

# SECURING AMERICAN LEADERSHIP IN SCIENCE AND TECHNOLOGY ACT OF 2021

## Section-by-Section

### *Section 1. Short Title.*

This section establishes the short title for the bill as the “Securing American Leadership in Science and Technology Act of 2021.”

### *Section 2. Table of Contents.*

This section establishes a table of contents for the bill.

### *Section 3. Purposes.*

The purpose of this act is to ensure the continued leadership of the U.S. in science and technology by providing for a coordinated nation science and technology strategy for the economic and national security of the U.S.; prioritizing investment in in Federal basic research by authorizing a doubling of basic research funding over the next 10 years at the Department of Energy (DOE), the National Science Foundation (NSF), the National Institute of Standards and Technology (NIST), and the National Oceanic and Atmospheric Administration (NOAA); providing for investment in the key areas necessary for the competitiveness of the U.S., including computing, cybersecurity, artificial intelligence and autonomous technology, materials and advanced manufacturing, energy and climate, and biosciences; providing for investment in critical science and technology infrastructure to maintain world-class research and user facilities; expanding STEM workforce at all levels to meet the demands of a 21<sup>st</sup> Century economy; promoting regional innovation to support local economic growth across all regions of the U.S.; maximizing the effectiveness of the Federal Government’s research and development activities; promoting collaboration among the Federal Government, Federal laboratories, universities, and industry; and improving technology transfer from the Federal Government and Federal laboratories to the private sector for commercialization.

## *Title I – National Science and Technology Strategy and Office of Science and Technology Policy*

### *Subtitle A – National Science and Technology Strategy*

#### *Section 101. National science and technology strategy.*

This section amends the National Science and Technology Policy, Organization, and Priorities Act of 1976 to authorize a National Science and Technology strategy for the U.S. every 4 years.

The Director of the OSTP, in consultation with the National Science and Technology Council, shall develop and submit to Congress a comprehensive national science and technology strategy of the U.S. to meet national research and development objectives for the following 4-year period.

The President shall submit to Congress an annual report on the national science and technology strategy of the U.S. Each report shall include a description of strategic objectives and priorities necessary to maintain the leadership of the U.S. in science in technology, including near-term, medium-term, and long-term research priorities; programs, policies, and activities that the President recommends across all Federal agencies; global trends in science and technology, including potential threats to the leadership of the U.S. in science and technology.

*Section 102. Quadrennial science and technology review.*

This section amends the National Science and Technology Policy, Organization, and Priorities Act of 1976 by inserting section an additional section which authorizes a quadrennial review for U.S. Science and Technology.

Every 4 years, OSTP shall complete a review of the science and technology enterprise of the U.S. The review shall be a comprehensive examination of the science and technology strategy of the U.S., including recommendations for maintaining global leadership in science and technology. In each quadrennial science and technology review, the Director shall provide and integrated view of, and recommendations for, science and technology policy across the Federal government, while considering economic and national security; assess and recommend priorities for research, development and demonstration programs to maintain American leadership in science and technology; assess global competition in science and technology and identify potential threats to the leadership of the U.S. in science and technology; assess and make recommendations on the STEM workforce in the U.S.; assess and make recommendations to improve regional innovation across the U.S.; assess and identify infrastructure tools needed to maintain the leadership of the U.S. in science and technology; and review administrative or legislative policies that affect the science and technology enterprise and identify and make recommendations on policies that hinder research and development in the U.S.

*Subtitle B – Office of Science and Technology Policy*

*Section 111. Authorization of appropriations.*

This section authorizes appropriations for fiscal years 2022-2031 to be appropriated for the Office of Science and Technology Policy.

*Title II – Research Security and Integrity*

*Section 201. Foreign talent program prohibition*

This section directs Federal research agencies to develop a policy to prohibit all agency personnel from participating in a foreign government talent recruiting program.

*Section 202. Computing enclave pilot program.*

This section directs the Directors of the National Science Foundation (NSF), National Institute of Standards and Technology (NIST), and Secretary of Energy to award grants to establish a pilot program to ensure the security of federally supported research data and to assist regional institutions of higher education and their researchers in compliance with regulations regarding

the safeguarding of sensitive information and other relevant research guidelines. The Director of the NSF shall select three institutions of higher education with very high levels of research activity and with a history of working with secure information for the development, installation, maintenance, or sustainment of secure computing enclaves.

The Director of the NSF shall work with the institutions of higher education to develop an approved design blueprint for compliance with Federal data protection protocols; develop a comprehensive and confidential list, or a bill of materials, of each binary component of the software, firmware, or product that is required to deploy additional secure computing enclaves; develop templates for all policies and procedures required to operate the secure computing enclave in a research setting; develop a system security plan template; and develop a process for managing a plan of action and milestones for the secure computing enclave. The pilot program shall operate for no less than 3 years and the Director of the NSF shall submit a report to Congress no later than 6 months after the completion of the pilot program with an assessment of the pilot program, including an assessment of the security benefits provided by such secure computing enclaves; recommendations related to the value of expanding the network of secure computing enclaves; and recommendations on the efficiency of the use of secure computing enclaves by other Federal agencies in a broader effort to expand security of Federal research.

*Section 203. Protecting research from cyber theft.*

This section amends the National Institute of Standards and Technology Act to improve cybersecurity of institutions of higher learning. No later than 90 days after the enactment of this Act, the Director of the National Institute of Standards and Technology shall disseminate and make publicly available resources to help research institutions and institutions of higher education identify, assess, manage, and reduce their cybersecurity risk related to conducting research.

*Section 204. Chinese research funds accounting act.*

This section directs the Comptroller General of the United States to conduct a study on Federal funding made available to covered entities for research during the study period. The study shall also include an assessment of the total number and types of covered entities of whom such funding was made available; the requirements relating to the awarding, tracking, and monitoring of such funding; any other data available with respect to Federal funding made available to covered entities for research; and other matters the Comptroller General determines appropriate.

This section also directs the Comptroller General no later than 120 days after the date of the enactment of this Act to brief the Committee on Science, Space, and Technology and the Committee on Foreign Affairs of the House of Representatives and the Committee on Commerce, Science, and Transportation and the Committee on Foreign Relations of the Senate on the data that is available with respect to Federal funding made available to covered entities for research. This section also directs the Comptroller General to submit a report to the respective Congressional committees no later than 240 days after the date of the enactment of this Act on the findings of the study conducted in this section.

### *Title III – Supply Chain and Critical Materials Security*

#### *Section 301. National supply chain database.*

This section directs the Director of NIST to establish a National Supply Chain Database to assist the Federal government and industry sectors in minimizing disruptions to the United States supply chain by having an assessment of United States manufacturers' capabilities. The National Supply Chain Database shall be carried out and managed through the Hollings Manufacturing Extension Partnership program of the National Institute of Standards and Technology. The National Supply Chain Database shall be capable of providing a national view of the supply chain and enable authorized database users to determine in near real-time the United States manufacturing capabilities for critical products, including defense supplies, food, and medical devices, including PPE. The Director shall maintain the National Supply Chain Database and integrate State level databases from each State's Manufacturing Extension Partnership Center.

#### *Section 302. Critical minerals mining research and development at the National Science Foundation.*

This section directs the Director to award grants to support basic research that will accelerate innovation to advance critical minerals mining strategies and technologies for the purpose of making better use of domestic resources and eliminating national reliance on minerals and mineral materials that are subject to supply chain disruptions.

#### *Section 303. Advanced recycling research and development.*

This section directs the Secretary of Energy to carry out a research, development, and demonstration program to accelerate innovation in energy-efficient recyclable plastics, next-generation plastics, and composites recycling and upcycling strategies and technologies in order to increase the economic value of plastics supply streams and to reduce the environmental impact of global plastics consumption. The Secretary shall develop novel collection and sorting technologies to prevent plastics and composites, including waterborne plastics, from entering landfills and the marine environment; develop biological, chemical, and hybrid bio-chemical technologies and methods for deconstructing plastic and composite waste, including environmental waste, into useful chemical and material streams; develop technologies to upcycle waste, including chemical, material, and gaseous streams, into higher-value products; develop new economically recyclable by-design plastics and composites that can be scaled for domestic manufacturability and recovery; develop new energy-efficient advanced manufacturing techniques for reclaimed plastics and composites; and develop new data collection methods and practices in collaboration with relevant Federal agencies. The Secretary shall periodically review activities carried out under the program to determine the achievement of technical milestones as determined by the Secretary. This section authorizes appropriations for fiscal years 2022-2026 to carry out the program.

This section directs the Secretary to carry out a research, development, and demonstration program to support the development of advanced materials for batteries with considerations given to resource availability and environmentally benign disposal and recycling; innovative technologies to reclaim and recycle critical materials from advanced lithium-ion battery

technologies used in consumer electronics, defense, stationary storage, and transportation appliances. The Secretary shall promote the discovery of new domestically sourced raw materials for batteries; develop innovative and cost-effective technologies and processes for the collection, storage, and transportation of discarded lithium-ion batteries that use domestic mining resources and increase availability of domestically sourced raw materials for batteries; and develop cost-effective recycling processes to recover critical materials from discarded lithium-ion batteries and enable their reintroduction in new lithium-ion cell technologies and for use in other relevant industries. The Secretary shall leverage expertise from the Basic Energy Science Program of the Office of Science; the Office of Energy Efficiency and Renewable Energy; and the Office of Technology Transitions. The Secretary shall periodically review activities carried out under the program to determine the achievement of technical milestones as determined by the Secretary. This section authorizes appropriations for fiscal years 2022-2026 to carry out the program.

*Section 304. Critical minerals interagency subcommittee.*

This section directs the Critical Minerals Subcommittee of the National Science and Technology Council to coordinate Federal science and technology efforts to ensure secure and reliable supplies of critical minerals to the United States. The Subcommittee shall advise and assist the Committee on Homeland and National Security and the National Science and Technology Council on the United States policies, procedures, and plans as it relates to critical minerals; to identify emerging opportunities, stimulate international cooperation, and foster the development of secure and reliable supply chains of critical minerals; ensure the transparency of information and data related to critical minerals; and provide recommendations on coordination and collaboration among the research, development, and deployment programs and activities of Federal agencies to promote a secure and reliable supply of critical minerals necessary to maintain national security, economic well-being, and industrial production.

*Section 305. Heavy freight autonomous trucking research corridor.*

This section directs the Secretary of Transportation no later than 1 year after the date on enactment of this Act to establish a Heavy Freight Autonomous Trucking Research Initiative to lay the foundation for the broad scale adoption of autonomous freight trucking. The Secretary shall support and conduct research and development on automated and connected freight trucking with private industry, and industry associations, other Federal agencies, State and local Transportation agencies, research universities, and a National Transportation center and support or establish a heavy freight autonomous trucking research and development corridor and related pilot programs. The Secretary shall establish an agenda for research and development that including analyzing, modeling, and piloting the feasibility and benefits of dedicated autonomous trucking corridors and providing deployment guidance. This section states that institutions of higher learning or consortiums of nonprofits and institutions of higher education shall be eligible to receive grants under this program. This section authorizes appropriations for fiscal years 2022-2026 to carry out the program.

*Section 306. NIST UAV challenges and credentialing program.*

This section directs the Secretary of the National Institute of Standards and Technology to carry out a program to partner with academic institutions to award prizes competitively to stimulate research and development of innovative unmanned aerial vehicle (UAV) technologies to expand upon and improve emergency response operations. No later than 60 days after the date on which a prize is awarded under the prize challenges, the Secretary shall submit to Congress a report that describes the winning proposal of the challenge. This section also directs the Secretary to establish the measurements and standards infrastructure necessary for credentialing remote pilots, including implementation and demonstration of distributed pilot training and evaluation using standard test methods, and support flight test simulations. This section authorizes appropriations for fiscal years 2022-2032 to carry out the section.

*Title IV – Department of Energy*

*Subtitle A – Office of Science*

*Section 401. Definitions.*

This section defines the terms “Department,” “Director,” “National Laboratory,” and “Secretary.”

*Section 402. Basic energy science.*

This section authorizes funding for a program in basic energy sciences, including materials sciences and engineering, chemical sciences, physical biosciences, and geosciences in order to provide the foundations for new energy technologies and support the Department’s missions in energy, environment, and national security. Within this program, this section authorizes upgrades and construction of basic energy sciences infrastructure, including the Advanced Photon Source upgrade, Spallation Neutron Source Proton Power Upgrade, Spallation Neutron Source Second Target Station, Advanced Light Source Upgrade, and Linac Coherent Light Source II High Energy Upgrade.

This section also specifically authorizes funding for research and development programs in artificial photosynthesis, multivalent systems, and electrochemistry modeling. This section also authorizes Computational Materials and Chemistry Science Centers and a Materials Research Database.

*Section 403. Advanced scientific computing research.*

This section authorizes programs to achieve computing systems with capabilities beyond exascale computing systems, applied mathematics and software development for high-end computing systems, and advanced energy efficient computing technologies and practices. This section also authorizes a research and development program in artificial intelligence, data analytics, and computational research.

This section also authorizes upgrades to the Energy Sciences Network (ESnet) and directs the Department to support a computational science graduate fellowship program and the development of an advanced scientific computing workforce.

This section also amends the National Quantum Initiative Act by directing the Secretary to carry out a research, development, and demonstration program to accelerate innovation in quantum network infrastructure in coordination with the National Science Foundation (NSF), National Institute of Standards and Technology (NIST), subcommittee on Quantum Information Science of the National Science and Technology Council, and Subcommittee on Economic and Security Implications of Quantum Science. No later than 180 days after the enactment of this Act, the Secretary shall submit a report to Congress a 4-year research plan that identifies and prioritizes basic research needs related to quantum network infrastructure. No later than 90 days after the enactment of this Act, the Secretary must establish and carry out a program to encourage and facilitate access to United States quantum computing hardware and quantum computing clouds for research purposes. This section also authorizes appropriations for fiscal years 2022-2026 to carry out activities in this section.

#### *Section 404. High energy physics.*

This section establishes a program to research the fundamental constituents of matter, energy, and the nature of space and time to support fundamental accelerator science and technology. In carrying out these activities, the Director is instructed to ensure access of U.S. researchers to the most advanced accelerator facilities and research capabilities in the world, including the Large Hadron Collider and to carry out a program in accelerator and detector research and development.

Within this program, this section authorizes the construction of the Long-Baseline Neutrino Facility (LBNF). This facility will be used to run the Deep Underground Neutrino Experiment (DUNE), which will enable fundamental research of neutrinos and their properties. This section also authorizes the Proton Improvement Plan II upgrade (PIP-II) to the Fermilab accelerator complex to provide the world's most intense beam of neutrinos to the international LBNF/DUNE experiment as well as a broad range of future high energy physics experiments. This section also authorizes the Cosmic Microwave Background Stage 4 experiment and a cryomodule repair and maintenance facility.

#### *Section 405. Biological and environmental research.*

This section authorizes biological systems science research activities to increase understanding of complex biological systems to accelerate breakthroughs in the sustainable production of biomass-based liquid transportation fuels, bioenergy, and biobased materials. This section authorizes up to four Bioenergy Research Centers to conduct basic and fundamental research. This section authorizes appropriations for a basic research program on low-dose radiation within the Office of Science at the DOE and creates a low-dose and space radiation program in coordination with NASA. This section authorizes a program on earth and environmental systems modeling and analysis, including atmospheric data user facilities in coordination with the National Oceanic and Atmospheric Administration (NOAA), and the EPA. Additionally, this section authorizes the establishment of a coastal zone research initiative, including a national

system for coastal data collection. This section also establishes an emerging infectious disease research program.

*Section 406. Fusion energy.*

This section authorizes a high-performance computing collaborative research program for fusion energy sciences and establishes a high-performance computing for fusion innovation hub. This section also establishes a brightest light research initiative to enable the development of laser technologies necessary for discovery science, authorizes the construction of key fusion energy experiments and instruments like the Material Plasma Exposure Experiment and Matter in Extreme Conditions Instrument Upgrade, and extends funding for U.S. contributions to the ITER project

*Section 407. Nuclear physics.*

This section specifically authorizes the construction of and instrumentation of key nuclear physics user facilities such as the Facility for Rare Isotope Beams (FRIB) in order to enable the study of a variety of rare isotopes and their properties, and the and the Electron Ion Collider (EIC) in order to expand our understanding of internal structure of the proton and the nucleus and answer fundamental questions about the nature of visible matter.

*Section 408. Science laboratories infrastructure program.*

This section requires the Director to establish a mid-scale instrumentation program to support national laboratory user facilities.

*Section 409. Authorization of appropriations.*

This section authorizes appropriations for fiscal years 2022-2031 to the Secretary for the Office of Science.

*Subtitle B – Advanced Research Projects Agency-Energy*

*Section 411. Advanced Research Projects Agency-Energy.*

This section amends the America COMPETES Act by authorizing additional appropriations for fiscal years 2026-3031.

*Subtitle C –DOE Clean Energy Infrastructure*

*Section 421. Regional Energy Innovation Centers.*

This section defines the terms “Advanced Energy Technology,” and Qualifying Entity.” This section authorizes a program to establish and operate Regional Energy Innovation Centers (REICs) in diverse regions of the United States, each with a technology development focus.



*Section 422. Versatile neutron source.*

This section amends the Energy Policy Act of 2005 by authorizing additional appropriations for the Versatile Neutron Source for fiscal years 2026-2030.

*Section 423. Carbon sequestration research and development program.*

This section establishes an initiative focused on the evaluation the sequestration of carbon dioxide in geologic formations in order to enhance the scientific understanding of, and reduce uncertainties associated with, the effects of carbon dioxide stored in geologic formations for long and short term periods, and inform improved risk-assessment methods, risk-management practices, and standards with respect to the storage of carbon dioxide in geologic formations on large and small scale.

*Section 424. Frontier Observatory for Research in Geothermal Energy.*

This section extends appropriations for fiscal years 2026-2031 to carry out FORGE activities.

*Section 425. Energy Storage Grand Challenge.*

This section establishes an advanced energy storage technologies research initiative, including the authorization of grid-scale energy storage user facilitates.

*Section 426. Critical infrastructure research and construction.*

This section authorizes a program to support innovative systems and tools to help ensure the resilience and security of critical integrated grid infrastructures, including the authorization of a Critical Infrastructure Test Range.

*Title V – National Institute of Standards and Technology*

*Section 501. Findings.*

Highlights in the important role NIST plays as “industry’s lab.”

*Section 502. Authorization of appropriations.*

This section authorizes appropriations for fiscal years 2022-2029 to be appropriated for the National Institute of Standards and Technology, including 10-year doubling for basic research.

*Section 503. NIST facilities modernization fund.*

This section establishes the NIST Facilities Modernization Fund for the modernization and construction of research facilities needed to conduct leading edge scientific and technical research. This section authorizes appropriations for fiscal years 2022-2031 to be appropriated for the construction and maintenance of facilitates.

*Section 504. Cybersecurity research.*

This section directs the Secretary to expand NIST's ongoing cybersecurity research to include key questions relating to the measurement of privacy, security and vulnerability of software tools and communication networks by developing research and engineering capabilities to provide practical solutions to cybersecurity challenges, investing in cybersecurity measurement tools, and investing in tools to provide the U.S. with strong cybersecurity and encryption technologies.

*Section 505. Internet of things.*

This section states that the Secretary shall continue to conduct research to support the expanded, interconnected systems of the Internet of Things by: developing new tools and methodologies for the cybersecurity of the Internet of Things; developing technologies to address network congestion and device interference; convene experts in the public and private sectors to create best practices and guidelines; and develop and publish new cybersecurity tools, encryption methods, and best practices for Internet of Things security.

*Section 506. Composites research.*

This section states that the Secretary shall: implement recommendations to facilitate the adoption of composite technology in U.S. infrastructure; establish a design clearinghouse to identify, gather, validate, and disseminate existing composites design criteria; and develop resources for the testing and evaluation of uses for composite materials in infrastructure.

*Section 507. Enabling the future bioeconomy.*

This section states that the Secretary shall continue to support the research and development of engineering biology, through building up NIST's core capabilities in measurement science supporting synthetic biology by investing in foundational measurement tools; delivering the necessary measurement methods, standards and related services required to impart confidence in emerging engineering biology capabilities; and developing and evaluating computation tools in order to develop and deploy predictive models that will link biological blueprints and biological outcomes.

*Section 508. International standards development.*

This section prioritizes the role of U.S. participation in international standards development. This section also states that the Secretary shall build the capacity and training opportunities to create a pipeline of talent and leadership in key standards development positions; partner with private sector entities to support strategically increased engagement and leadership in the development of international standards for digital economy technologies; and develop approaches to prioritize standardization for emerging technologies, Identify organization in which to develop these standards; identify leadership positions of interest to the U.S.; and identify key contributors for technical and leadership expertise.

*Section 509. Review of the center for neutron research.*

This section implements an evaluation of NIST's Center for Neutron Research. The evaluation would conduct: an assessment of NIST's progress in planning for the future of the Center for Neutron's Research's nuclear reactor; an analysis of the extent NIST's planning efforts align with leading practices; an assessment of the extent NIST has worked with DOE to identify the scientific community's long-term needs for neutron research facilities; and recommendations for NIST and DOE on how to best support civilian nuclear research reactors.

*Section 510. Hiring and management.*

This section grants the Secretary the authority to appoint research, engineering, and professional personnel to carry out research and development work that requires specially qualified skills without regard to civil service laws. Pay rate will not exceed that of the Vice President of the United States and NIST is limited to appoint ten personnel to these positions. This provision also includes a five-year sunset. This section also grants authority to the Secretary to enter into cooperative research and development arrangements, grants, and work.

*Section 511. National institute of standards and technology foundation.*

This section establishes a nonprofit National Institute of Standards and Technology Foundation to support NIST in its mission. The Foundation may solicit and accept funds to support international metrology and standards engagement activity; conduct education and outreach activities; and offer direct support to NIST associates through fellowships, grants, and occupational safety and awareness training.

*Section 512. MEP outreach.*

This section amends the Manufacturing Extension Partnership (MEP) program to allow their education and workforce development activities to include outreach and engagement with local high schools, including those in underserved and rural communities.

*Section 513. Definitions.*

This section defines the terms "Director," "Framework," "Institute," "institution of higher education," "NIST associate" and "Secretary."

*Title VI – National Oceanic and Atmospheric Administration*

*Section 601. Establishment of a technology transfer office.*

This section directs the Under Secretary to establish a technology transfer office at the corporate agency level. This section also directs the Under Secretary to appoint a Technology Transfer Coordinator to be the principal advisor to the Under Secretary on all matters relating to technology transfer and commercialization and will serve as the director of the technology transfer office.

*Section 602. Technology transfer and transitions assessment.*

This section directs the Under Secretary to transmit a report to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Space, and Transportation of the Senate on the Agency's research to operations activities during the previous fiscal year and recommended agency policy changes to increase research to operations activities in the coming fiscal year.

*Section 603. National Mesonet program.*

This section authorizes the National Weather Service to carry out the National Mesonet Program to improve the understanding of forecast capabilities for atmospheric events, placing priority on leveraging available commercial and non-federal weather data to enhance coordination across the private, public, and academic sectors of the American weather enterprise. This National Mesonet Program will also continue to work towards meeting the National Weather Service's goal of 30-minute warning time for severe weather. This section also authorizes appropriations for fiscal years 2022-2027 to be appropriated out of funds otherwise available the National Weather Service to carry out this section.

*Section 604. Severe weather extramural testbeds.*

This section authorizes the Assistant Administrator for NOAA's Office of Ocean and Atmospheric Research to establish a program to create one or more weather research testbeds to develop improved understanding of and forecast capabilities for atmospheric events and their impacts. The program would focus on: improving the fundamental understanding of weather; improving the understanding of how the public receives, interprets, and responds to warnings and forecasts of high impact weather events that endanger life and property; and research and development, and transfer of knowledge, technologies, and applications to the National Weather Service and other appropriate agencies, including the U.S. weather industry and academic partners. This section authorizes appropriations for fiscal years 2022 and 2023 out of funds appropriated to NOAA to carry out this section.

*Section 605. Next generation digital radar.*

This section directs the National Weather Service to develop a program to accelerate research of next-generation phased array radar system to replace the current radar system. Such a program would demonstrate the ability to significantly improve the accuracy of severe weather forecasts while lowering long term federal operating costs. This section authorizes appropriations for fiscal years 2022 and 2023 out of funds appropriated for NOAA's Operations, Research and Facilities action to carry out this section.

*Section 606. Fellowships.*

This section states that the Administrator shall support a program of weather fellowships for qualified individuals at the graduate level of education in fields related to meteorology, atmospheric science, space weather, and climatology within NOAA.

*Section. 607. Commercial Data Report Update*

This section amends the Weather Research and Forecasting Innovation Act of 2017 to include an update on commercial data reporting requirements.

*Section 608. Report on National Weather Service Internet Bandwidth Shortage*

This section directs the Administrator no later than 6 months after the date of enactment of this Act to issue a report to the Committee on Commerce, Science, and Transportation of the Senate and the Committee on Science, Space, and Technology of the House on internet bandwidth issues at the National Center for Environmental Prediction. The report shall include an assessment of the cause of any internet bandwidth issues experienced by the National Weather Service; recommended solutions to mitigate ongoing bandwidth issues; potential impacts on commercial data users; and estimated costs of recommended solutions.

*Section 609. NAPA Study.*

This section directs the Administrator to conduct a study with the National Academy of Public Administration examining the feasibility of transferring Marine Protection Services to the Department of the Interior. No later than 180 days after the date of enactment of this Act, the Administrator shall submit to Congress a report on the results of the study.

*Section 610. Authorization of appropriations.*

This section authorizes appropriations for fiscal years 2022-2031 to be appropriated for the Office of Oceanic and Atmospheric Research at NOAA, including 10-year doubling for basic research.

*Section 611. Definitions.*

This section defines the terms “Agency,” “NOAA,” and “Under Secretary.”

*Title VII – National Science Foundation*

*Section 701. Authorization of appropriations.*

This section authorizes appropriations for fiscal years 2020-2029 to be appropriated for the National Science Foundation, including 10-year doubling for Research and Related Activities.

*Section 702. NSF organizational review.*

This section directs an external review of NSF’s research directorate structure for improving support for cross-disciplinary research. Upon completion of the review, the Director shall transmit the findings to Congress.

*Section 703. Ethics and security plans.*

This section supports research security through development of a new policy for plans to manage security and ethical implications of research, and the authorization of secure computing enclaves.

The policy shall include clear guidelines of what constitutes ethical and security risks; field specific guidance as appropriate mechanisms to ensure appropriate evaluation of the submitted ethical and security plans; mechanisms to ensure that researchers comply with approved ethical and security plans; and to the extent practical be harmonized with existing ethical and security policies or requirements.

*Section 704. Major research investments update.*

This section amends the America COMPETES Act of 2007 by updating the maximum amount of an award under the program to \$6,000,000.

*Section 705. NSF research security*

This section establishes an Office of Research Security and Policy within the Office of the Director of NSF. This section also establishes a Chief of Research Security for the Foundation. This section directs the Office to coordinate all research security activities across the Foundation.

*Section 706. Reproducibility in science.*

This section supports reproducibility in science through research, education and the development of new tools and infrastructure for a broad range of studies across multiple disciplines. This section also defines the term “Reproducibility.”

*Section 706. Public-private partnerships.*

This section states that the Director shall pursue partnerships with private industry, private foundations, and other appropriate private entities that enhance the impact of the Foundations investments and contributions to American economic competitiveness and security; and make available infrastructure, expertise, and financial resources to the U.S. scientific and engineering research and education enterprise.

*Section 708. EPSCoR.*

This section offers a Sense of Congress that EPSCoR investments into State research and education capacities are in the Federal interest and should be sustained; and that EPSCoR should maintain its experimental component by supporting innovative methods for improving research capacity and competitiveness. This section also defines the term “EPSCoR,” and updates the program to include rural communities providing STEM education and STEM workforce development programs.

*Section 709. Definitions.*

This section defines the terms “Director,” “Federal Science Agency,” “Foundation,” and “Institute of Higher Education.”

## *Title VIII – STEM Workforce for the 21<sup>st</sup> Century*

### *Section 801. Findings; sense of Congress.*

Highlights in the important role of maintaining a skilled STEM workforce to improve U.S. competitiveness.

### *Section 802. Advanced technical education and skilled technical workforce.*

This section states support for NSF's Advanced Technical Education program to grow a skilled technical workforce. This section also amends the Scientific and Advanced Technology Act of 1992 by updating the Advanced Technical Education program.

### *Section 803. Graduate research fellowship program update.*

This section promotes growing the NSF Graduate Research Fellowships to over 2,500 students annually with new fellowships in areas of national need over the next 10 years. This section also amends the National Science Foundation Act of 1950 by updating the Graduate Research Fellowships program.

### *Section 804. Robert Noyce Teacher Scholarship Program Sense of Congress.*

This section states the important role the Robert Noyce Teacher Scholarship Program plays in supporting the development and dissemination of evidence-based teacher preparation models and the recruitment, preparation, and retention of STEM educators; improving recruitment of underrepresented and STEM-trained students into teaching; and the need for doubling the number of new STEM teachers supported through the scholarship over the next 10 years to meeting growing demands for STEM capable educators.

### *Section 805. Innovations in informal STEM learning.*

This section amends the STEM Education Act of 2015 to include supporting the participation of students in nonprofit competitions, out-of-school activities, and field experiences related to STEM subjects. This section also amends the STEM Education Act of 2015 to direct the Director of the National Science Foundation to award grants for research on programming that engages students in grades pre-kindergarten through 8, including underrepresented and rural students in STEM in order to prepare students to pursue degrees or careers in STEM.

### *Section 806. AI traineeships and fellowships.*

This section directs the Director of the National Science Foundation to award grants to institutions of higher education to establish traineeship programs for graduate students who pursue artificial intelligence-related research leading to a masters or doctoral degree by providing funding and other assistance, and by providing graduate students' opportunities for research experiences in government or industry related to the students artificial intelligence studies. This section also directs the Director to award fellowships to masters and doctoral students and postdoctoral researchers at institutions of higher education who are pursuing degrees or research in artificial intelligence and related fields, including in the field of technology ethics.

*Section 807. Cybersecurity workforce development at federal science agencies.*

This section directs the Secretary of Energy to support the development of a cybersecurity workforce program that facilitates collaboration between undergraduate and graduate students, researchers at the National Laboratories and the private sector; prioritizes science and technology in areas relevant to the mission of the Department of Energy through the design and application of cybersecurity technologies; develops, or facilitates private sector development of, voluntary cybersecurity training and retraining standards, lessons, and recommendations for the energy sector that minimize duplication of cybersecurity compliance training programs; and maintains a public database of cybersecurity education, training, and certification programs.

This section amends section 5055 of title 49, United States code on national university transportation centers to include cybersecurity implications of technologies related to connected vehicles, connected infrastructure, and autonomous vehicles.

*Section 808. Broadening participating.*

This section amends the National Science Foundation Authorization Act of 1988 to broaden participation for Presidential Awards for Excellence in Mathematics and Science Teaching to include U.S. territories.

*Title IX – Technology Transfer and Innovation*

*Section 901. Federal laboratory computer programs update.*

This section amends the Stevenson-Wydler Technology Innovation Act of 1980 by adding legislation for copyright protections for computer programs created at a Federal lab.

*Section 902. Extend CRADA information protection period.*

This section amends the Stevenson-Wydler Technology Innovation Act of 1980 by extending cooperative research and development agreement (CRADA) information protection from 5 years to 12 years. This will preserve and promote the incentive to collaborate with Federal labs. By extending the protection period to 12 years, business concerns are more likely to achieve commercialization without the threat of a Government release or disclosure of CRADA information to foreign or domestic competitors.

*Section 903. Stevenson-Wydler Act authority update.*

This section amends the Stevenson-Wydler Technology Innovation Act of 1980 by granting NIST the authority to formally collaborate with other Federal Agencies through the Interagency Working Group for Technology Transfer to implement regulations that provide guidance and clarity for the Stevenson-Wydler Act.

*Section 904. Royalty payments to Federal employees update.*

This section amends the Stevenson-Wydler Technology Innovation Act of 1980 by authorizing royalty payments to Federal employees for other non-invention forms of licensed intellectual



property, extends the increase in royalty cap from up to \$150,000 per year to up to \$500,000 per year to Federal employees, and authorizes Federal labs to manage copyright royalties received in the same manner as for patent royalties.

*Section 905. Government intellectual property clarification.*

This section amends the Stevenson-Wydler Technology Innovation Act of 1980 to require Federal employees to report inventions and other intellectual property and to assign all right, title, and interest in work-related inventions and other intellectual property to the Federal government.

*Section 906. Clarifying CRADA authority.*

This section amends the Stevenson-Wydler Technology Innovation Act of 1980 by clarifying government use rights in CRADA inventions and remove conflicting definitions regarding who may collaborate under a CRADA with a Federal lab.

*Section 907. Expansion of agreements for commercializing technology authority.*

This section amends the Stevenson-Wydler Technology Innovation Act of 1980 by adding legislation that extends use of Agreements for Commercializing Technology to all Government-Owned, Contractor-Operated Labs (GOCOs) beyond Department of Energy National Labs.

*Section 908. Other transaction authority.*

This section amends the Stevenson-Wydler Technology Innovation Act of 1980 to authorize Federal lab support of emerging technologies and industries of the future including AI, advanced manufacturing, quantum information science, and advanced wireless communication networks. This amendment would authorize Federal agencies who do not currently have other transaction authority to permit the director of an agency's Federal lab to enter into other transactions. It would also enable Federal labs to enter into the types of partnerships necessary in today's innovation networks when the principal purpose of the agreement is support of emerging technologies and industries of the future in ways that advance an Agency's mission.

*Section 909. Nonprofit foundations.*

This section amends the Stevenson-Wydler Technology Innovation Act of 1980 by adding legislation that would authorize Federal labs to establish non-profit foundations that would advance their missions by attracting private sector investment to accelerate technology maturation, transfer, and commercialization of research and development outcomes. Non-profit foundations benefit Federal research and development agencies by employing mechanisms that Federal agencies cannot always readily pursue, such as receiving and actively seeking funding that are deemed gifts and other monetary donations from private donors and organizations.

*Section 910. Improving reporting and metrics.*

This section amends the Stevenson-Wydler Technology Innovation Act of 1980 to require federal labs to report data on intellectual property. This change would allow for more effective tracking of outcomes of Federal research and development spending.

*Section 911. Innovative approaches to technology transfer.*

This section amends the Small Business Act to allow agencies to set aside a portion of Small Business Technology Transfer funds to create "proof of concept" grant programs and other innovative technology transfer programs to address the "valley of death."

*Section 912. DOE public-private partnerships for commercialization.*

This section authorizes DOE national lab signature authority to improve public-private partnerships.

*Section. 913. Department of Energy foundation.*

This section establishes a nonprofit corporation to be known as the Energy Foundation. The purpose of the Foundation is to channel private sector investments that support efforts to create, develop, and commercialize innovative technologies that address diverse energy challenges, by methods that may include fostering collaboration and partnerships between the Federal Government, State governments, institutions of higher education, federally funded research and development centers, industry, and nonprofit organizations for the research, development, or commercialization of next-generation energy technologies; leveraging technologies to support new product development that supports regional innovation and economic development; and administering prize competitions to accelerate private sector competition and investment.