

# NATIONAL SCIENCE FOUNDATION FOR THE FUTURE ACT

## SEC. 1. SHORT TITLE

## SEC. 2. FINDINGS

## SEC. 3. DEFINITIONS

## SEC. 4. AUTHORIZATION OF APPROPRIATIONS

Funds the current Foundation portfolio at \$10.5 billion in fiscal year 2022 with a 6% average annual increase over 5 years to \$13.3 billion in fiscal year 2026.

Funds a new Directorate for Science and Engineering Solutions within the Research and Related Activities account at \$1 billion in fiscal year 2022 with a 50% annual increase over 5 years to \$5 billion in fiscal year 2026.

Provides specific allocations for a 50% increase over 5 years for: Graduate Research Fellowship Program; Mid-Scale Research Infrastructure Program; Robert Noyce Teacher Scholarship Program; NSF Research Traineeship Program; and CyberCorps Scholarship for Service Program.

## SEC. 5. STEM EDUCATION AND WORKFORCE TRAINING

- (a) **PreK-12 STEM Education.** Supports a decadal survey to be carried out by the National Academies to identify research priorities in PreK-12 STEM education and an additional study on barriers to the widespread implementation of STEM education innovations. Establishes a program to fund multidisciplinary research and translation centers to scale STEM education innovations.
- (b) **Undergraduate STEM Education.** Supports research and development to improve the alignment of undergraduate STEM education and training with workforce needs. Updates the Advanced Technological Education program to establish a network of centers for science and technical education.
- (c) **Graduate STEM Education.** Expands requirement for funding proposals to include a mentoring plan to graduate students. Supports activities to facilitate career exploration for graduate students and postdoctoral researchers. Creates a requirement for funding proposals to include individual development plans for graduate students and postdoctoral researchers and provides supplemental funding to facilitate professional development activities. Supports research on the graduate education system. Updates the Graduate Research Fellowship Program to address workforce demand, increase the cost of education allowance, and recruit a more diverse pool of applicants. Requires an evaluation of mechanisms for supporting graduate student education and training.
- (d) **STEM Workforce Data.** Requires a portfolio analysis of Foundation investments in the skilled technical workforce. Requires an assessment of the feasibility and benefits of adding rotating questions/topic modules to existing National Center for Science and Engineering Statistics (NCSES) surveys. Requires an assessment of the feasibility and benefits of incorporating new questions to existing (NCSES) surveys on a range of topics

related to the nature of the STEM workforce and the workforce environment. Requires a Government Accountability Office evaluation of the capacity of NCSES to meet current and future needs for data on the STEM workforce.

## **SEC. 6. BROADENING PARTICIPATION**

- (a) **Presidential Awards for Excellence in Mathematics and Science Teaching.** Updates the program to allow for the selection of at least one teacher each from the Commonwealth of the Northern Mariana Islands, American Samoa, the Virgin Islands of the United States, and Guam.
- (b) **Robert Noyce Teacher Scholarship Program Update.** Requires outreach to historically Black colleges and universities, minority institutions, higher education programs that serve veterans and rural communities, and emerging research institutions.
- (c) **NSF INCLUDES Initiative.** Codifies the NSF INCLUDES program.
- (d) **Broadening Participation on Major Facilities Awards.** Establishes a requirement for organizations seeking management awards to demonstrate experience and capabilities in employing best practices in broadening participation and directs the Foundation to consider implementation of such practices in oversight of the award.
- (e) **Partnerships with Emerging Research Institutions.** Establishes a pilot program to require multi-institution proposals seeking funding in excess of \$1 million be submitted in partnership with emerging research institutions and requires annual reporting on such grants to include feedback directly from participating emerging research institutions.
- (f) **Tribal Colleges and Universities Program Update.** Expands the scope of the Tribal Colleges and Universities program to include support for activities to build graduate programs.
- (g) **Diversity in Tech Research.** Supports organizational research, including research on diversity, equity, and inclusion in the technology sector.

## **SEC. 7. FUNDAMENTAL RESEARCH**

- (a) **Broader Impacts.** Directs an assessment of the application of the Broader Impacts review criterion across the Foundation and provides support for activities to improve its implementation.
- (b) **Sense of Congress.** Expresses the sense of Congress that the Foundation should continue to identify opportunities to reduce administrative burden on researchers.
- (c) **Research Integrity and Security.** Directs the Foundation to take steps to address security risks to Foundation-supported research, including through the Office of Research Security and Policy, the appointment of a Chief of Research Security, the development of an online resources to inform institutions and researchers of security risks, support for the establishment of a risk assessment center, and support for research on misconduct in the research environment. Expands the requirement for institutions to provide research misconduct training to faculty and other senior personnel and broadens the scope of that training to include mentoring and research security. Supports an update to the National Academies Guide to Responsible Conduct in Research.

- (d) **Research Ethics.** Expresses the sense of Congress with respect to potential ethical, social, safety, and security implications of research in emerging technologies. Establishes a requirement for the inclusion of an ethics statement in award proposals. Supports research on the ethical and social implications of Foundation-supported research and the development of approaches for risk mitigation.
- (e) **Research Reproducibility and Replicability.** Establishes a requirement for the inclusion of a machine-readable data management plan in award proposals. Requires the development of a set of criteria for trusted open repositories and provides support for the development of open data repositories to address any gaps. Requires the establishment of a single web-based point of access for data, software, and code resulting from Foundation-funded projects. Directs the Foundation to ensure that data resulting from Foundation-funded projects is made available in trusted open repositories. Supports research and development of tools and infrastructure to support research reproducibility.
- (f) **Climate Change Research.** Supports research to improve understanding and predictability of the climate system and climate-change risk, resilience, and mitigation and to educate and train climate researchers.
- (g) **Violence Research.** Supports research related to violence.
- (h) **Social, Behavioral, and Economic Sciences.** Directs the Foundation to take steps to ensure the participation of social, behavioral, and economic science researchers in cross-cutting agency programs.
- (i) **Food-Energy-Water Research.** Supports research related to the food-energy-water system.
- (j) **Sustainable Chemistry Research and Education.** Establishes a program to support research related to sustainable chemistry.
- (k) **Risk and Resilience Research.** Supports research related to risk assessment and predictability and development of tools and technologies for increased resilience.
- (l) **Leveraging International Expertise in Research.** Codifies the MULTIPLIER program.
- (m) **Biological Research Collections.** Supports databases and tools to secure and improve biological research collections. Establishes a requirement for the inclusion of a specimen management plan in award proposals. Supports the establishment of a center to facilitate coordination and data sharing.

## SEC. 8. RESEARCH INFRASTRUCTURE

- (a) **Facility Operations and Maintenance.** Requires the continuation of the Facility Operation Transition pilot program in the Facilities Construction (MREFC) account to provide cost sharing with the managing directorate during the first five years of operation.
- (b) **Reviews.** Directs periodic assessment of the cost and benefits of extending the operation of research facilities beyond their planned operational lifespan.
- (c) **Helium Conservation.** Expands eligibility for the Major Research Instrumentation program to include the purchase, installation, operation, and maintenance of equipment and instrumentation to conserve helium.

- (d) **Advanced Computing.** Directs the Foundation to collect information and regularly publish a report on the computational needs for Foundation-funded projects. Directs the Foundation to develop and regularly update an advanced computing roadmap.

## SEC. 9. DIRECTORATE FOR SCIENCE AND ENGINEERING SOLUTIONS

- (a) **Establishment.** Establishes a new directorate to advance research and development solutions to address societal and national challenges.
- (b) **Purposes.** Describes the purposes of the new directorate.
- (c) **Activities.** Describes activities to be supported by the directorate, including support for use-inspired research and translation, the development of innovative approaches to connect research with societal outcomes, the development of partnerships and collaborations that include traditional and nontraditional players, support for translational research infrastructure and capacity building, and support for education and training of students.
- (d) **Assistant Director.** Establishes an Assistant Director position to head the directorate.
- (e) **Advisory Committee.** Establishes an advisory committee to assess the activities carried out by the directorate and propose new strategies for fulfilling the purpose of the directorate.
- (f) **Existing Programs.** Authorizes the Foundation to place existing programs under the management of the directorate.
- (g) **Focus Areas.** Directs the Foundation to identify focus areas to guide directorate activities and to consider focus areas that contribute to a list of societal challenge –climate change and environmental sustainability, global competitiveness, cybersecurity, national security, STEM education and workforce, and social and economic inequality.
- (h) **Transfer of Funds.** Authorizes the transfer of funds to other Foundation offices, directorates, or divisions and prohibits the reverse transfer of funds.
- (i) **Authorities.** Provides flexible funding and hiring authorities.
- (j) **Ethical, Legal, and Societal Considerations.** Directs the Foundation to take steps to ensure that ethical, legal, and societal considerations are integrated into the activities of the directorate.
- (k) **Reports and Roadmaps.** Directs the Foundation to provide an annual report describing the activities of the directorate and a roadmap describing the strategic vision that will guide future investment decisions.
- (l) **Evaluation.** Directs an evaluation of the success of the directorate in achieving its purpose to advance solutions to pressing societal challenges through use-inspired and translational research.
- (m) **Limitation.** Prohibits the appropriation of funds for the directorate unless sufficient funding is appropriated to support the directorate without drawing funding from other Foundation activities.

## SEC. 10. ADMINISTRATIVE AMENDMENTS

- (a) **Supporting Veterans in STEM Careers.** Provides a technical fix.

- (b) **Sunshine Act Compliance.** Relaxes the requirement for an annual review and report related to Sunshine Act Compliance of the National Science Board and authorizes a risk-based approach to scheduling compliance reviews.
- (c) **Science and Engineering Indicators Report Submission.** Changes the deadline for a biennial report on science and engineering indicators from January 15 to March 15.