounds to believe that the person to be arrested has committed or is committing such felony, provided that such authority to make arrests may be exercised only while guarding and protecting buildings and other plant facilities,

equipment, and property owned or leased by, used or under the control of, the United States under the administration and control of the Secretary.''; and

(2) by amending section 17(a) to read as follows:

''(a) The Secretary is authorized, notwithstanding any other provision of law, to expend such sums, within the limit of appropriated funds, as the Secretary may deem desirable through direct support for activities of international organizations and foreign national metrology institutes with which the Institute cooperates to advance measurement methods, technical standards, and related basic technologies, for official representation, to host official receptions, dinners, and similar events, and to otherwise extend official courtesies, including transportation of foreign dignitaries and representatives of foreign national metrology institutes to and from the Institute, for the purpose of maintaining the standing and prestige of the Department of Commerce and the Institute, through the grant of fellowships or other appropriate form of financial or logistical assistance or support to foreign nationals not in service to the Government of the United States while they are performing scientific or engineering work at the

Institute or participating in the exchange of scientific or technical information at the Institute.''.

(b) STEVENSON-WYDLER UPDATES.—The Stevenson-Wydler Technology Innovation Act of 1980 (15 U.S.C. 3701) is amended—

(1) in section 17(c)(1)—

(A) by moving each of subparagraphs (D) and (E) two ems to the left; and

(B) by adding at the end the following:

''(G) Community.''; and

(2) in section 23(a)—

(A) by redesignating paragraphs (1) and (2) as paragraphs (2) and (3), respectively; and

(B) by inserting before paragraph (2), as so redesignated, the following:

''(1) accept, apply for, use, and spend Federal, State, and nongovernmental acquisition and assistance funds to further the purposes of this Act as well as share personnel, associates, facilities, and property with these partner organizations, with or without reimbursement, upon mutual agreement: *Provided*, That the approving official may waive statutory and regulatory administrative provisions so that a single agency may administer a joint program, upon mutual agreement;''.

(c) AMERICAN INNOVATION AND COMPETITIVENESS ACT UPDATE.—Section 113 of the American Innovation and Competitiveness Act (15 U.S.C. 278e note) is repealed.

(d) FEDERAL ENERGY MANAGEMENT IMPROVEMENT ACT UPDATE.—Section 4 of the Federal Energy Management Improvement Act of 1988 (15 U.S.C. 5001) is amended by striking ''Secretary of Commerce'' and ''Secretary'' each place either such term appears and inserting ''Consumer Product Safety Commission''.