COMMITTEE ON
SCIENCE, SPACE AND TECHNOLOGY
CHAIRMAN FRANK LUCAS

FULL COMMITTEE

HEARING CHARTER

"*An Overview of the Budget Proposal for the National Science Foundation for Fiscal Year 2024*"

Wednesday, April 26, 2023
10:00 a.m. – 12:00 p.m.
2318 Rayburn House Office Building

Purpose

The purpose of the hearing is to review the Administration's fiscal year (FY) 2024 budget request for the National Science Foundation (NSF) and related policy and management issues. The hearing will cover the priorities of NSF and the National Science Board (NSB), including a discussion of the construction and operation of cutting-edge research facilities and instrumentation; investments in STEM education and workforce development; the establishment of the Directorate for Technology, Innovation, and Partnerships; increasing support for research security; and the plans and progress in implementing the CHIPS and Science Act of 2022. The hearing is an opportunity for Members to ask questions about research and STEM education interests in their states and communities, international competition in science and technology (S&T), and important oversight issues for the Foundation.

Witnesses

- **Dr. Sethuraman Panchanathan**, Director, National Science Foundation
- **Dr. Dan Reed**, Chair, National Science Board

Key Questions

- How will NSF balance its core directorate research programs with the addition of the new Technology, Innovation and Partnerships Directorate?
- How is NSF coordinating its STEM education activities with STEM programs across the federal government, and meeting workforce needs of the private sector?
- How is the NSF addressing increased international competition in S&T, as well as foreign espionage and theft of NSF funded research at U.S universities and research institutions?
- What progress has been made implementing reforms on oversight of large facilities construction projects, and what is the status of the construction projects currently in progress?
- How is the Board working with NSF to address the Foundation's priorities?

Background

The National Science Foundation (NSF) is an independent federal agency established by Congress in 1950 and is the primary source of federal funding for non-medical and non-defense basic research. NSF supports fundamental research that is not funded by the private sector. NSF is also responsible for the majority of the federal science, technology, engineering, and mathematics (STEM) education programs.

Through more than 11,200 competitive awards per year, NSF supports approximately 352,000 scientists, engineers, educators and students at universities, laboratories, and field sites. NSF is the funding source for over 23 percent of all federally supported basic research conducted at 2,000 American colleges, universities, and other research institutions. These grants fund specific research proposals that have been judged the most promising by NSF's peer merit-review system. On average only one out of four proposals submitted to NSF is awarded funding.[1]

Governance

As an independent agency, NSF does not fall within a cabinet department. The agency's activities are governed jointly by the NSF Director and the National Science Board (NSB). The Director is appointed to a six-year term by the President and confirmed by the Senate. The current NSF Director, Dr. Sethuraman Panchanathan, was nominated by President Trump in 2019 and subsequently unanimously confirmed by the U.S. Senate on June 18, 2020.[2]

The Board consists of 24 members appointed to six-year terms by the President.[3] The NSB performs two primary functions: (1) provides policy direction to NSF, including approval of the annual budget submission to the Office of Management and Budget (OMB) and new major programs and awards, and (2) serves as an external advisory body to Congress and the President on policy issues pertaining to science and engineering and STEM education. The Board also publishes a biennial report on indicators of the state of science and engineering in the United States.[4] The Board Chair and Vice Chair are elected to two-year terms by the Board membership. The current Chair, Dr. Dan Reed, was elected in May 2022.[5,6]

Research and Education

NSF supports fundamental non-biomedical research and education across all fields of science and engineering. Research and education activities are managed through seven research directorates under the Research and Related Activities (RRA) appropriations account – Biological Sciences (BIO); Computer and Information Science and Engineering (CISE); Engineering (ENG); Geosciences (GEO); Mathematical and Physical Sciences (MPS); Social, and Behavioral and

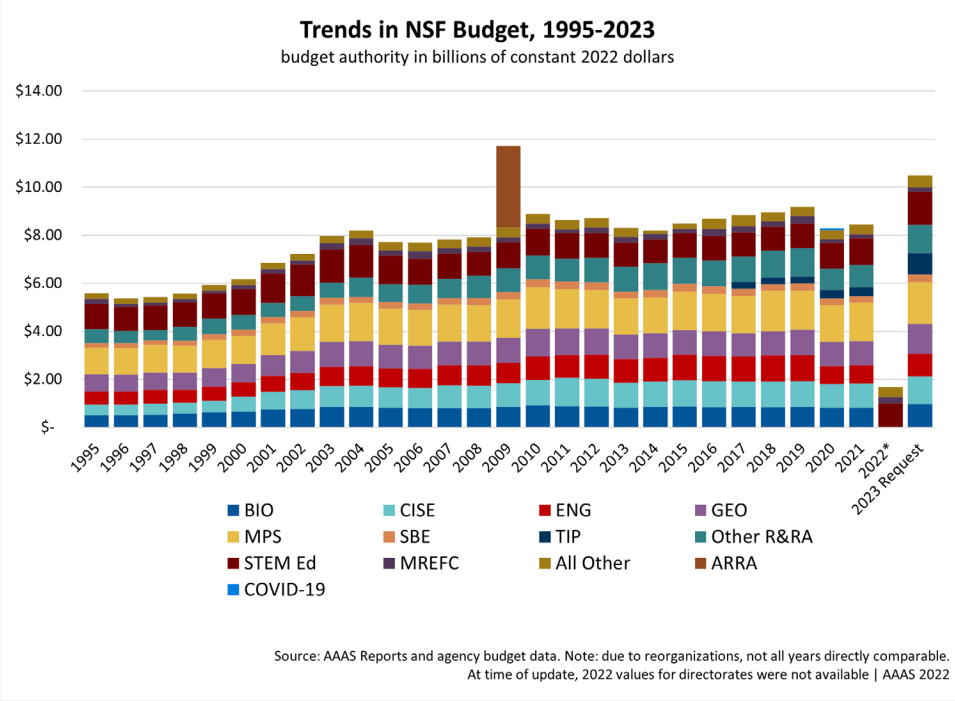
[1] National Science Foundation. "FY 2024 Budget Request to Congress," March 13, 2023. https://nsf-gov-resources.nsf.gov/2023-03/NSF%20FY24%20CJ_Entire%20Rollup-revised.pdf?VersionId=piT6beLuOyugsHnEnBgrvdTknW8564PZ.
[2] NSF, "New director takes helm at National Science Foundation", https://beta.nsf.gov/news/new-director-takes-helm-national-science.
[3] NSB appointments are staggered so that every two years one-third of the Board is appointed.
[4] The most recent Indicators report was released in January 2022 and can be found here: https://ncses.nsf.gov/pubs/nsb20221.
[5] National Science Board, "New Leadership of the National Science Board," https://www.nsf.gov/nsb/news/news_summ.jsp?cntn_id=305154.
[6] The current Vice-Chair of the NSB is Dr. Victor McCrary.

Economic Sciences (SBE); Technology, Innovation and Partnerships (TIP) – and the STEM Education (EDU) directorate under its own account. Each directorate is headed by an Assistant Director (AD) and further organized into divisions. In addition to these eight directorates, two offices administer agency-wide programs – the Office of International Science and Engineering (OISE) and the Office of Integrative Activities (OIA), both of which are housed in the Office of the Director. NSF is the primary source of support for academic research in several scientific disciplines, accounting for more than 60% of federal funding in computer science, biology, environmental sciences, mathematics, and social sciences.[7]

Institutions and People

To support research and education activities, NSF typically enters into grant agreements with universities or other non-profit organizations. In FY 2022, NSF received 32,100 research grant proposals and made about 8,700 new awards to colleges, universities, and other institutions across all 50 states. Across the agency, 27 percent of proposals were selected for grant awards in FY 2022. The average award size that year was $214,500 over 3 years. Activities funded by NSF in FY 2022 involved an estimated 52,700 senior researchers, 6,100 postdoctoral associates, 43,600 graduate students, 39,200 undergraduate students, and 181,000 K-12 teachers and students.[8]

Approximately 80% of NSF research and education funds are awarded to colleges, universities, and academic consortia. The remainder goes to private industry, including small businesses and non-profits (12%), Federally Funded Research and Development Centers (4%), and other recipients (5%).[9]



[7] National Science Foundation, *supra* note 1.
[8] *Id.*
[9] National Science Foundation, "FY 2022 Performance and Financial Highlights," https://nsf-gov-resources.nsf.gov/2023-03/FY22 PerfFinHighlights_web-Final-3-9-23.pdf?VersionId=xkiMiW2aY1HAL9Y0J2zDgd0._9XeLd53.

Facilities

In addition to research grants, NSF funds the construction, operations, and maintenance of research facilities and equipment. NSF typically enters into cooperative agreements with universities or other non-profit organizations for the construction and management of major facilities. The construction phases of such projects usually span multiple years, with extensive planning and oversight. Large equipment and facility projects include multi-user facilities, such as astronomical observatories and ocean research vessels; networked instrumentation and equipment; and large-scale computational infrastructure.

Merit-Review

The NSF proposal review and award process is based on competition between proposals within a specific scientific discipline or under an interdisciplinary initiative. Award selection involves input from individuals outside and within NSF, starting with a review panel made up of scientists and engineers with expertise in the relevant research area.

Every proposal is reviewed by multiple experts in the field and confidential feedback is made available to each proposer, allowing them to refine their proposal and increase their chance of success in the future. The panel evaluates proposals using two, NSB-approved criteria: (1) Intellectual Merit and (2) Broader Impacts. The NSF Merit Review Process is rigorous, highly competitive, and widely regarded as the "gold standard" for reviewing proposals in a competitive environment.

Research Security

U.S. research agencies have worked for decades to foster openness, transparency, and reciprocal international collaboration on basic research. However, in recent years, several incidents have led to the concern that other countries are taking advantage of the openness of the academic research environment in the United States.[10] This exploitation of U.S. research is entwined with concerns about our economic and national security. Threats to research security primarily arise from the failure of researchers applying for federal funding to disclose foreign affiliations, commitments, and sources of funding that may present a conflict of interest. Foreign talent recruitment programs have been found to incentivize or coerce participants to acquire "through illicit as well as licit means, proprietary technology or software, unpublished data and methods, and intellectual property to further the military modernization goals and/or economic goals of a foreign government."[11]

Research agencies, law enforcement and intelligence agencies, and universities are actively engaging to identify and mitigate threats to research security while preserving the U.S. system of scientific openness, transparency, and international collaboration.

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[10] JASON, The MITRE Corporation. *Fundamental Research Security*. December 2019. McLean, VA. Available at https://www.nsf.gov/news/special_reports/jasonsecurity/JSR-19-2IFundamentalResearchSecurity_12062019FINAL.pdf.

[11] National Science & Technology Council. Recommended Practices for Strengthening the Security and Integrity of America's Science and Technology Research Enterprise. January 2021. Available at https://trumpwhitehouse.archives.gov/wp-content/uploads/2021/01/NSTC-Research-Security-Best-Practices-Jan2021.pdf.

At NSF, a new Chief of Research Security Strategy and Policy position was created in March 2020 to lead the agency's response to this challenge. NSF employees and IPA Program staff are prohibited from participating in foreign talent recruitment programs. Disclosure requirements for researchers seeking a grant were clarified to include participation in foreign talent recruitment programs and an electronic form was created to facilitate and streamline such disclosures.

In January 2021, OSTP provided guidance to research organizations on best practices for protecting the security and integrity of Federally funded research.[12] President Trump also issued a National Security Presidential Memorandum (NSPM-33) outlining steps agencies should take.[13] The Biden Administration has indicated it plans to move forward with implementation of NSPM-33. In January 2022, the National Science and Technology Council's Research Security Subcommittee, which is co-chaired by NSF, issued implementation guidance for National Security Presidential Memorandum 33 (NSPM-33) on National Security Strategy for United States Government-Supported Research and Development.[14]

The CHIPS and Science Act of 2022 contained several research security provisions that NSF is implementing. These include establishing an Office of Research Security and Policy at NSF, developing online resources to inform institutions and researchers of security risks and best practices, conducting risk assessments, and providing training and mentoring in responsible research to awardees.

NSF participation in discussions with the U.S. research community and with international colleagues and development of common frameworks for understanding research security are major components of the NSF Research Security activity that is expected to continue to grow in FY 2024. Specific activities for FY 2024 include (1) ramping up the capabilities of the Research Security and Integrity Information Sharing and Analysis Organization to provide additional tools, information and resources; (2) establishing a Research on Research Security funding program using guidance from the JASON study[15] and NSF-funded workshops; (3) scaling up analytic capabilities to proactively identify conflicts of commitment, vulnerabilities of pre-publication research, and risks to the merit review system; and (4) making available and deliver research security training modules for the larger research community.[16]

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[12] National Science and Technology Council, Office of Science and Technology Policy, "Recommended Practices for Strengthening the Security and Integrity of America's Science and Technology Research Enterprise," https://trumpwhitehouse.archives.gov/wp-content/uploads/2021/01/NSTC-Research-Security-Best-Practices-Jan2021.pdf.

[13] White House, "Presidential Memorandum on United States Government-Supported Research and Development National Security Policy," https://trumpwhitehouse.archives.gov/presidential-actions/presidential-memorandum-united-states-government-supported-research-development-national-security-policy/.

[14] National Science and Technology Council, Office of Science and Technology Policy. "Guidance for Implementing National Security Presidential Memorandum 33 (NSPM-33) on National Security Strategy for United States Government-Supported Research and Development," https://www.whitehouse.gov/wp-content/uploads/2022/01/010422-NSPM-33-Implementation-Guidance.pdf.

[15] JASON, The MITRE Corporation. *Research Program on Research Security*. March 2023. McLean, VA. Available at https://nsf-gov-resources.nsf.gov/2023-03/JSR-22-08%20NSF%20Research%20Program%20on%20Research%20Security_03152023_FINAL_1.pdf.

[16] National Science Foundation, *supra* note 1.

Strategic Planning

In January 2022, the NSB released its biennial Science and Engineering Indicators report which found that the global position of the U.S. science and engineering enterprise has shifted due to rapid growth in Asia's research and development investments and science and technology capabilities. The report highlights the importance of building capacity through investing in research and development, enhancing education and training opportunities, and bringing in underrepresented groups into a STEM-educated labor force.[17]

On March 28, 2022, NSF released its 2022-2026 Strategic Plan. The Plan builds on 70 years of NSF driving critical research across all disciplines. The four strategic goals identified in the Plan are to (1) empower STEM talent to fully participate in science and engineering, (2) discover new information about our universe, the world and ourselves, (3) positively impact society by translating knowledge into solutions, and (4) excel at NSF operations and management. These goals will serve as a foundation for ensuring American leadership in science and technology innovation.[18]

Budget Request Overview

The President's FY24 budget request for NSF is $11.3 billion, a 14.6% increase of $1.438 billion above the FY23 total enacted level of $9.877 billion.[19]

National Science Foundation (NSF) FY24 Budget Request
(Dollars in millions)

Account	FY22 Enacted*	FY23 Enacted	FY24 Request	FY24 Request Over FY23 Enacted**	
				$	%
Research and Related Activities (RRA)	6964.66	7826.80	9029.90	1415.60	18.59%
STEM Education	1146.72	1371.00	1444.18	198.18	14.46%
Major Research Equipment & Facilities Construction (MREFC)	120.60	187.23	304.67	117.44	62.72%
Agency Operations & Award Management (AOAM)	420.21	463.00	503.87	40.87	8.83%
Office of Inspector General (OIG)	18.89	23.39	26.81	3.42	14.62%
National Science Board (NSB)	4.52	5.09	5.25	0.16	3.14%
Totals:	**8675.61**	**9876.51**	**11314.68**	**1775.67**	**18.61%**

* Excludes $360.65 million provided by the American Rescue Plan supplemental appropriation and $23.45 million provided by the "Extending Government Funding and Delivering Emergency Assistance Act", for necessary expenses related to RCRV construction impacted by Hurricane Ida.

** Captures both the FY 2023 Omnibus appropriation and the Disaster Relief Supplemental Base, excluding CHIPS and Science supplemental funds.

[17] National Science Board, National Science Foundation. 2022. Science and Engineering Indicators 2022: The State of U.S. Science and Engineering. NSB-2022-1. Alexandria, VA. Available at https://ncses.nsf.gov/pubs/nsb20221.
[18] National Science Foundation, "2022-2026 Strategic Plan," March 2022. https://www.nsf.gov/pubs/2022/nsf22068/nsf22068.pdf.
[19] National Science Foundation, *supra* note 1.

Budget Request Highlights

The NSF Director's vision for the future can be summarized in three pillars that point to opportunities to continue building on recent investments, such as the CHIPS and Science Act[20] and the FY 2023 Omnibus and the Disaster Relief Supplemental Appropriations. [21] These pillars[22] include:

1. ***Strengthening Established NSF*** – For more than seven decades, NSF has been making investments to expand the frontiers of science and technology. This mission to accelerate discovery and enhance U.S. research capabilities will continue to be a central focus.
2. ***Inspiring the Missing Millions*** – In its *Vision 2030*[23] report, the NSB identified a significant talent gap in the science and engineering workforce which they names the "Missing Millions." Every geographic region of the country has talented people who can participate in STEM and contribute too the innovation enterprise. In an effort to address the talent gap, NSF plans to increase investments in existing programs and create new pathways into STEM fields to expand opportunities that will lead to a well-paid workforce and vibrant economy.
3. ***Accelerating Technology and Innovation –*** Global competition for leadership and talent in science, engineering and technology is at an all-time high. To maintain global leadership, the U.S. must continue to invest in advancing breakthrough technologies ,translating research results to the market and society, and nurturing diverse talent by creating opportunities for everyone everywhere. To enable these types of investments, NSF plans to accelerate partnerships with other agencies, private industry, nonprofits, and foreign allies to foster innovation through the leveraging of resources.

Broadening Participation

In FY 2022, NSF supported $630 million of broadening participation activities through 30 focused and geographic diversity programs. NSF is requesting $1.02 billion, a 20% increase from FY 2023 total enacted level, for programs that create and expand opportunities for underrepresented individuals in STEM. These programs include the Growing Research Access for Nationally Transformative Equity and Diversity (GRANTED) which supports the enhancement of research administration and post-award management at underserved institutions[24]; the Centers of Research Excellence in Science and Technology (CREST) which provides support for the establishment of centers that effectively integrate education and research to enhance the research capabilities of minority-serving institutions (MSI) [25]; the Eddie Bernice Johnson INCLUDES Initiative (NSF INCLUDES) which is a comprehensive national initiative to enhance U.S. leadership in STEM discoveries and innovations through catalyzing the STEM enterprise to work collaboratively for

[20] P.L. 117-167
[21] P.L. 117-164
[22] National Science Board, *supra* note 1.
[23] National Science Board. "*Vision 2030*," May 2020. https://www.nsf.gov/nsb/publications/2020/nsb202015.pdf.
[24] NSF, "GRANTED, Broadening Participation in STEM," https://beta.nsf.gov/funding/initiatives/broadening-participation/granted.
[25] NSF "Centers of Research Excellence in Science and Technology (CREST) and HBCU Research Infrastructure for Science and Engineering (HBCU-RISE)," https://beta.nsf.gov/funding/opportunities/centers-research-excellence-science-technology-0.

inclusive changes to the STEM workforce demographics[26]; the Louis Stokes Alliances for Minority Participation (LSAMP), an alliance based program that works to increase the number of STEM baccalaureate and graduate degrees awards to historically underrepresented populations in STEM disciplines[27]; the Established Program to Stimulate Competitive Research (EPSCoR) which builds research competitiveness in targeted states and territories[28]; and targeted programs to strengthen STEM undergraduate education and research at MSIs.[29]

The FY 2024 proposed investments will advance the priorities of the CHIPS and Science Act to support diversity at the individual, institutional, and geographic levels. These include provisions originally introduced as H.R. 210, the Rural STEM Education Research Act, which authorized activities at NSF that would support research and development activities to improve understanding of the challenges facing rural communities in providing sustaining quality STEM education programs.

Building a Resilient Planet

NSF supports research related to climate change through agency-wide initiatives and targeted funding opportunities across the seven research directorates. NSF participates in the government-wide U.S. Global Change Research Program (USGCRP)[30] by supporting interdisciplinary research in the biological, geological, and social and behavioral sciences to study Earth system processes and the consequences of climate change. In FY 2022, NSF invested $781 million in its contribution to USGCRP and is requesting $1.05 billion for FY 2024.

In addition to studying the impacts of climate change, NSF supports basic research in materials science and engineering, nanoscience, computing, chemical sciences, quantum science, and biosciences that lay the foundation for improving existing or developing new renewable energy technologies. This includes a proposed investment of $550 million in FY 2024 for Clean Energy Technology (CET) which are designed to identify and support transformative research to advance U.S. leadership in the transition to clean energy, as well as the creation of two new programs – the National Discovery Cloud (NDC) for Climate and the OISE Global Centers (GC) program – whose aim is to provide cyberinfrastructure ecosystems to further climate-related science and engineering, and support federal and international interdisciplinary collaboration to address grand societal challenges, respectively.

Advancing Emerging Industries for National and Economic Security

NSF has supported research to advance emerging technologies for decades. As the U.S. faces intensifying global competition for science and technology leadership, the investments of NSF in emerging technology research are imperative for strengthening and scaling innovation and translation of basic research to commercial markets.

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[26] NSF, "Inclusion across the Nation of Communities of Learners of Underrepresented Discoverers in Engineering and Science," https://beta.nsf.gov/funding/opportunities/inclusion-across-nation-communities-learners.
[27] NSF, "Louis Stokes Alliance for Minority Participation," https://beta.nsf.gov/funding/opportunities/louis-stokes-alliances-minority-participation.
[28] NSF, "Estab-lished Program to Stim-u-late Com-pet-i-tive Research (EPSCoR)," https://beta.nsf.gov/funding/initiatives/epscor.
[29] National Science Foundation, *supra* note 1.
[30] U.S. Global Change Research Program. "About USGCRP," https://www.globalchange.gov/about.

As the newest NSF Directorate, TIP advances emerging technologies to address societal and economic challenges and opportunities; accelerates the translation of research results from the lab to market and society; and cultivates new education pathways leading to a diverse and skilled future technical workforce comprising researchers, practitioners, technicians, and entrepreneurs. Building on NSF's longstanding leadership in science and engineering research and education, TIP serves as a crosscutting platform that leverages, energizes, and rapidly advances use-inspired research and innovation. Further, TIP opens new possibilities for research and education by catalyzing strategic partnerships that link academia; industry, including startups and small businesses; federal, state, local, and tribal governments; nonprofits and philanthropic organizations; civil society; and communities of practice to cultivate 21st-century innovation ecosystems that give rise to future jobs and enhance the Nation's long-term competitiveness.

The FY 2024 budget request for TIP is $1.19 billion[31]. The major TIP investments in FY 2024 include:

- *NSF Regional Innovation Engines,* which was authorized in the CHIPS and Science and aims to catalyze new business and economic growth in those regions of America that have not fully participated in the technology boom of the past few decades.
- *Experiential Learning in Emerging Industries (ExLENT)*, which supports inclusive experiential learning opportunities for cohorts of diverse learners with the crucial skills needed to prepare them to enter the workforce or pivot into new jobs in key technology focus areas.
- *NSF Entrepreneurial Fellows* was authorized in the CHIPS and Science Act, and provides Ph.D.-trained scientists and engineers with resources to mature promising ideas and technologies from the lab to the market and society.
- *Accelerating Research Translation (ART)* which will support institutions of higher education to build necessary infrastructure to boost their overall capacity to accelerate the pace and scale of translational research, in alignment with the intent of the CHIPS and Science Act.
- *NSF Convergence Accelerator* which will focus on regional acceleration of the translation of use-inspired research pursuing technology solutions to location-specific challenges in a variety of research areas (i.e. food and agriculture, disaster response and mitigation, transportation, etc.).

NSF investments in key technology focus areas remain crucial to securing American leadership in the future. NSF has identified six focus areas for proposed funding increases including advanced manufacturing, advanced wireless, artificial intelligence, biotechnology, microelectronics and semiconductors, and quantum information science.

[31] National Science Foundation, *supra* note 1.

NSF Emerging Industries Funding[32]
(Dollars in Millions)

Emerging Industry	FY22 Actual	FY23 Enacted	FY24 Request
Advanced Manufacturing	$364.89	$367.43	$453.86
Advanced Wireless	$131.76	$161.31	$179.17
Artificial Intelligence	$679.23	$687.70	$796.48
Biotechnology	$315.22	$401.28	$470.05
Microelectronics & Semiconductors	$106.46	$164.24	$209.68
Quantum Information Science	$252.48	$275.91	$332.67

*Investments may overlap and should not be summed.

Research Infrastructure

Research infrastructure is foundational to science and innovation and enables advances in all areas of research. The FY 2024 request includes funds for ongoing Major Research Equipment and Facilities Construction (MREFC) ($304.67 million) which supports construction projects that require an investment of more than $100 million. This funding would support three ongoing projects – the Antarctic Infrastructure Recapitalization program[33], the two detector upgrades to operate the High Luminosity-Large Hadron Collider, and the Vera C. Rubin Observatory – and one new project – the Leadership-Class Computing Facility. The MREFC account also supports the Mid-scale Research Infrastructure Track 2 program which funds projects in the $20 million to $100 million range.

MREFC Account Funding, by Project[34]
(Dollars in Millions)

Project	FY23 Estimate	FY24 Request
Antarctic Infrastructure Recapitalization	$60.00	$60.00
HL-Large Hadron Collider Upgrade	$33.00	$38.00
Leadership-Class Computing Facility	-	$93.00
Mid-scale Research Infrastructure, Track 2	$76.25	$105.06
Regional Class Research Vessel	$1.98	-
Vera C. Rubin Observatory	$15.00	$7.61
Dedicated Construction Oversight	$1.00	$1.00
Totals	**$187.23**	**$304.67**

[32] National Science Foundation, *supra* note 1.
[33] United States Antarctic Program, "Background of AIMS," https://future.usap.gov/foundation-of-aims/.
[34] National Science Foundation, *supra* note 1.

The FY 2024 budget proposal also includes increases for Major Facilities operations and maintenance. In addition to regular upkeep, support for upgrades and periodic maintenance must be addressed within the budget for facilities operations and management, which accounts for 10 percent of NSF's total request in FY 2024.[35]

CHIPS and Science Act of 2022

Title III of the CHIPS and Science Act was based on the bipartisan NSF for the Future Act, which takes important steps to improve NSF's capabilities and ensure the U.S. maintains its edge against rising global competition, while protecting NSF's primary mission of supporting fundamental research--the kind of groundbreaking exploration that industry cannot afford to fund. It also expands our STEM workforce, supports geographic diversity of research in the U.S., and secures our research from theft.

Summary of Major Provisions[36]

- Authorizes $81 billion over the next five years for the Foundation, prioritizing basic research, STEM education, and major research equipment.
- Directs investments in critical research-enabling infrastructure and directs a roadmap for meeting the research community's growing need for advanced computing capabilities.
- Codifies a new NSF directorate to support translational research, accelerate the development and use of federally funded research, strengthen U.S. competitiveness through development of key technologies, and expand student and researcher participation and the U.S. workforce in key technologies and in areas of societal, national, and geostrategic importance. Authorizes $20 billion over five years for initiatives.
- Supports strategic investments in the STEM workforce to expand and enhance the American talent pipeline, including efforts to align undergraduate STEM education with workforce needs.
- Supports geographic diversity of research in the U.S., including bolstering opportunities for Minority-Serving Institutions and rural communities.
- Secures taxpayer-funded research and technologies from adversaries like the CCP. Includes a prohibition on grantees' participation in malign foreign talent programs and a requirement for annual training on research security threats.

[35] National Science Foundation, *supra* note 1.
[36] National Science Foundation, "CHIPS and Science," accessed April 24, 2023, at https://new.nsf.gov/chips.