Management Challenges for the U.S. National Science Foundation in Fiscal Year 2025

U.S. NATIONAL SCIENCE FOUNDATION
Office of Inspector General

October 22, 2024

At a Glance

Management Challenges for the U.S. National Science Foundation in Fiscal Year 2025
October 21, 2024

WHY WE ISSUED THIS REPORT

The *Reports Consolidation Act of 2000* (Pub. L. No. 106-531) requires us annually to update our assessment of the U.S. National Science Foundation's "most serious management and performance challenges facing the agency … and the agency's progress in addressing those challenges."

WHAT WE FOUND

Each year, we identify NSF's most serious challenges based on our audit and investigative work, knowledge of NSF's operations, independent sources such as U.S. Government Accountability Office reports and NSF's advisory committees, and discussions with NSF senior staff and contractors. This year, we identified seven areas representing the most serious management and performance challenges facing NSF:

- Challenge 1: Overseeing and Managing Risks of Sexual Assault/Harassment in Antarctica
- Challenge 2: Addressing Sexual Harassment in the Scientific Enterprise
- Challenge 3: Growing Participation and Capacity in STEM Education and Workforce
  Challenge 4: Overseeing the United States Antarctic Program (USAP)
- Challenge 5: Overseeing NSF's Funding Portfolio
- Challenge 6: Managing Human Capital
- Challenge 7: Mitigating Threats to Research Security

We are encouraged by NSF's progress in its efforts to address critical management and performance challenges. Effective responses to these challenges will promote the integrity of NSF-funded projects, help ensure research funds are spent effectively and efficiently, and help maintain the highest level of accountability over taxpayer dollars.

AGENCY RESPONSE TO *MANAGEMENT CHALLENGES FOR FISCAL YEAR 2024*

Following the issuance of this report, NSF will include its Management Challenges Progress Report and its response to *Management Challenges for the National Science Foundation in Fiscal Year 2024* in its Agency Financial Report.

CONTACT US

For congressional, media, and general inquiries, email OIGPublicAffairs@nsf.gov.

U.S. NATIONAL SCIENCE FOUNDATION
Office of Inspector General

MEMORANDUM

DATE: October 22, 2024

TO: Dr. Darío Gil
Chair
National Science Board

Dr. Sethuraman Panchanathan
Director
U.S. National Science Foundation

FROM: Allison C. Lerner
Inspector General

SUBJECT: Management Challenges for the U.S. National Science Foundation in Fiscal Year 2025

Attached for your information is our report, *Management Challenges for the U.S. National Science Foundation in Fiscal Year 2025*. The *Reports Consolidation Act of 2000* (Pub. L. No. 106-531) requires us annually to update our assessment of the "most serious management and performance challenges facing the agency … and the agency's progress in addressing those challenges." A summary of the report will be included in the U.S. National Science Foundation Agency Financial Report.

We appreciate the courtesies and assistance NSF staff provided during the completion of this report.

If you have questions, please contact me at 703-292-7100.

Attachment

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Introduction

The U.S. National Science Foundation is an independent federal agency created by Congress in 1950 "[t]o promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense; and for other purposes."[1] With a budget of approximately $9.06 billion for fiscal year 2024, NSF is the funding source for about 25 percent of all federally supported basic research conducted by America's colleges and universities. Each year, NSF supports more than 300,000 scientists, engineers, educators, and students at universities, laboratories, and field sites.

The *Reports Consolidation Act of 2000* (Pub. L. No. 106-531) requires us annually to update our assessment of NSF's "most serious management and performance challenges … and the agency's progress in addressing those challenges." Each year, we identify these challenges based on our audit, inspection, and investigative work; knowledge of the NSF's operations; independent sources such as U.S. Government Accountability Office reports and NSF's advisory committees; and discussions with NSF senior staff and contractors. We identify management challenges as those that meet at least one of the following criteria:

- The issue involves an operation that is critical to an NSF core mission.
- The issue presents a risk of fraud, waste, or abuse to NSF or other government assets.
- The issue involves strategic alliances with other agencies, the U.S. Office of Management and Budget, the Administration, Congress, or the public.
- The issue is related to key initiatives of the President.

It is important to note that identifying an issue as a "management challenge" does not necessarily mean NSF is having difficulty addressing it; instead, it means we identify the issue as one of the top challenges facing NSF and report on NSF's progress in addressing it, as required by the Act.

This year, we identified seven areas representing the most serious management and performance challenges facing NSF:

- Overseeing and Managing Risks of Sexual Assault/Harassment in Antarctica
- Addressing Sexual Harassment in the Scientific Enterprise
- Growing Participation and Capacity in STEM Education and Workforce
- Overseeing the United States Antarctic Program (USAP)
- Overseeing NSF's Funding Portfolio
- Managing Human Capital
- Mitigating Threats to Research Security

This year, we renamed two prior challenge areas to better reflect the challenges they describe: "Increasing Diversity in Science & Engineering Education and Employment" became "Growing Participation and Capacity in STEM Education and Workforce," and "Overseeing NSF's Funding Portfolio in a Changing Environment" became "Overseeing NSF's Funding Portfolio."

[1] Pub. L. No. 81-507, *National Science Foundation Act of 1950*

NSF's Very Large Array, a facility of NSF's National Radio Astronomy Observatory, at dusk with the moon rising.
Credit: Bettymaya Foott, NRAO/AUI/NSF (available under Creative Commons Attribution 3.0 Unported)

We also removed the prior-year challenge of "Mitigating Threats Posed by the Risk of Cyberattacks." Although cybersecurity will remain an area with inherent risk, NSF's actions have addressed some of the highest-risk areas. For example, NSF continues to implement a Zero Trust Architecture (ZTA), which seeks the vigorous use of modern technology and security practices to defend against the current threat environment. In January 2024, NSF established a new, independent Office of the Chief Information Officer to manage current needs and anticipate future challenges. NSF also completed actions to resolve all remaining weaknesses identified in FY 2019 and FY 2021 *Federal Information Security Modernization Act* (FISMA, Pub. L. No. 113-283) audits.[2] In addition, we confirmed that NSF implemented all corrective actions from our report *External Penetration Testing of National Science Foundation and U.S. Antarctic Program Networks*.[3]

Due to its evolving nature, the cybersecurity area presents potential, unanticipated risks that will continue to test NSF's ability to respond to and mitigate threats. Accordingly, NSF should remain focused on this area, which might again prove to be a management challenge for the agency in the future.

NSF has continued to demonstrate its ability to achieve its mission in an ever-changing environment. As the agency moves into FY 2025 and beyond, it is well positioned to address both familiar and new challenges it may face with acuity, agility, and adaptability.

[2] NSF OIG Report No. 20-2-002, November 22, 2019, and NSF OIG Report No. 22-2-003, November 17, 2021
[3] NSF OIG Report No. 24-6-001, November 15, 2023

Challenge 1: Overseeing and Managing Risks of Sexual Assault/Harassment in Antarctica

NSF is continuing to institutionalize and codify its Sexual Assault/Harassment Prevention and Response (SAHPR) Program to address critical prevention and response elements and enhance its capacity to expand SAHPR functions within United States Antarctic Program (USAP). In August 2022, NSF publicly released the SAHPR Final Report, which it commissioned to examine sexual harassment and sexual assault in the USAP community and identify corrective actions.[4] The report highlighted a concern that NSF lacks adequate reporting and response systems to "ensure that it is appropriately informed of and responsive to incidents of sexual assault and sexual harassment within the USAP community."

Sexual assault cases present law enforcement challenges even under ordinary circumstances; those challenges are compounded by Antarctica's distant and sometimes inaccessible location. In March 2023, our office provided NSF with a white paper detailing considerations for an effective reporting and response capability when presented with allegations of sexual assault and stalking.[5] Since then, NSF has been coordinating with our Office of Investigations, which has been investigating alleged criminal violations covered under the Special Maritime and Territorial Jurisdiction of the United States, including aggravated sexual abuse, sexual abuse, abusive sexual contact, and stalking. OIG special agents began responding, remotely, to concerns raised by individuals in Antarctica in July 2023, and will provide an on-site investigative presence during two 30-day trips to Antarctica in October-November 2024 and January-February 2025. OIG is also working toward having an on-site presence during future austral summer seasons.

KEY FACTS

- This issue involves an operation that is critical to an NSF core mission.
- NSF commissioned a report to examine sexual harassment and sexual assault in the USAP community and identify corrective actions.
- NSF has taken actions, including establishing a SAHPR office within the Office of the Director, stationing an on-ice victim advocate, and establishing a 24/7 NSF Antarctic Helpline.
- NSF made changes to the Antarctic Support Contract to require additional reporting on SAHPR complaints and imposed new requirements on prospective employees.
- NSF has multiple actions planned for the 2024-2025 austral summer season.
- NSF is coordinating with our office, which has been investigating criminal violations covered under the Special Maritime and Territorial Jurisdiction of the United States.

We also initiated a review of NSF's and its contractor's actions to prevent and respond to sexual harassment in the USAP. In September 2024, we reported that before the release of the SAHPR report, NSF primarily relied on the Antarctic Support Contractor to manage its harassment reporting and response efforts. NSF has gradually assumed a greater leadership role and has taken steps to help prevent and respond to sexual assault and sexual harassment, such as establishing a SAHPR

[4] Department of the Interior's Federal Consulting Group, NSF/OPP/USAP Sexual Assault/Harassment Prevention and Response (SAHPR) Final Report, June 22, 2022

[5] NSF OIG, Law Enforcement Perspectives on Sexual Assault and Stalking Issues Pertaining to the United States Antarctic Program, March 7, 2023

office within the Office of the Director, stationing a victim advocate in Antarctica, and establishing a 24/7 NSF Antarctic Helpline. NSF also made changes to the Antarctic Support Contract to require additional reporting on SAHPR complaints and imposed new requirements on prospective employees. We recommended NSF consider additional measures to help prevent and respond to sexual harassment through the next Antarctic Support Contract. NSF has also planned multiple actions for the 2024-2025 season.

NSF's Key Completed Actions

- Delivered bystander intervention training and sexual assault and sexual harassment response trainings to approximately 1,000 USAP deployers.
- On-ice victim advocates traveled to Palmer, South Pole, and McMurdo Stations to conduct outreach and provide training on sexual harassment and sexual assault to the USAP community.
- SAHPR Office held office hours, met with key leaders, and gave informational presentations to the USAP community at Palmer and McMurdo Stations.
- Provided additional satellite communication devices to improve access to the USAP counselor, advocate, and other support systems for individuals working in field camps.
- Continued to improve enhanced screening procedures for contractors.
- Issued an April 2024 memo, signed by the NSF Director, directing the creation of a dedicated SAHPR Program Office within the Office of the Director.
- Continued to collaborate with OIG on the law enforcement response in USAP through a working group including the SAHPR Program Office, Office of Polar Programs, the Division of Acquisition and Cooperative Support, the Office of Equity and Civil Rights, and Office of the General Counsel.
- Developed and launched the USAP Climate Survey in May 2024.
- Met regularly with the Antarctic Support Contractor's Chief Executive Officer, Chief Operating Officer, and Human Resources to ensure transparency, accountability, and direct follow-up on USAP concerns.

NSF's Key Planned and Ongoing Actions

- Continuing to invest resources in SAHPR initiatives and staffing.
- Analyzing and reviewing existing NSF policies and procedures related to sexual assault and sexual harassment to ensure a survivor-centered and trauma-informed approach is consistently included in agency procedures and practices.
- Codifying the agency's official definitions for terms related to sexual assault and sexual harassment and codifying NSF protocols for the confidentiality of reporting and referral of SAHPR reports.
- Developing standard guidelines on how to respond to a report of sexual assault and sexual harassment throughout the NSF enterprise.
- Shifting the oversight of the existing SAHPR support contract from the Office of Polar Programs to the SAHPR Program Office.
- Continuing improvements to living and recreation conditions for USAP participants, including hiring on-site staff dedicated to community engagement, adding recreation equipment, expanding Wi-Fi capacity, and making the counselor available during both winter and summer seasons.

Challenge 2: Addressing Sexual Harassment in the Scientific Enterprise

Sexual harassment is a pervasive issue within the scientific enterprise. According to a 2018 National Academies of Sciences, Engineering, and Medicine (National Academies) report, women in academia are at a higher risk of experiencing sexual harassment due to a male-dominated environment, organizational tolerance for sexually harassing behavior, hierarchical and dependent relationships between faculty and their trainees, and isolating environments. More than 50 percent of women faculty and staff and 20–50 percent of women students encounter or experience sexual harassment in academia.

The *CHIPS and Science Act of 2022* (CHIPS and Science Act) requires NSF to contract with the National Academies to conduct a follow-up study "on the influence of sex-based and sexual harassment in institutions of higher education on the career advancement of individuals in the STEM workforce." The Act also requires NSF to fund research examining "factors contributing to, and consequences of, sexual harassment affecting individuals in the STEM workforce."[6]

KEY FACTS

- This challenge involves an operation that is critical to an NSF core mission.
- Recent research, reports, and legislation indicate harassment is pervasive across the scientific enterprise and jeopardizes diversity and inclusion in STEM.
- The CHIPS and Science Act requires NSF to examine the contributing factors and consequences of harassment. NSF is addressing this challenge by conducting compliance evaluations, introducing a pilot program for safe and inclusive fieldwork plans, and seeking restorative justice-informed approaches.

NSF has taken several steps to address harassment in the scientific enterprise. In October 2018, NSF implemented an award term and condition to foster safe research and learning environments. Also, effective January 2023, for each proposal that includes research off-campus or off-site, the proposing organization must certify that it has a plan to address harassment and other abusive or unwelcome behavior. To help evaluate the effectiveness of its guidelines, NSF established the Safe and Inclusive Fieldwork Plans Pilot, which requires principal investigators to document their plans to nurture an inclusive and harassment-free off-campus or off-site working environment. Additionally, in March 2024, NSF issued a solicitation for a contractor to design restorative justice-informed approaches to repair harm and offer accountability to those affected by sexual and other forms of harassment and discrimination at NSF-funded off-campus or off-site research venues. With this effort, NSF is seeking to learn whether restorative justice approaches can be used at NSF-funded off-campus and off-site venues to encourage proactive compliance with Title IX, Title VI,[7] and similar requirements and to promote safe and inclusive research environments. NSF also maintains a website with frequently asked questions and other resources to help prevent harassment.

[6] Pub. L. No. 117-167, Title V, Subtitle D—Combating Sexual Harassment in Science

[7] Title IX of the Education Amendments of 1972 prohibits sex-based discrimination in any school or education program that receives federal funding. Title VI of the Civil Rights Act of 1964 prohibits discrimination based on race, color, or national origin in programs and activities that receive federal financial assistance.

We are conducting a review to evaluate 100 NSF recipients' compliance with NSF's harassment terms and conditions. This review will provide NSF with insight into the effectiveness of its efforts to combat sexual and other forms of harassment within the scientific enterprise.

NSF's Key Completed Actions

- Employed a contractor to evaluate independently the research, conference, and travel award policies with authorized organizational representatives and Title IX coordinators at institutions of higher education.
- Established the Safe and Inclusive Fieldwork Plans Pilot, which requires principal investigators to summarize their plans to nurture an inclusive and harassment-free working environment.
- Issued a solicitation for a contractor to design a restorative justice-informed project to repair harm and offer accountability to individuals and communities affected by harassment and discrimination at NSF-funded off-campus or off-site research venues.
- Co-chaired the National Science and Technology Council-led Interagency Working Group on Safe and Inclusive STEM Environments to identify federal guidance to prevent and address sex-based and sexual harassment in research.
- Updated the Office of Equity and Civil Rights' complaint filing system to incorporate complainant pronouns and remove unnecessary fields.
- Conducted two on-site Title IX compliance reviews at NSF awardee universities and seven desk audits of NSF awardee Title IX policies, procedures, and practices.

NSF's Key Planned and Ongoing Actions

- Reporting on findings and best practices available by the end of FY 2025 from the on-site Title IX review of a scientific research organization conducted in September 2024.
- Participating in the Interagency Working Group on Safe and Inclusive STEM Environments as a co-chair to tailor NSF's promising practices to the practices and standard guidelines identified by the working group.
- Selecting a contractor with expertise in designing restorative justice approaches to address sexual and other forms of harassment and discrimination at NSF-funded off-campus or off-site research venues.
- Conducting a formal assessment of the Safe and Inclusive Fieldwork Plans Pilot that runs through FY 2024 and into FY 2025.

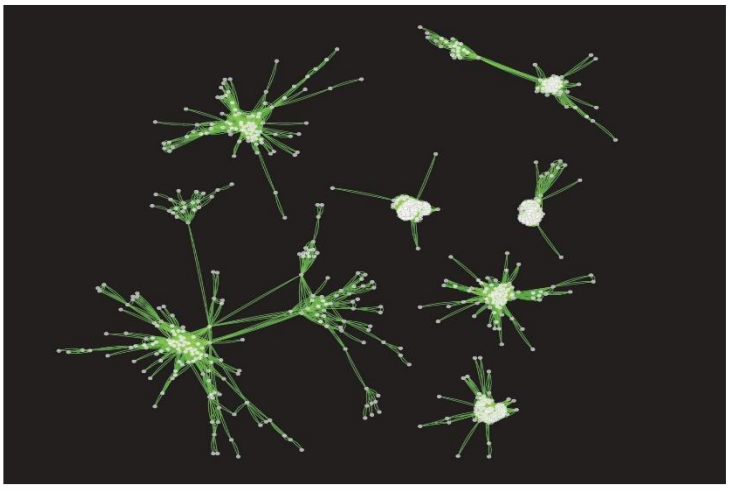
Challenge 3: Growing Participation and Capacity in STEM Education and Workforce

Recent National Science Board (NSB) reports indicate the United States is facing a STEM talent crisis that is putting our economic and national security at risk. Although U.S. investment in research and development remains a tremendous strength, the United States is underperforming in preK-12 education compared to other peer countries and is not producing STEM workers in sufficient numbers or diversity to meet the workforce needs of the 21st century. Instead, to fill STEM jobs, the United States has long relied on foreign-born workers. The NSB concluded that to remain globally competitive, the nation must continue to attract foreign talent but also grow its domestic STEM workforce.[8] In addition, the CHIPS and Science Act requires outreach to underserved populations and broadened participation in major research awards.

According to the NSB, 2024 indicators show the nation is "leaving talent on the bench," including individuals from different cultural backgrounds, communities, geographic regions, and socioeconomic status. The NSB conceptualized underrepresented talent as the "Missing Millions" due to the difference between the demographics of the research community and the demographics of the nation.

KEY FACTS

- This challenge involves an operation that is critical to an NSF core mission.
- Greater participation in STEM is key to U.S. economic competitiveness worldwide and to national security.
- Broadening participation in STEM is a top priority of NSF, the NSB, the President, and Congress.
- Women, minorities, and persons with disabilities remain underrepresented in STEM.
- The CHIPS and Science Act requires NSF to address underrepresentation in STEM.
- NSF has created an Equity Ecosystem framework to broaden participation in STEM, ensure equity in NSF program delivery, and promote diversity, equity, inclusion, and access in the NSF workforce.



Through the support of NSF's EPSCoR, researchers use data visualization to compare genomes across species.
Credit: Stephen Smith and Casey Dunn, Brown University

To broaden participation and grow its domestic STEM workforce, NSF has expanded outreach and awards to underrepresented groups and organizations in STEM. NSF established the *Growing Research Access for Nationally Transformative Equity and Diversity* (GRANTED) initiative, which supports the development of the research enterprise, particularly at emerging research and minority-serving institutions. NSF doubled the number of *Established Program to Stimulate Competitive Research* (EPSCoR) fellows and recently awarded six projects, totaling $7.6 million, to advance equitable STEM education and training

[8] *See* Talent is the Treasure: Who Are We Leaving on the Bench, March 2024, and Science & Engineering Indicators 2024, May 30, 2024

Sundial Peak in the Wasatch Mountains, where Utah researchers modeled the year-to-year variability in precipitation and temperature in work partially supported by iUTAH EPSCoR and funded by NSF. *Credit: David White*

opportunities that strengthen the nation's semiconductor workforce. NSF also established its Equity Ecosystem framework, which aims to broaden participation in STEM and ensure equity in NSF program delivery.[9]

NSF's Key Completed Actions

- Published an FY 2024-2025 Agency Priority Goal Action Plan to "Improve Representation in the Scientific Enterprise."
- Increased awards, including investing more than $64 million in GRANTED in FY 2024.
- Doubled the number of EPSCoR Research Fellows.
- Enlarged focus on rural STEM education and workforce development.
- Expanded outreach to emerging research institutions and minority-serving institutions.
- Increased funding opportunities focused on Tribal Colleges and Universities, Hispanic Serving Institutions, Historically Black Colleges and Universities, and persons with disabilities.

NSF's Key Planned and Ongoing Actions

- Advancing efforts to reach agency-wide EPSCoR funding targets.
- Including Broader Impacts experts on all Committees of Visitors for the next 3 years.
- Continuing to study and provide better data to staff on underrepresented groups and organizations in NSF's portfolio.
- Incorporating the Creating Opportunities Everywhere approach into NSF's core research portfolio.

[9] The Equity Ecosystem framework also promotes diversity, equity, inclusion, and accessibility within the NSF workforce.

Challenge 4: Overseeing the United States Antarctic Program (USAP)

NSF, through the USAP, manages U.S. scientific research in Antarctica. Antarctica's remote location, extreme environment, and the short period of time each year during which the continent is accessible present challenges above and beyond those typically encountered for domestic science operations. NSF operates three permanent, year-round stations in Antarctica: McMurdo, Palmer, and Amundsen-Scott South Pole stations, as well as a research vessel and temporary field stations.

KEY FACTS

- This challenge involves an operation that is critical to an NSF core mission.
- Antarctica's environment presents unique operating and contract monitoring challenges.
- The Antarctic Support Contract is NSF's largest and most visible contract, valued at $2.8 billion over nearly 15 years. It will expire in September 2026.
- NSF is currently soliciting for the Antarctic Science and Engineering Support Contract as a replacement to the Antarctic Support Contract. The anticipated contract will run 20 years with a ceiling of $8 billion.
- NSF is undertaking long-range infrastructure modernization projects and planning across the program.
- NSF faces ongoing challenges to vetting Antarctic Support Contract staff on timelines that support operational requirements.

Management of the Antarctic Support Contract

The Antarctic Support Contract is NSF's largest, valued at $2.8 billion over nearly 15 years. The Office of Polar Programs (OPP) monitors contract performance, with several other NSF offices collaborating to manage the USAP more broadly. Managing the contract is complex and requires a strong cost monitoring program, oversight of deliverables and deadline requirements, and appropriate consideration of risks. Because of these complexities, NSF must obtain timely audits of the Antarctic Support Contractor's claimed costs to ensure the costs are allowable, allocable, and reasonable.

Procurement of the Antarctic Science and Engineering Support Contract

The Antarctic Support Contract's period of performance has been extended from March 2025 to September 2026. NSF is procuring the next USAP support contract, to be known as the Antarctic Science and Engineering Support Contract (ASESC), and intends the ASESC to be a single award, indefinite delivery, indefinite quantity (IDIQ) hybrid contract. NSF anticipates a 20-year contract with an $8 billion ceiling. NSF will need to closely monitor the transition from the Antarctic Support Contract to the ASESC to ensure the research stations can fully support Antarctic-based science.

Construction Delays and Deferred Science

Long-range infrastructure investment projects at USAP's three permanent stations have faced delays. For example, staffing changes, hiring challenges, and design errors related to the McMurdo-based Antarctic Infrastructure Modernization for Science (AIMS) project have affected the timeline and will push major components of the project beyond September 2026. Further, the COVID-19 pandemic halted on-site construction work in March 2020, and ultimately NSF prioritized two modules: 1) Lodging and 2) the Vehicle Equipment and Operations Center. Construction resumed in

October 2023 and continues on the Lodging module. However, NSF placed the Vehicle Equipment and Operations Center module and the separate Information Technology and Communications primary addition project on hold to prioritize completion of the Lodging module.

NSF is also considering a series of large-scale recapitalization projects at the South Pole Station to address normal wear and tear, environmental challenges, aging infrastructure, and evolving scientific research interests. NSF is also planning to "lift" the Atmospheric Research Observatory and conduct other urgent facility maintenance projects. These projects will temporarily reduce NSF's ability to support new scientific research at the station. For the next two field seasons (August 2024 through March 2026), NSF will prioritize already-funded science projects while limiting support for new projects.

Finally, NSF is soliciting an integrator for the design and build of a new Antarctic Research Vessel to replace the Research Vessel Icebreaker (RVIB) *Nathaniel B. Palmer*, which was commissioned in 1978. In July 2024, NSF also ended its charter for the Antarctic Research and Supply Vessel (ARSV) *Laurence M. Gould*. As a result, only the RVIB *Nathaniel B. Palmer* will be available for the next 10 years or longer.

The RVIB *Nathaniel B. Palmer* at Davis Station anchorage in Antarctica with an aurora australis light show overhead. *Credit: Scott Crabbe (Available under Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International)*

Vetting of Contractors

In 2022, we reported that NSF did not ensure all USAP contract employees were onboarded and vetted in accordance with NSF requirements; instead, NSF relied on the contractor's internal vetting processes, which are less rigorous than the minimum level of investigation.[10] OPP has since modified its process to follow federal requirements for vetting and credentialing contractors that require elevated access to USAP systems and data. NSF also modified the Antarctic Support Contract to require the contractor's compliance with NSF vetting process for all contract employees. Though OPP is submitting seasonal contractors to NSF for vetting, challenges remain with timely vetting of U.S. citizens before deployment to Antarctica and obtaining support from other federal agencies to help vet foreign nationals working in the USAP.

Occupational Health and Safety

In 2023, we began an inspection of NSF's oversight of USAP occupational health and safety. As part of our inspection, we are assessing the USAP contractor's safety program and evaluating safety complaints reported to us by USAP participants.

NSF's Key Completed Actions

- Initiated development of the solicitation for the ASESC, which will replace the Antarctic Support Contract.
- Hired a new executive officer to oversee OPP Front Office groups in the areas of environment, communications, outreach and media, policy, budget, and program analysis and management.
- Hired a new OPP deployment specialist to oversee contractor onboarding and separation and monitor the hiring process.
- Used commercial vehicles for on-continent transport, which allowed USAP to leverage additional resources without taking on the future operating cost of expanding the USAP-owned fleet.
- Issued a draft South Pole Station Master Plan for comment.

NSF's Key Planned and Ongoing Actions

- Awarding the ASESC in FY 2025.
- Ongoing construction on the lodging module at McMurdo Station.
- Placing dedicated construction engineering resources at McMurdo Station to increase direct federal oversight of the lodging construction.
- Deploying military C-130s at key times during the upcoming season to alleviate the need to send the ski-equipped LC-130 fleet off-continent, allowing for more on-continent scientific support.
- Continuing efforts to meet NSF vetting requirements for contractors.

[10] NSF OIG Report No. 22-6-004, NSF Vetting of United States Antarctic Program Contractors, March 18, 2022

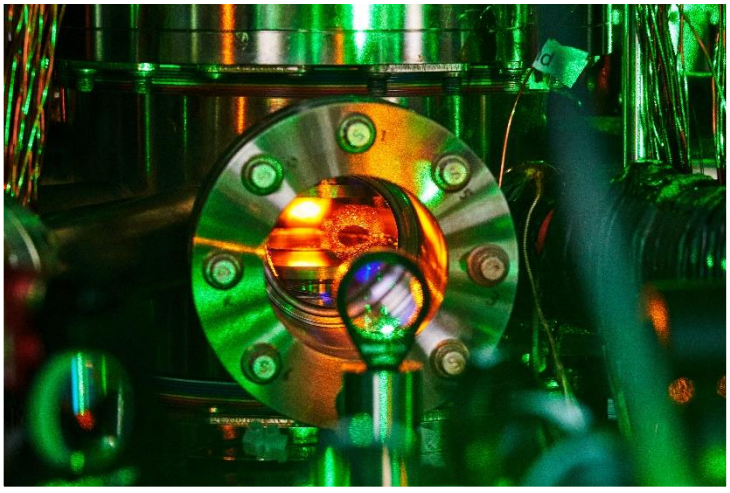
Challenge 5: Overseeing NSF's Funding Portfolio

Making grants to support promising scientific research is a key element of NSF's mission. However, NSF's grant making environment has experienced significant changes over the past several years. The CHIPS and Science Act, enacted August 9, 2022, formally established the Technology, Innovation, and Partnerships (TIP) directorate and created several new requirements for NSF related to research security, broadening participation in the research enterprise, and strengthening STEM education. It also provided NSF's TIP with authority to use new types of award instruments. NSF has responded to this changing environment by strengthening its controls and implementing risk mitigation techniques, but many of the impacts from these changes are still early in their lifecycles.

NSF is continuing to manage the many requirements of the CHIPS and Science Act while facing an uncertain fiscal environment. The Act authorized NSF's budget to more than double within 5 years, to nearly $19 billion. However, actual funding has been constrained, with NSF receiving an overall budget of $9.06 billion in FY 2024 (42 percent less than what was authorized) and requesting an overall budget of $10.1 billion in FY 2025 (40 percent less than what was authorized). If total appropriated funding continues to fall short of authorized amounts, NSF will have to overcome continued uncertainty and fiscal challenges to accomplish the various requirements of the Act.

KEY FACTS

- This challenge involves an operation that is critical to an NSF core mission. It also presents a risk of fraud, waste, or abuse of NSF or other government assets.
- The CHIPS and Science Act of 2022 formally established the TIP Directorate, created several new requirements, and authorized NSF to use new funding instruments.
- Actual NSF funding levels have been significantly more constrained than what was authorized in the CHIPS and Science Act.
- TIP continues to mature as a directorate and has made extensive progress in implementing new programs.
- NSF is taking steps to manage its funding portfolio risks.



NSF-supported researchers created the first-ever Bose-Einstein condensate made from molecules, which was cooled to 5 nanoKelvin. *Credit: Sebastian Will/Will Lab/Columbia University*

Amidst this uncertainty, the TIP directorate continues to grow and mature. In FY 2024, TIP made extensive progress in implementing its flagship program, Regional Innovation Engines (NSF Engines), and several other new programs. The NSF Engines program aims to support multiple regional innovation ecosystems across the United States to spur economic growth. In FY 2024, NSF established the first-ever NSF Regional Innovation Engines by awarding 10 awards worth $15 million each over the first 2 years, with the potential to receive up to $160 million each for up to 10 years. NSF also issued 58 NSF Engines Development awards worth $1 million over 2 years. The

NSF Engines program supports diverse groups, many of which are non-traditional award recipients with little experience managing federal funds. NSF has taken steps to manage these risks; however, new award instruments, new programs, an expanded mission, and an increase — even if less than anticipated — in funding will bring inherent challenges in ensuring proper stewardship and accountability of award funds.

In April 2024, the U.S. Office of Management and Budget updated the "Uniform Guidance" (Title 2 of the Code of Federal Regulations), which consists of administrative requirements, cost principles, and audit requirements for federal awards. The new guidance is effective for all federal awards issued on or after October 1, 2024. On August 28, 2024, NSF issued an update to its Award Terms and Conditions to implement the updated Uniform Guidance. Although NSF has taken appropriate steps to implement the Uniform Guidance, the more than 2,000 institutions that receive NSF funding will have to amend their award management environments to comply with the updated federal and NSF guidelines. This significant change to the regulatory environment may create an increased risk of misspending on federal awards.

NSF's Key Completed Actions

- Established and implemented targeted oversight activities to cover 50 percent of the NSF Engines Development award portfolio.
- Developed and conducted targeted webinar outreach to assist all NSF Engines recipients, with a focus on those unfamiliar with managing federal awards.
- Developed an oversight plan for the NSF Regional Innovation Engines that included a review of all recipients through a combination of site visits, desk reviews, and targeted review assessments.
- Educated NSF leadership on risk management, emphasizing risk areas identified by the U.S. Government Accountability Office and NSF OIG.

NSF's Key Planned and Ongoing Actions

- Conduct NSF Engines oversight and evaluate the results.
- Host webinars on financial stewardship and cost allowability for EPSCoR recipients.
- Conduct triennial improper payment risk assessment, including quantitative testing of financial assistance portfolio payments.
- Expand the distribution of risk management guidance at the program level.
- Create a risk management framework for new types of awards.

Challenge 6: Managing Human Capital

One of the priorities of the President's Management Agenda is strengthening and empowering the federal workforce.[11] NSF has continued to demonstrate its ability to engage its employees. According to the Partnership for Public Service, NSF is a top-ten place to work in the federal government.[12]

A defining characteristic of NSF's human capital management strategy continues to be its use of temporary staff, which includes both those brought on through authority provided by the *Intergovernmental Personnel Act*, and those employed through NSF's own Visiting Scientist, Engineer, and Educator program. These individuals — referred to as IPAs or rotators — bring fresh perspectives from all fields of science and engineering to support NSF's mission. More than 1,500 federal employees and 200 non-federal employees comprise NSF's workforce.[13]

As part of its human capital management strategy, NSF allows IPAs to hold supervisory positions. As of April 2024, NSF's IPAs accounted for 8 percent of all supervisors at NSF and were responsible for directly supervising 10 percent of NSF's workforce. However, according to FY 2022 Office of Personnel Management (OPM) guidance, IPAs do not have authority to serve in supervisory roles. NSF is working with OPM to determine a path forward that is compliant.

KEY FACTS

- This issue is related to key initiatives of the President.
- IPAs continue to play a significant role in NSF's human capital management strategy.
- NSF allows IPAs to hold supervisory positions, which conflicts with guidance from OPM. NSF is aware of OPM's guidance and is working towards a resolution.
- NSF has adjusted its AD pay bands and policies to help prevent future instances of employee pay exceeding statutory limitations.
- NSF continues its implementation of the Workspace Management Policy and workspace realignment.

In addition to using temporary appointments of non-federal staff, NSF employs part of its workforce under an excepted service compensation program authorized by the NSF Act, which includes five administratively determined (AD) pay bands. NSF updated its policy on AD pay bands in September 2023 after confirming with OPM and the U.S. Department of Justice that its pay bands are subject to statutory pay limitations, and that NSF's pay levels exceeded the statutory cap on basic pay with locality. In January 2024, NSF revised its AD pay bands to comply with the federal limitations and waived debt collection of more than $15 million in overpayments. Although NSF has amended its AD pay bands to comply with the statutory limits, we are conducting an audit to determine if NSF has adequate policies and procedures to ensure staff in AD positions are paid in accordance with federal regulations.

NSF continues to evaluate how best to modernize how it works while strengthening relationships and personal interactions. NSF has a hybrid work environment that includes staff who work full-time

[11] Workforce Priority | President's Management Agenda | Performance.gov

[12] Partnership for Public Service, 2023 Best Places to Work in the Federal Government

[13] National Science Foundation, NSF FY 2025 Budget Request to Congress

NSF Headquarters in Alexandria, VA. *Credit: JHVEPhoto*

at Headquarters, telework part-time or full-time, or work remotely full-time. In 2023, NSF introduced its Workspace Management Policy and Telework and Remote Work Policy to help manage its dispersed workforce and physical footprint. The NSF Workspace Management Policy enables NSF to partner with the Union and enhance NSF workspaces through hoteling, shared workspaces, and other measures, while establishing footprints that account for current needs and address plans to support a hybrid workforce. NSF's implementation of the Workspace Management Policy is ongoing as its space realignment continues.

NSF's Key Completed Actions

- Implemented the AD Pay Setting Policy to set pay within statutory limits.
- Implemented the Workspace Management Policy and Telework and Remote Work Policy.
- Realigned workspace for one office and four directorates.
- As part of IPA vetting, began requiring notification of any finding or determination of sexual harassment, other forms of harassment, or sexual assault made by any institution or professional organization.

NSF's Key Planned and Ongoing Actions

- Conducting research and benchmarking studies of comparable external pay for work similar to the functions of NSF's program directors.
- Conducting oversight and evaluation of the AD pay setting policy.
- Continuing to update internal resources to engage staff on the Workspace Management Policy and Telework and Remote Work Policy.
- Continuing to develop policies and procedures to improve IPA vetting for undue foreign influence.

Challenge 7: Mitigating Threats to Research Security

Safeguarding the U.S. research enterprise from threats of inappropriate foreign influence continues to be of critical importance. Although significant challenges remain, U.S. funding agencies and academia have made progress in combating malign foreign influence, while maintaining an open research environment that fosters collaboration, transparency, and the free exchange of ideas.

NSF, and other agencies that fund research, continue to face challenges from foreign talent recruitment programs. According to the National Science and Technology Council, a foreign government-sponsored talent recruitment program is an effort organized, managed, or funded by a foreign government, or a foreign government instrumentality or entity, to recruit science and technology professionals or students in targeted fields. Although some of these programs are legitimate, many encourage or direct unethical and criminal behaviors, including the deliberate nondisclosure of the recruit's foreign position or employment and associated foreign scientific funding. Nondisclosure of affiliations with any such program may adversely affect NSF decision-making on proposals. Agreements for participation in some programs include language that creates conflicts of commitment and/or conflicts of interest for researchers, such as requirements to attribute U.S.-funded work to a foreign institution; recruit or train other talent recruitment program members; circumvent merit-based processes; and replicate or transfer U.S.-funded work to another country.

KEY FACTS

- This challenge presents a risk of fraud, waste, and abuse of NSF or other government assets.
- Federal agencies and academia have made progress in combating malign foreign influence on the U.S. research enterprise.
- NSF has worked to mitigate these threats by implementing new proposal certifications, strengthening research security-related disclosure requirements, and establishing a new process to assess proposals for potential national security concerns.
- NSF has also expanded research security training available to the research community.

Over the past 5 years, NSF has taken substantive action to mitigate threats posed by these programs. It strengthened disclosure requirements and provided compliance recommendations to U.S. academic institutions to ensure accurate disclosures to U.S. funding agencies. Further, NSF created an Office of the Chief of Research Security Strategy and Policy, which has taken a leading role in federal government efforts to combat this threat. It has expanded research security training and educated the research community through domestic and international outreach. NSF should continue to assess and refine its controls in this area and ensure that it has sufficient staff and resources to address this challenge.

NSF's Key Completed Actions

- Created a Chief of Research Security Strategy and Policy position, later codified in the CHIPS and Science Act.
- Formed the Research Security Liaison Group to develop a culture of research security at NSF and to help coordinate research security issues across the agency.
- Developed and implemented mandatory research security training for staff and rotators in direct communication with recipient organizations and principal investigators.

- Made two awards to establish the Research Security and Integrity Information Sharing Analysis Organization (SECURE Center), as required by the CHIPS and Science Act.
- Released four interactive research security training modules. These modules advise federal research funding recipients of risks and threats to the global research ecosystem and provide tools to protect against such risks.
- Funded a research community-wide workshop to support the development of the "Research on Research Security" program.
- Developed TRUST (Trusted Research Using Safeguards and Transparency), a new process to assess the risks associated with NSF proposals, including those related to potential national security concerns, as directed by the CHIPS and Science Act.
- Developed a reporting process (Foreign Financial Disclosure Report) for institutions of higher education that are direct recipients of NSF funding to disclose gifts and contracts received from a foreign country of concern, as mandated by Section 10339B of the CHIPS and Science Act.
- Educated the research community about research security-related risks and the importance of compliance with NSF's policies and procedures.
- Strengthened disclosure requirements and processes, including implementation of a requirement for senior award personnel to certify during the proposal process that they are not a party in a malign foreign talent recruitment program, and that the information contained in their Biographical Sketch and Current and Pending (Other) Support documents is accurate, current, and complete.
- Launched the Research Security Strategy and Policy Group; developed and implemented a research security data analytics capability that captures nondisclosure of foreign affiliations, sources of funding, and collaborations that present conflicts of commitment or interest.
- Communicated an express prohibition of Foreign Talent Plan membership for all NSF staff, including rotators, thereby improving the process of vetting incoming rotators.
- Increased collaboration with NSF OIG, U.S. government agencies, and other relevant stakeholders.

NSF's Key Planned and Ongoing Actions

- Capturing nondisclosure of foreign affiliations, sources of funding, and collaborations that present conflicts of commitment or interest.
- Continuing to conduct and monitor mandatory research security training for staff and rotators in direct communication with recipient organizations and principal investigators.
- Continuing education of the research community about risks presented by malign foreign talent recruitment programs and the importance of compliance with NSF policies and procedures.
- Continuing to refine and scale up research security-related analytics capabilities and expand a pilot program to share research security-related information with the research community.
- Maintaining collaborative relationships with NSF OIG, U.S. government agencies, and other relevant stakeholders.
- Developing guidelines for strengthening research security, including those required by the CHIPS and Science Act and National Security Presidential Memorandum 33.
- Expanding the Research-on-Research Security Program to include international partners.
- Implementing the TRUST process with the pilot phase focused on quantum-related projects.

National Defense Authorization Act General Notification

Pursuant to Pub. L. No. 117-263 § 5274, business entities and non-governmental organizations specifically identified in this report have 30 days from the date of report publication to review this report and submit a written response to NSF OIG that clarifies or provides additional context for each instance within the report in which the business entity or non-governmental organizations is specifically identified. Responses that conform to the requirements set forth in the statute will be attached to the final, published report.

If you find your business entity or non-governmental organization was specifically identified in this report and wish to submit comments under the above-referenced statute, please send your response within 30 days of the publication date of this report to OIGPL117-263@nsf.gov, no later than December 15, 2024. We request that comments be in .pdf format, be free from any proprietary or otherwise sensitive information, and not exceed two pages. Please note, a response that does not satisfy the purpose set forth by the statute will not be attached to the final report.

About Us

NSF OIG was established in 1989, in compliance with the *Inspector General Act of 1978* (5 USC 401-24). Our mission is to provide independent oversight of NSF to improve the effectiveness, efficiency, and economy of its programs and operations and to prevent and detect fraud, waste, and abuse.

Contact Us

Address:
U.S. National Science Foundation Office of Inspector General
2415 Eisenhower Avenue
Alexandria, VA 22314

Phone: 703-292-7100

Website: oig.nsf.gov
Follow us on X (formerly Twitter): x.com/NSFOIG

Congressional, media, and general inquiries: OIGPublicAffairs@nsf.gov
Freedom of Information Act inquiries: FOIAOIG@nsf.gov

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- Anonymous Hotline: 1-800-428-2189
- Mail: 2415 Eisenhower Avenue, Alexandria, VA 22314 ATTN: OIG HOTLINE

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