



2023

# AGENCY EQUITY ACTION PLAN



Submitted to

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Office of Management and Budget



# Plan

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**AGENCY NAME:** National Science Foundation

**AGENCY EQUITY TEAM LEAD:** Dr. Chuck Barber, NSF CDIO



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## Message from the Agency Head

Dear Colleagues,

Today, I am pleased to share the National Science Foundation's (NSF) Equity Action Plan, reinforcing our commitment to ensuring that all sectors of society can contribute to the scientific enterprise.

In February, the Biden administration issued Executive Order (EO) 14091, "Further Advancing Racial Equity and Support for Underserved Communities Through the Federal Government." This order targets the significant barriers that underserved communities still face by directing federal agencies to undertake additional efforts to advance equity initiatives and integrate equity into all federal planning and decision-making aspects.

Diversity and inclusion are core values of NSF. We continue to advocate that societal equity drives innovation and creates accessible opportunities for people of all backgrounds, benefiting humanity. This plan articulates our approach to championing racial equity and advancing equal opportunity for underserved communities, which includes increasing public access to NSF-funded research, promoting equity in procurement, enhancing equitable data practices, creating research and learning environments free from harassment, and further diversifying the research community.

Broadening participation in science, technology, engineering, and mathematics (STEM) at scale remains a key priority. Historically, NSF invests over \$1 billion each year in broadening participation programs and projects at institutions nationwide. Programs already underway — such as the [Growing Research Access for Nationally Transformative Equity and Diversity](#) program, the [Established Program to Stimulate Competitive Research \(EPSCoR\)](#), and other activities in the NSF Broadening Participation in STEM Portfolio — provide funding opportunities to support underrepresented students at all educational levels. We have taken additional steps in recent years to increase participation in STEM among populations that have been under-resourced and underserved. For example:

- Expanding the Broadening Participation in STEM Portfolio, including the NSF Eddie Bernice Johnson [Inclusion Across the Nation of Communities of Learners of Underrepresented Discoverers in Engineering and Science \(INCLUDES\)](#) program.
- Responding to the National Science Board's February 2021 resolutions to broaden participation by offering merit review panelists training videos on unconscious bias and other topics, along with piloting the inclusion of broader impacts experts in committees of visitors.
- Requesting a 23.5% increase over the actual funding in Fiscal Year 2021 for EPSCoR.



NSF is also addressing recommendations from a staff-led Racial Equity Task Force that examines the potential for racial barriers in NSF policies and practices and how NSF can address such barriers internally for the NSF workforce and externally for program delivery. Additionally, NSF is fostering geographic diversity in research and development activities with the [NSF Regional Innovation Engines](#) and expanded EPSCoR programs.

In December, NSF created a new executive position of chief diversity and inclusion officer (CDIO), which was included in the "CHIPS and Science Act of 2022." The primary responsibility of this position is to coordinate NSF's work to advance equity and lead the integration and sustainability of diversity, equity, inclusion, and accessibility (DEIA) into our culture, mission, and all aspects of agency operations and decision-making. Under the CDIO's leadership, we will ensure that equity and DEIA remain priorities, maintain organizational mechanisms for accountability, and advance new initiatives and legislation related to equity and DEIA in the NSF workplace and the STEM enterprise.

In keeping with NSF's mission to promote the progress of science, advance national health, prosperity, and welfare, and to secure the national defense, we will continue delivering on equity and opportunity to develop a lasting future for discovery and innovation across all science and engineering disciplines and keep the U.S. at the forefront of global leadership.

Sincerely,

Sethuraman Panchanathan  
Director



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## Advancing Equity Through Agency Mission

In continuing to advance the progress of science, maintain our Nation's scientific leadership and global competitiveness, and safeguard our National Security, the National Science Foundation will deliberately recruit, educate, train, and retain more scientists, engineers, and computer scientists to leverage the wide-ranging talent that society offers. This cohort includes underrepresented populations and underserved communities that remain the most prominent untapped Science, Technology, Engineering, and Mathematics (STEM) talent pools in the United States. NSF's continued leadership to capitalize on the dynamic opportunities that characterize a complex and sophisticated technology-centric landscape will also depend on our ability to optimize the collective power of diverse talent to bring a wealth of untapped potential, experience, and value to the NSF mission. Moreover, the Foundation will encourage all Americans' full participation and deliberately strive to eliminate systemic barriers to their success. Through this approach, NSF will continue to advance strategies that integrate the missing millions of STEM talent, thus creating opportunities for previously marginalized communities to contribute to the scientific enterprise.

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## Executive Summary of Equity Action Plan

NSF's Agency Equity Team (AET) is executing our plan to champion racial equity and advance equal opportunity for underserved communities in accordance with EO 14091. Ongoing activities and new initiatives include improving public access to NSF-funded research, increasing participation in Federal Acquisition Regulation-based solicitation and awards, optimizing demographic data collection in support of equity assessments, addressing sexual and other forms of harassment, and creating opportunities to diversify STEM. NSF has also established the Office of the Chief Diversity Officer and the position of the Chief Diversity Officer in accordance with the CHIPS and Science Act of 2022.

### **Strategy #1: Implement NSF's Revised Public Access Plan to Increase Equitable Access to NSF-Funded Research**

Academic research and NSF working group findings, and years of public feedback to NSF officials, including program officers, NSF directors, and directly to NSF's Public Access and Open Science (PAOS) representatives indicate that paywalls and other publication restrictions limit the accessibility of NSF-supported research for those unable to pay for it. Access to publications is a privilege to those entities affiliated with institutions or organizations that will pay for it, have access to libraries that provide it, or have other means of accessibility (e.g., scientific society membership).



*Publication and access restrictions reduce researchers' opportunities to publish their research, prevent access to outlets that charge authors per page or article, and therefore limit the ability of researchers to participate in the scientific research ecosystem fully.*

NSF's updated [Public Access Plan](#) (2023) is intended to ensure that the ability to publish or access NSF-funded studies to support research, education, and new economic activity will not be hindered by a researcher's ability to pay. Researchers can upload their publications without cost through NSF's Public Access Repository. Implementation of the updated NSF Public Access Plan will ensure that the research community and members of the public have immediate access to scientific publications. NSF will also require researchers to provide access to research data from NSF-funded studies. Research data must be uploaded to publicly accessible locations (links via publications in journals and repositories) to the extent possible, with restrictions allowed to address privacy, security concerns, or other recognized data access limitations. Implementing these policies will ensure equitable access to NSF-funded research and that all Americans, including scientists from underserved and under-resourced research institutions, can access NSF research products, publications, and data. These actions will facilitate equitable public access to research output and expand opportunities for data reuse from NSF-funded studies. New economic activity derived from these data will be independent of a researcher's ability to pay open-access publication fees.

### **Strategy #2: Increase Participation in Federal Acquisition Regulation (FAR)-based Solicitations and Awards to Promote an Inclusive Contracting Environment**

Under EO 13985, *Advancing Racial Equity and Support for Underserved Communities Through the Federal Government*, and other directives, NSF continues to remediate federal acquisition process complexity and lack of access to procurement and program staff. NSF will improve outreach efforts, market research, and acquisition planning to increase access and participation in FAR-based solicitations and awards for disadvantaged entities such as Minority Serving Institutions (MSIs) and other similar groups.

### **Strategy #3: Optimize Demographic Data Collection to Support Robust Equity Assessments**

NSF has determined the need to evaluate the impacts of its existing investments concerning equity and response rates from beneficiaries of NSF programs (such as PIs, reviewers, post-doctoral fellows, teachers, and students). The Foundation will optimize demographic data collection to support equity assessments that address an increasing trend in "non-response" categories that PIs and reviewers observe regarding demographic data. Through these actions, NSF will ensure it leverages the most accurate and robust demographic data for analysis.



#### **Strategy #4: Enhance NSF’s Harassment Prevention Efforts to Further Reduce Sexual and Other Forms of Harassment**

As indicated by scientific studies/literature, NSF-funded research, and NSF-led evaluations, sexual and other forms of harassment present barriers to full participation by underrepresented groups in the scientific endeavor. Remote fieldwork areas and sites also present unique challenges that can increase the likelihood of harassment, which may include challenging physical conditions, social isolation, and limited communication methods. NSF will expand efforts to address sexual and other forms of harassment, including by strengthening accountability measures and extending the reach of NSF harassment prevention efforts to research activities at field sites and on research vessels to help ensure all NSF-funded research and learning environments are free from sexual harassment and other forms of harassment.

#### **Strategy #5: Create Opportunities Everywhere to Reach the “Missing Millions” and Diversify STEM**

NSF’s Create Opportunities Everywhere (COE) is a comprehensive approach for inspiring, attracting, supporting, and advancing groups underrepresented in STEM. This strategy incorporates all NSF directorates and offices and encourages increased investment and advocacy for equity in program delivery while building on the concept of the “Missing Millions.” The National Science Board (NSB) conceptualizes the Missing Millions as the difference between the demographics of the research community and the Nation’s demographics. The NSB has charged NSF with reducing this talent gap. Through COE, NSF will accelerate equitable access to NSF’s research funding, foster collaborations and partnerships with educational institutions serving underrepresented groups, and support developing a diverse STEM education and workforce enterprise. Through this comprehensive approach, NSF intends to further integrate equity and DEIA into all program efforts to strengthen the US STEM infrastructure by drawing on the full extent of national talent and resources.

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## Equity Progress Update and Accomplishments

### **A. 2022 Equity Action Plan Update**

- As a result of its ongoing efforts to increase participation in FAR-based solicitation and awards processes, NSF is on track to meet and exceed agency goals for small business participation for a consecutive fiscal year. This forecast follows the A+ grade NSF received on its FY22 scorecard in July for exceeding all its small business goals.
- To further address sexual and other forms of harassment, NSF’s Office of Equity and Civil Rights (OECR) is finalizing the recruitment and selection of a Sexual Assault/Harassment Prevention and Response (SAHPR) Program Manager.





- In August, OECR also released a Dear Colleague letter, which encourages applicants to submit research proposals to NSF-funding opportunities that address the following:
    - Anti-harassment in STEM Education and Research Settings and Workplaces, and
    - Culture Change and Organizational Policy Structure Projects to Create Harassment-Free STEM Education and Research Settings and Workplaces. OECR has also engaged in collaborative discussions and benchmarking with ten (10) federal agency partners to collect information on types of SAHPR support services offered, tracking and reporting incidents, measuring success, and program logistics.
  - In July, the American Association for the Advancement of Science (AAAS) co-hosted a webinar titled "[How can public access advance equity and learning?](#)".
  - NSF also participates in the Year of Open Science, the federal government's interagency effort to promote equity in Public Access and Open Science.
  - OECR has also engaged in collaborative discussions and benchmarking with ten (10) federal agency partners to collect information on types of SAHPR support services offered, tracking and reporting incidents, measuring success, and program logistics.
  - NSF engaged with European stakeholders at the EU Horizon Europe Gender Action Plus Workshop to better understand current practices and focus areas among international research funding institutions to prevent and respond to harassment.
- B. **Environmental Justice Scorecard:** (according to section 223 of EO 14008): NSF is advancing environmental justice for communities across America in alignment with the agency's ongoing efforts to implement the [Justice40 Initiative](#). NSF's Phase One Scorecard metrics and highlights in FY 22 included three (3) Justice40 covered program(s), three (3) funding announcement(s) covered under the Justice40 Initiative, and \$49 million in funding made available from Justice40 covered programs. Future versions of the Environmental Justice Scorecard will provide additional information and updates on the benefits of Justice40-covered programs.
- C. **Additional Efforts to Advance Equity**
- In the past year, NSF has hosted several webinars and virtual meetings and created an archive of available content, which can be accessed [here](#), to help inform on implementing the Public Access Plan. Advising on fulfilling this plan promotes equal access to knowledge, enables global reach to include disadvantaged communities, provides an open platform for sharing research, and encourages a diverse range of contributions. These actions also facilitate collaboration among researchers and institutions, regardless of their geographic location or financial capacity.



- The National Science Foundation (NSF) and the Asian American Foundation collaborated to support the White House Initiative on Asian Americans, Native Hawaiians, and Pacific Islanders by introducing the "Demystifying Federal Grants" webinar series. This series was created to provide valuable knowledge and practical advice to assist community-based organizations in successfully applying for federal grants and accessing resources.
- NSF's chief diversity and inclusion officer (CDIO) has collaborated with a dedicated team of program directors (PDs) to leverage its review and awards process to ensure the Foundation's funded programs can reach the broad pool of untapped scientific talent. These discussions have yielded critical insights into how NSF can better support the inclusion of underrepresented scientists by emphasizing the importance of more general impact statements in grant applications, ensuring diversity within review panels, and increasing participation of researchers from Minority Serving Institutions (MSIs).
- Under the June 2022 Executive Order 14075, *Advancing Equality for Lesbian, Gay, Bisexual, Transgender, Queer, and Intersex (LGBTQI+) Individuals*, the Office of the Chief Statistician of the United States provided recommendations for Federal agencies on best practices to collect self-reported sexual orientation and gender identity (SOGI) data in federal statistical surveys. In an effort led by the CDIO, a dedicated team of individuals across the agency has developed a pilot survey to collect voluntary, non-personally identifiable SOGI data from within the NSF workforce. These efforts are taking place in concert with the National Council of Science and Engineering Statistics (NCSES) efforts to pilot the collection of SOGI data in their national surveys.

**D. Advancing Equity Through Key Legislation:** NSF is committed to the principle that a diverse scientific workforce is vital to promoting advances in knowledge, innovation, and the global competitiveness of the U.S. scientific enterprise. Under the [CHIPS and Science Act of 2022](#), NSF appointed its first CDIO in December. The office of the CDIO is responsible for guiding and leading the Foundation's strategic plans to promote diversity, equity, inclusion, and access (DEIA) in all NSF-funded activities. In addition to advocating for DEIA within the Foundation's workforce and funded programs, the CDIO is partnering with other agencies and thought leaders to advance the mission of broadening participation in the U.S. science and technology enterprise. The CDIO is guided by the principle that diversity, in all forms, enriches the scientific community, drives breakthroughs, and brings forth lasting solutions to urgent problems.

Among NSF's other efforts towards advancing equity, NSF will commit to examining the influence of sexual harassment in higher education institutions on the career advancement of individuals pursuing education and careers in STEM. Recent reports and legislation indicate harassment is pervasive in institutions of higher education and a deterrent to participation in STEM. According to the CHIPS and Science Act, NSF will undertake a follow-up study to the 2018 NASEM study to examine the influence of sexual harassment in institutions of higher education on the career advancement of individuals in the STEM workforce and assess progress in implementing recommendations from the 2018 report.



## Strategies to Advance Equity in FY 2024

### **Strategy #1: Implement NSF’s Revised Public Access Plan to Increase Equitable Access to NSF-funded Research**

#### Whole-of-Government Equity Objectives

By funding pertinent, novel, basic science resulting in valuable research data and publications (referred to as “research products”), NSF contributes to all Whole-of-Government Equity Objectives. Access to research products seeks to break down barriers that ensure institutions have access to the best and most recent scientific advances and the ability to make their research accessible immediately. These advantages often come with a cost – such as publication and subscription fees – which members of the broader public and less-resourced scientific communities may be unable to afford. Thus, each of the eight equity areas identified – Civil Rights, Criminal Justice, Economic Justice, Educational Equity, Environmental Justice, Global Equality, Health Equity, and Housing Justice and Community Investment – will have an opportunity to advance via the open science and public access efforts of NSF, as research in areas relevant to each become more accessible to all Americans.

#### Collaborating Agencies

NSF co-chairs the National Science and Technology Council (NSTC) Office of Science and Technology Policy (OSTP) Subcommittee on Open Science (SOS). This body is the nexus for interagency discussion and interaction on federal public access policy, including NSF’s Public Access Initiative. NSF routinely collaborates with other federal agencies through the SOS to the extent possible and as appropriate to Agency missions and priorities. This work will continue throughout the implementation of this strategy.

Notably, the development, implementation, and management of NSF’s Public Access Repository (NSF-PAR system) – initially created as a response to the [OSTP 2013 Memorandum on Increasing Access to the Results of Federally Funded Research](#) and currently being expanded as part of this strategy – is in partnership with the Department of Energy.

#### Barriers to Equity

Specific publishing models for federally funded data, publications, and other research require subscriptions or additional fees that present paywalls and hinder equitable access and use. The federal government’s updated public access and open science guidelines are designed to allow federal funding agencies to reduce/eliminate access limitations due to barriers to accessing publications and data that currently exist for under-resourced researchers, institutions, and members of the public. As noted by Nelson et al., elite institutions and resourced individuals have access that is



not impeded by resources. By making research products widely available, the barriers to equity will be on a path to reduction.

Barriers exist across the following areas:

- Barriers to access
  - Under-resourced *individuals and institutions* may be unable to afford the publications and research data from NSF-funded research accessed via subscriptions.
  - Sharing of research data has historically been optional, presenting the risk that data is either not shared at all or only shared within established research networks. This limits the ability of researchers, including those with limited access to such networks, to reuse Federally supported data in new research or business applications or to replicate existing research.
- Barriers to timely impact
  - Barriers for under-resourced *researchers* (principal investigators (PIs,) co-PIs, students, and other groups) and *research institutions* to pay unrestricted access fees charged by journals to make their research results available without a paywall and embargo. When researchers and institutions cannot pay these fees, their work may be subject to an optional 12-month publication embargo for federally funded peer-reviewed research articles. This interim delay behind a paywall limits immediate access to work produced by under-resourced researchers and the potential impact of their research in the short term.

Eliminating these access barriers levels the playing field, ensuring that the opportunity to utilize the knowledge and technology from NSF funding exists regardless of the ability of researchers to pay.

These actions can help ensure researchers from less-resourced institutions can build upon the best available science, have their work enter the scientific ecosystem at the same time as that stemming from more-resourced institutions, and ensure researchers and students are building skills, credentials, and opportunities that position them to advance in scientific careers. This can reduce visibility gaps introduced because some scientists can pay costly direct access fees while others cannot. A centralized repository allows all federally funded research output to become available without delay.

## Evidence Base to Support Strategy

The evidence supporting the strategy includes the following:

- The 2022 OSTP guidance [Ensuring Free, Immediate, and Equitable Access to Federally Funded Research](#) (“Nelson Memo”) and the [2021 OSTP Public Access Congressional Report](#) and [Economic Landscape](#). Using available data, OSTP estimates that “the societal and economic benefits of a change in federal policy toward immediate public access to federally funded



research results greatly exceed costs” and that “...any economic burden falling on individual researchers resulting from a zero-embargo publication policy would likely be offset by the greater benefits of increased visibility, consumption, and potential impact that their research would realize.” The OSTP Economic Landscape report acknowledges that limited transparency on publication costs indicates that many cost implications are based on estimates. An article by then Acting OSTP Director and her colleagues ([Nelson, A., Marcum, C., & Isler, J. \(2022\). Public Access to Advance Equity. \*Issues in Science and Technology\*, 39\(1\), 33–35.](#)) notes that “eliminating the barriers to discovery and research outputs are critically important to realizing the... commitment to equity [and the] commitment to providing research, innovation, cures, and improved health and well-being to the nation and the world.”

- A report of the General Conference of the United Nations Educational, Scientific and Cultural Organization (UNESCO) November 2021 meeting in Paris explains the benefits of open science ecosystems related to the equity and sustainable development goals and formally recommends that member states “collaborate in bilateral, regional, multilateral and global initiatives for the advancement of open science.” The report recommends the creation of, encouraging or enabling policy environment, to which implementation of NSF’s public access plan would contribute, and notes that “a paywalled method of publication, where immediate access to scientific publications is only granted in exchange for payment, is not aligned with the present Recommendation.”
- Input derived from NSF participation in the Subcommittee on Open Science (SOS) and deliverables from the subgroups of the SOS.
- In addition to recognizing the positive equity impact of public access policies, NSF recognizes potential equity challenges that could arise from public access implementation. The NSF Public Access and Open Science Working Group’s Equity of Access subgroup addresses this issue by identifying potential inequities arising from public access guidelines at different implementation phases. The literature points to four specific areas of equity challenges: (1) challenges for researchers and institutions based on resources available for public access implementation; (2) challenges based on methodologies and disciplines based on variation in public access infrastructure; (3) challenges for historically marginalized groups for whom critical issues of reclamation of rights and data sovereignty exist; and (4) challenges for international collaborations due to variation in international regulations and practices in data sharing. To address these challenges, NSF has identified four priority areas to manifest the equity promises of public access policies and minimize challenges. Actions include:
  - Consult with PIs and institutions to understand and respond to potential equity challenges. A key priority is focusing on under-represented and under-resourced institutions and the potential for increases in public access implementation costs.
  - Understanding and measuring investment in public access compliance’s financial and non-financial costs must improve. It remains unclear what the magnitude and distribution of costs



of public access requirements are likely to be. Understanding who will bear these costs and the impact on engagement with NSF programs is critical.

- Mitigating practices must have a measurable impact. Practices designed to broaden participation in STEM against the changes required for public access implementation must be carefully monitored for effectiveness. Evidence that measurement of impact does not have an iatrogenic effect (e.g., repeatedly polling the same cohort of URM researchers for feedback) is essential.
- Examination of equity barriers over time is critical. Some barriers, such as education on public access data storage repositories, may reflect transient initial barriers. Other barriers, such as PIs bearing the costs of public access implementation, may endure over the longer term and be more complex to address. Monitoring challenges over the long term over different implementation phases is a key priority.

To gain insight into equity barriers, NSF plans to release a request for information on equity in public access in the final months of 2023. Results from that request are expected to inform implementation options in 2024.

### Actions to Achieve Equity

Implementation of NSF's revised [Public Access Plan](#) (June 2023) will continue over the next year, and ongoing implementation of the Plan will be the primary action of this strategy.

The policies in the plan are intended to ensure that the ability to obtain funding, publish, and have NSF-funded research cited and used in furthering research, education, and new economic activity will not be dependent upon a researcher's ability to pay (often unreasonable) open access publication fees, and will be managed by processes that limit the additional burden on researchers. Specifically, the plan pledges that:

- All NSF-funded research **peer-reviewed scholarly publications** will be made freely available and publicly accessible in the NSF Public Access Repository ([NSF-PAR](#)) without embargo, and **associated scientific data** will be made available via the journal publications and in appropriate disciplinary repositories.
- **Critical metadata** associated with peer-reviewed publications and data from NSF-funded research *will be collected and made publicly available in NSF-PAR.*
- **Exceptions** to the data-sharing requirements will be made based on *legal, privacy, ethical, intellectual property, and national security* considerations, ensuring that data that might be misused to undermine equitable treatment of marginalized groups, for example, is secured and not so used.



These actions will ensure that all participants in the scientific research community have the broadest possible opportunity to use knowledge and data funded by the NSF, regardless of their ability to pay for such access. This action will also ensure that researchers at under-resourced institutions do not face inequity in having their research accessed by others to be utilized and built upon based on their ability to pay for the non-embargoed release of the work.

Although implementation of the revised Public Access Plan will be the primary action in 2024, additional actions will include:

- **External engagement of impacted communities.** NSF is committed to addressing the unintended equity consequences of changing public access policies. Periodic engagement will, therefore, provide opportunities for researchers, publishers, universities, libraries, and the public to alert NSF to equity challenges that should be addressed during implementation.
- **Gathering input from NSF staff to inform policy implementation.** Within NSF, five active subgroups of the Public Access and Open Science Working Group have participation from approximately fifty people across NSF; this cross-agency participation will continue to implement the updated public access plan equitably. The subgroups are 1) Data Management and Sharing, 2) Equity, 3) the FAIR Open Science program, 4) Outreach, and 5) enhancing NSF's Public Access Repository (the access portal for NSF-funded publications).
- **Possible development of targeted Dear Colleague Letters and solicitations** (e.g., further development of the Open Knowledge Network, funding of Research Coordination Networks, or other aligned NSF funding activities).

Such funding actions are expected to improve access to cyberinfrastructure supporting the knowledge economy, ensuring that the ability to comply with and benefit from updated Public Access policies does not rely on access to specialized knowledge about or ability to pay for supporting infrastructure. This funding will also ensure that the work of further opening the scientific scholarly system will include those that have too often been underrepresented and that underserved researchers have access to the funding NSF provides to make science more accessible to all. While funding opportunities will be varied, they will likely build on the success of existing programs such as:

- FAIROS RCN, which last year issued ten awards totaling \$12.5M, to build and enhance national coordination among researchers and other stakeholders to advance FAIR (findable, accessible, interoperable, reusable) data principles and open-science practices, advancing the availability of supporting cyberinfrastructure that will enable equity in the ability to comply with new policies.
- Funding of [The Minority-Serving Cyberinfrastructure Consortium](#) to support cyberinfrastructure-centric research capacity at institutions historically underserved in this area



- "[Create Opportunities Everywhere](#)," which will support awards that measure the impacts of Federally funded research by collecting and analyzing data on STEM participant demographics in federally funded awards.
- [A recently funded program to embed research Fellows into existing open science initiatives to study their impacts](#) during development. By building impact research into program design, this program aims to improve the assessment of the equity impacts of open science practices and provide actionable evidence for future investments.

## Proposed Metrics

The metrics for the entire public access initiative are complex, and metrics for efficacy are unfolding. NSF is issuing a Request for Information (RFI) to solicit input from a broad set of communities to identify potential barriers to compliance with NSF Public Access policy. Issues brought to NSF's attention via public engagements, the RFI, and other input (e.g., via agency merit review panels and direct information from PIs) will be addressed, and revised guidance for NSF and the researcher community will be developed. This will ensure that policy implementation does not introduce new or further entrench existing inequities in the research publications/data access space. Following this work, the target date for implementing the first phase of policy changes is **December 31<sup>st</sup>, 2025**. By this date, new policies for depositing NSF-supported publications and data will be in effect.

To enable future assessment of the impact of implementing the updated public access policy, engagement with NSF's evaluation unit is taking place, and consideration of third-party appraisals is also being evaluated.

NSF is currently examining the possible assessment of (a) data used, (b) data sets collected and repositied by NSF-funded researchers, and (c) utilization of the NSF-Public Access Repository for deposition of publications and datasets to measure anticipated increases in usage. In the short term, a baseline of data currently being submitted to the Public Access Repository in one or more of these areas for future benchmarking will be required, with a **targeted completion date by the end of 2024**.

In the longer term, and utilizing this baseline, NSF should be able to determine whether there is an increase in deposition of publications, increase in deposition of datasets, increased traffic to NSF-PAR, increased citation of NSF-supported data via identifiers provided as required metadata in PAR, and other related metrics.

Engagement with external communities of interest is a proposed continuing action of this strategy. Likewise, NSF will continue to monitor attendance at webinars to better understand from whom NSF is gathering feedback on the implementation. For the RFI, NSF will provide metrics for respondents, focusing on marginalized communities. The metrics collected will mirror those used for past engagements (see next section).





If additional funding announcements related to this strategy are made, the communities expected to be impacted via the metrics collected will mirror those used for past engagements because metrics able to be collected will include the dollar amounts and researcher demographics for those awards.

## Public Participation and Community Engagement

Since September 2022, NSF has obtained input from thousands of individuals on its open science and public access activities, including developing and implementing NSF's Public Access Plan. This includes feedback from webinars and listening sessions with nearly 700 unique individuals representing approximately 300 unique academic institutions (from schools representing 14 different [Carnegie](#) classifications), commercial businesses, Tribal governments, and other Federal agencies. In addition, NSF has met with scientific societies, publishers, PIs, and other entities; scores of outreach efforts at conferences; and numerous conversations with other international, national, and subnational research funding entities. Examples of selected engagements are presented on the [Public Access Initiative's webpage](#). The reaction to NSF's goals has been variable, with many in the community applauding openness and NSF's commitment to equity as part of current and ongoing public access/open science activities and others expressing skepticism regarding how the costs will be covered.

To gain insight into equity barriers, NSF plans to release a request for information (RFI) on equity in public access in the final months of 2023.

The RFI aims to collect information from the public, NSF-funded researchers, and other parties that may be impacted by implementing the public access plan about specific challenges stemming from current inequities in the scholarly publishing and data-sharing spaces. Results from that request are expected to inform implementation options in 2024.

## Strategy #2: Increase Participation in FAR-based Solicitations and Awards to Promote an Inclusive Contracting Environment

### Whole-of-Government Equity Objectives

Economic Justice: Build a strong, fair, inclusive workforce and economy.

### Collaborating Agencies

Small Business Administration

### Barriers to Equity

NSF has identified the following barriers based on its outreach activities with Minority Serving Institutions (MSIs) and small businesses. The small business category includes several socioeconomic



population groups, such as Small Disadvantaged Businesses, Women-Owned Small Businesses, Service-Disabled Veteran-Owned Small Businesses, and Historically Underutilized Business Zones, all of which have experienced the following barriers:

- Lack of access to NSF staff and solicitations for NSF procurement actions hinder the creation of an equitable and inclusive contracting environment for MSIs and small businesses.
- The complexity of the Federal contracting framework hinders existing and new entrants from accessing the Federal acquisition process. Entities must be familiar with Federal Acquisition and all supplemental agency guidance.
- Existing category management practices and best-in-class solutions can negatively impact the ability of disadvantaged entities and new entrants to position themselves for access to compete and secure awards. Data used to validate the application of category management principles demonstrates that small businesses under category management have received a proportionally lower share of spending than others.
- Large contracts can increase the efficiency of contract spending, eliminate redundant agreements, and reduce administrative burdens; however, this action could adversely impact contracts available for small and disadvantaged entities and equity goals for Federal acquisitions.

## Evidence Base to Support Strategy

In addition to the outreach activities mentioned above, the evidence supporting this strategy includes the following:

- Memorandum M-22-03 updated guidance in OMB Memorandum M-19-13, *Category Management: Making Smarter Use of Common Contract Solutions and Practices*, which guides the use of category management intended to empower the acquisition workforce to pursue the best acquisition strategies that reach underserved small business communities and maximize awards to socioeconomic small businesses. This memorandum references the Government Accountability Office, which, in its November 2020 report, *OMB Can Further Advance Category Management Initiative by Focusing on Requirements, Data, and Training*, used validated agency data to identify that category management saved more than \$33 billion in three years. The same validated agency data shows that small businesses have received a proportionally lower share of spending under category management than others.
- SBA Studies on Contract Bundling, conducted with the University of Washington Evans Schools of Public Policy, found that disaggregation of large contracts provides more opportunities for socioeconomic small businesses to compete for awards.



## Actions to Achieve Equity

### Increased outreach to MSIs and Small Businesses

The NSF's Division of Acquisition and Cooperative Support (DACS) and the Office of Small and Disadvantaged Utilization (OSDBU) will announce outreach sessions through Special Notices on SAM.gov to raise awareness for socioeconomic business concerns and MSIs.

- To encourage participation, any outreach event will allow for virtual participation, reducing and eliminating the financial burden of requiring in-person attendance.
- Outreach sessions will provide information on doing business with NSF, how to identify potential contract opportunities and key points of contact.

### Improved market research and acquisition planning

Practical and robust market research provides a solid foundation for an outcome-oriented approach that efficiently meets NSF needs and enables mission success in a way that ensures a resilient vendor base, meets Small Business Administration (SBA) procurement goals, and complies with the Federal Acquisition Regulation. Early, frequent, and constructive engagement with prospective offerors, encouraged by the NSF Vendor Communication Plan, is critical in understanding the marketplace. NSF will require SAM.gov to post all engagement events, including industry days, small business outreach sessions, pre-solicitation conferences, and question-and-answer sessions.

- The NSF Acquisition Career Manager, working with the NSF OSDBU, has hosted several training sessions for NSF's Acquisition Workforce on effective market research and acquisition planning. Additional training will be provided this fiscal year.
- Increase public notifications, known as "Sources Sought" notices, to identify potential sources, including MSI and small business concerns.

### Increased subcontracting opportunities and enforcement of subcontracting plans

For all contracts not set aside for small businesses, DACS plans to coordinate with the owner of the requirements and the OSDBU to design reasonable subcontracting goals.

- Based on market research results and engagement with potential offerors, the NSF Acquisition Function and OSDBU will establish small business participation goals for specific awards to allow for small business inclusion in that industry. This will also enable MSIs and small businesses to offer services and supplies while building experience and capacity to perform as prime contractors for federal awards.



## Proposed Metrics (Outputs and Outcomes)

### Near- to Medium-Term (Likely to be mainly outputs)

- Disaggregation of contracts, where possible, will provide additional opportunities for small and disadvantaged entities to participate in the Federal acquisition process.
- NSF will conduct no less than two training sessions for its Acquisition Workforce related to including small businesses in the acquisition process.
- NSF will, every quarter, monitor progress against published acquisition information and small business contracting to track progress against goals issued by SBA.

### Longer-Term (Outcomes)

- Achievement of small business goals, including the prime contracting SDB goal, which is increasing from the FY 2023 goal (12.60%) to 15% of total annual contract obligations by FY 2025.
- Increase in small and small disadvantaged entities receiving prime and subcontract awards.

## Public Participation and Community Engagement

- The NSF Senior Procurement Executive (SPE) and NSF OSDBU will publish a list of engagement opportunities on SAM.gov in October, where MSIs and socioeconomic business concerns can receive information on how to do business with NSF, identify barriers, discuss potential solutions, and provide feedback on their experiences.
- The NSF will attend third-party conferences and outreach events for MSIs and socioeconomic business concerns to receive feedback and discuss barriers and solutions.

## Strategy #3: Optimize Demographic Data Collection to Support Robust Equity Assessments

### Whole-of-Government Equity Objectives

Economic Justice: Build a strong, fair, inclusive workforce and economy.

### Collaborating Agencies

Not applicable



## Barriers to Equity

- NSF’s Learning Agenda includes a priority question, “How can NSF help increase the participation of underrepresented groups in the STEM workforce?” However, agency evidence-building activities and direct efforts to address potential inequities are hampered by an inadequate understanding of who participates in and benefits from NSF-funded activities.
- NSF has incomplete data on the demography of principal investigators (PIs), reviewers, post-doctoral fellows, teachers, and students.

Response rates to current NSF administrative data collections are uneven across demographic groups and diverse types of participants (e.g., PIs, reviewers, fellows, etc.) and, in some cases, are too low to ensure robust conclusions about the participation of members of different groups. This reflects the steady decline in the response rate for many Federal and private-sector surveys over the past few decades ([Federal Committee on Statistical Methodology, 2020](#)). In addition, demographic data collected about students, teachers, and post-doctoral fellows has focused on those participating in NSF activities; data about applicants have not routinely been collected until recently.

- Incomplete and potentially unrepresentative demographic data hampers NSF’s ability to evaluate the impacts of existing investments on different demographic groups and to use evidence to prioritize future investments to advance equity for individuals who are members of groups underrepresented in STEM.

## Evidence Base to Support Strategy

- An NSF Office of the Inspector General review ([OIG Report No. 22-6-003](#)) of NSF’s use of remote vs. in-person merit review panels found that NSF does not have sufficient demographic data on reviewers to determine if virtual panels reduce a barrier to participation.
- Published statistics on the demographic characteristics of PIs showed a significant increase in a) non-response and b) respondents who declined to provide demographic data, which prompted NSF to implement strategies to improve the collection of demographic data from PIs. In FY 2017, 59 percent of grant proposals submitted to NSF included complete data about the gender, ethnicity, race, and disability status of the PI. This number decreased to 43 percent in FY 2021.
- Analysis of FY 2021-22 activities to improve PI response rates demonstrated the success of the strategy outlined in this plan. Among PIs, complete demographic data increased to 75 percent of grant proposals from the baseline of 43 percent in FY 2021. An additional 15 percent included partial data. Based on these results, NSF is expanding its strategy to the



collection of data from reviewers and Graduate Research Fellowship Program (GRFP) applicants.

## Actions to Achieve Equity

To address these barriers, NSF will take the following actions:

- Expand the demographic data collection for additional participant types, including reviewers and GRFP applicants, as part of the user profile within Research.gov.
- Improve demographic data collection from undergraduate and graduate students, post-doctoral fellows, and teachers who apply for and participate in NSF-funded programs through the continued expansion of the Education and Training Application (ETAP) system, designed to help find and apply to education and training opportunities funded by NSF.
- Test prototype questions to collect sexual orientation and gender identity (SOGI) data from PIs and reviewers in program monitoring and assessment surveys and systems.
- Conduct a review of NSF administrative surveys, systems, and forms that collect demographic data to identify any additional practices or policies that may be needed for the collection, management, and use of such data per Federal best practices described in Chapter 3 of the Evidence Agenda and applicable law to safeguard privacy, security, and civil rights.
- Report on review of NSF administrative surveys, systems, and forms that collect demographic data and any recommended practices or policies for collecting, managing, and using such data.

Together, these efforts will allow NSF to conduct analyses of administrative data and related information to examine and understand more thoroughly any differences in the rates of participation in NSF activities of members of different demographic groups. This will enable NSF to focus future activities to advance equity for individuals who are members of groups underrepresented in STEM, including women and LGBTQI+ individuals.

## Proposed Metrics (Outputs and Outcomes)

### Near- to Medium-Term (Likely to be mainly outputs)

- Release of Research.gov system enhancements to collect demographic data from reviewers and GRFP applicants.
- Track the number of panel reviewers who successfully link their Reviewer ID with their NSF account in Research.gov, thereby increasing the completeness of demographic data on reviewers.



- Track decreases in non-response rates to demographic questions by PIs and reviewers, thereby increasing the completeness of demographic data on PIs and reviewers.

### Longer-Term (Outcomes)

- Monitor overall trends in participation in NSF programs by demographic characteristics.
- Track increases in the proportion of proposals received from investigators who are members of underrepresented groups in STEM. (This metric is reflected in NSF's agency [priority goal](#) to improve representation in the scientific enterprise.)
- Track increases in the proportion of applications for NSF-funded opportunities received from students, teachers, and post-doctoral researchers by members of underrepresented STEM groups.

### Public Participation and Community Engagement

- NSF anticipates engaging the researcher community in developing and testing prototype questions for collecting SOGI data. This may include listening sessions, formal requests for information, or other mechanisms.
- NSF anticipates releasing at least one funding opportunity highlighting NSF's interest in receiving proposals for workshops, colloquia, and other activities focused on gathering from the NSF-supported community perspectives regarding promising research, education, and other potential areas of interest related to promoting equity for LGBTQI+ individuals.

## Strategy #4: Enhance NSF's Harassment Prevention Efforts to Further Reduce Sexual and Other Forms of Harassment

### Whole-of-Government Equity Objectives

- **Civil Rights:** Protect the civil and constitutional rights of all persons, such as the right to vote, language access, and prohibitions on discrimination based on race, sex, disability, and other relevant factors. Promote equity in science to eliminate bias in the design and use of innovative technologies, such as artificial intelligence.
- **Educational Equity:** Pursue educational equity so that our Nation's schools put every student on a path to success.
- **Economic Justice:** Build a strong, fair, and inclusive workforce and economy. Ensure equitable procurement practices through small, disadvantaged businesses contracting and the Buy Indian Act (25 U.S.C. 47). Build prosperity in rural communities.



## Collaborating Agencies

- Interagency Working Group on Sexual Misconduct
- US Department of Education; US Department of Justice
- Interagency Working Group on Safe and Inclusive STEM Environments; White House Office of Science and Technology Policy

## Barriers to Equity

- Sexual and other forms of harassment are barriers to full participation and contribution to the scientific enterprise by underrepresented groups.
  - In response to concerns brought forth by US Antarctic Program (USAP) Community members, NSF enlisted independent subject matter experts to examine sexual harassment and sexual assault in the USAP and identify corrective actions for areas of concern revealed by the assessment.
    - The assessment, which consisted of surveys and interviews, indicated that sexual harassment is an ongoing issue faced by the USAP community.
    - [Report: Sexual Assault and Harassment Prevention and Response in United States Antarctic Program](#)
  - Individuals who experience sexual harassment experience a host of effects, which may include reduced job satisfaction and performance, lower academic achievement, reduced earning power, and harm to physical and mental well-being. The negative impacts of sexual harassment extend across all disciplines, races, and classes.
    - [Sexual Harassment of Women: Climate, Culture, and Consequences in Academic Sciences, Engineering, and Medicine |The National Academies Press](#)
    - (Please see, e.g., Chapter 4, Job and Health Outcomes of Sexual Harassment and How Women Respond to Sexual Harassment, p.68-69).
  - Universities that have conducted climate surveys report that a concerning number of students, faculty, and staff report having experienced or witnessed sexual harassment.
    - According to NASEM, between 20 and 50 percent of female science, engineering, and medicine students experienced harassment, often from faculty and staff. This report also states, “Although white (non-Hispanic) students reported greater incidence of sexual harassment by faculty/staff, students of color and white Hispanic students who experienced sexual harassment by faculty/staff generally perceived their campus as less safe than the other female STEM students.”





- In June 2017, the National Postdoctoral Association surveyed workplace sexual harassment among postdoctoral scholars, which included 2,734 responses. Ninety percent of respondents were sexually harassed as trainees (53 percent as graduate students and 35 percent as postdocs).
- According to the American Association of Universities 2019 Climate Survey on Sexual Assault and Sexual Misconduct, 41.8 percent of students reported experiencing at least one sexually harassing behavior since enrolment.
- [Sexual Harassment of Women: Climate, Culture, and Consequences in Academic Sciences, Engineering, and Medicine | The National Academies Press](#)

## Evidence Base to Support Strategy

- NSF conducted significant outreach to various federal and international partners on promising policies, practices, and procedures.
- Held in-person Listening Sessions at McMurdo Research Station (Antarctica) and a series of virtual listening sessions open to all current and former [United States Antarctic Program \(USAP\)](#) community members. Special sessions were reserved for the South Pole and Palmer Research stations, vessels, individuals who experienced sexual assault in the USAP program, and early-career individuals.
- Recent reports and legislation ([CHIPS and Science Act](#)) indicate harassment is pervasive in institutions of higher education and a deterrent to participation in STEM.
  - [Sexual Harassment of Women: Climate, Culture, and Consequences in Academic Sciences, Engineering, and Medicine | The National Academies Press](#), see e.g., p. 40-41.
- Scientific studies/literature and NSF-funded research reflect that remote field work areas/sites are uniquely challenging from a harassment context due to various factors, including difficult physical conditions, layered or otherwise confusing reporting mechanisms, social isolation, and limited communication methods.
  - [Dear Colleague Letter: Research on Sexual Harassment and Other Forms of Harassment in Science, Technology, Engineering, and Mathematics \(STEM\) Contexts \(nsf19053\) | NSF - National Science Foundation](#)
  - Clancy KBH, Nelson RG, Rutherford JN, Hinde K (2014) [Survey of Academic Field Experiences \(SAFE\): Trainees Report Harassment and Assault](#). PLoS ONE 9(7): e102172.
  - [Gendered Barriers to Australian Antarctic Research and Remote Fieldwork | PLOS ONE](#)
  - [Independent Review of Workplace Culture and Change at the Australian Antarctic Division \(AAD\) - DCCEEW](#)



- Climate survey data and other information gathered via compliance activities.
  - [OEER - Title IX of the Education Amendments of 1972 Compliance Program | NSF - National Science Foundation](#)
- NSF conducted an initial evaluation of community awareness of the terms and conditions and conference proposal requirements, which informed the next phase of our evaluation strategy. This strategy is discussed under Proposed Metrics.
  - The evaluation of NSF's harassment prevention efforts focused on the Harassment Notification Terms and Conditions and the conference policy. The communications analysis showed that, on average, universities submitting proposals to NSF have adopted an anti-harassment policy and disseminated it through their websites. The analysis also showed that NSF's conference policy positively impacted adherence to the guidance provided by NSF. This finding holds overall and by type of institution (R1 versus R2), but not for all Minority Serving Institutions (MSIs).
  - [NSF Anti-Harassment Findings Technical Appendix](#)

## Actions to Achieve Equity

To address these barriers, NSF will:

- Continue establishing and expanding NSF's Sexual Assault/Harassment Prevention and Response (SAHPR) Office.
- Launch the first USAP Climate Survey focused on the incidence and prevalence of sexual assault, harassment, and misconduct.
- Evaluate existing policies to address unintended consequences (e.g., a mandatory reporting policy that unintentionally discourages individuals from reporting sexual harassment).
- Conduct pilot studies to assess and evaluate NSF's off-campus and off-site research proposal requirement that extends beyond self-certification (current requirement) and requires that grant applicants submit a plan for creating and maintaining a safe and inclusive working environment as a part of the merit review process.
- Evaluate how NSF award terms and conditions should be modified to create future safe and inclusive research environments.
- Continue to conduct outreach and benchmarking with federal partners and international entities on promising policies, practices, and procedures for creating and maintaining safe and inclusive environments.



- Implement the NSF Accountability Framework via the NSF SAHPR Office to help ensure that individuals who commit sexual assault/sexual harassment are held accountable based on the most relevant organizational policies and legal standards.
- Extend the reach of NSF harassment prevention efforts to research activities at field sites and on research vessels through targeted outreach, proactive compliance efforts, and policy development.

## Proposed Metrics (Outputs and Outcomes)

### Near- to Medium-Term (Likely to be mainly outputs)

- In the current phase of NSF's evaluation of the terms and conditions and conference proposal requirements, NSF evaluates community understanding, experiences with, and implementation of the terms and conditions and conference requirements through direct engagement with relevant stakeholders. Subject matter experts will interview stakeholders at various Minority Serving Institutions (MSI) and send a survey to all academic institutions that currently receive NSF funding. Findings will serve to improve understanding, experiences, and implementation over time.
- Monitoring changes in harassment claims to NSF Office of Equity and Civil Rights. The overall number of claims is anticipated to initially increase in response to communications and outreach relevant to establishing the new SAHPR Office and then stabilize over time. Marked deviations or "spikes" in the number or types of claims will inform future strategies.
- Increased usage of NSF SAHPR informational resources (via web metrics), NSF Antarctic Helpline, and USAP Victim Advocate services.
- The USAP Climate Survey on sexual harassment will serve as a baseline for measuring improved experience in the USAP over time.
- Number of grant applicants that submit a plan for creating and maintaining a safe and inclusive working environment as a part of pilots to assess and evaluate NSF's off-campus and off-site research proposal requirement that extends beyond self-certification.
- The recently enacted [CHIPS and Science Act](#) requires NSF to undertake a follow-on study to the 2018 NASEM study to examine the influence of sexual harassment in institutions of higher education on the career advancement of individuals in the STEM workforce and assess progress in implementing recommendations from the 2018 report.

### Longer-Term (Outcomes)

- Improved experiences (i.e., increased feeling of safety and inclusion) related to the 2023/2024 baseline in USAP Climate Survey response rates and results.



- Measurable increase in NSF Awardee understanding and awareness of NSF policies as related to the baseline currently being developed via NSF’s evaluation of the terms and conditions and conference proposal requirements.
- Measurable decrease in harassment claims across NSF-funded activities.
- Measurable decrease in the rate of STEM students leaving science.
- Positive qualitative change in NSF awardee policies on field safety and prevention of sexual harassment. Examples could include additional supportive resources, clarified reporting mechanisms, incorporating preventative strategies, and others.

### Public Participation and Community Engagement

- Continued outreach to federal and international partners on promising policies, practices, and procedures.
- The NSF SAHPR Office will participate in the next NSF Grant Conference to host community of practice sessions focused on safe and inclusive field research and sexual harassment prevention.
- The NSF SAHPR Office is traveling to all Antarctic Research Stations during the 2023-2024 Austral summer season to engage directly with the community, build trust and understanding, educate the participants on SAHPR reporting and resources, assess the current environment, evaluate existing services and resources, and strengthen the safety net of NSF supportive services.

## Strategy #5: Create Opportunities Everywhere to Reach the “Missing Millions” and Diversify STEM

Create Opportunities Everywhere (COE) incorporates all NSF directorates and offices and surpasses prior efforts by striving to ensure equity in program delivery while building on the concept of the “Missing Millions.” The National Science Board (NSB) conceptualized the Missing Missions as the difference between the demographics of the research community and the nation's demographics. It charged NSF with reducing this talent gap across all demographic groups, including gender, race and ethnicity, and persons with disabilities.<sup>1</sup> COE strives for equity in program delivery and expanding access and inclusion in STEM to reduce the national talent gap and reach the missing millions. Strategy #5 represents a subset of the NSF COE effort and will focus on creating opportunities for undergraduate, graduate, and post-doctoral students who are underrepresented and underserved in

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<sup>1</sup> [www.nsf.gov/nsb/publications/2020/nsb202015.pdf](http://www.nsf.gov/nsb/publications/2020/nsb202015.pdf)



STEM, as well as minority-serving and other under-resourced institutions of higher education, and the students that they serve.

## Whole of Government Equity Objectives

- **Educational Equity:** Pursue educational equity so that our Nation’s schools put every student on a path to success.
- **Economic Justice:** Build a strong, fair, and inclusive workforce and economy.

## Collaborating Agencies

NSF collaborates with federal agencies through the Office of Science and Technology Policy (OSTP) and the National Science and Technology Council’s ([NSTC](#)) committees focused on STEM education and research. NSF staff are also active members of the OSTP committees on Science, Technology, S&T Enterprise, Environment, and Homeland Security and associated subcommittees.<sup>2</sup> NSF collaborates with federal agencies on programs and initiatives such as:

- [EPSCoR Research Infrastructure Improvement Track-4: EPSCoR Research Fellows | NSF - National Science Foundation](#) (Partnership with NASA to support early-career researchers)
- [National Artificial Intelligence \(AI\) Research Institutes \(nsf22502\) | NSF - National Science Foundation](#) – Projects funded in collaboration with the **U.S. Department of Education, the Institute of Education Sciences** address diversity, equity, and inclusion issues in AI and STEM education.
- NSF is a member of the **USPTO** Council on Inclusive Innovation (see [NSF joins USPTO Council for Inclusive Innovation | NSF - National Science Foundation](#))
- [Analytics for Equity](#) – Pilots a new way to support social, economic, and behavioral sciences research that leverages federal data assets and scientific advances in researching equity-related topics for more significant public benefit. Includes the U.S. Department of Health and Human Services, the Centers for Disease Control and Prevention, the U.S. Department of Labor, and the U.S. Environmental Protection Agency.

## Barriers to Equity

NSF is committed to identifying and addressing barriers to innovation, partnerships, and opportunities in STEM, both within our agency and in how we deliver our programs to the thousands

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<sup>2</sup> For a complete listing of NSF collaborations with public and private sector entities, see [NSF Collaborations with Other Organizations | NSF - National Science Foundation](#)



of institutions we support. In the 2012-2014 Biennial Report to Congress, the Committee on Equal Opportunities in Science and Engineering (CEOSE) describes the barriers to broadening participation in STEM as follows: “Factors influencing participation rates are numerous, complex, and often interrelated, including differences in high school course-taking and K-12 teacher preparation, school district resources, high school graduation rates, college graduation rates, historic and ongoing bias and exclusion, poverty and family income levels, education of parents, differing cultures within STEM fields, and differences in academic and institutional cultures within colleges/universities, among others. Research also indicates that overreliance on standardized test scores in admissions practices of many STEM graduate programs is a significant factor in the under-participation of minorities in STEM doctoral programs.”<sup>3</sup>

COE is designed to address individual, institutional, and geographic barriers through programs and activities. For example, barriers to student success include but are not limited to those identified by CEOSE. Barriers to institutional success and capacity building and barriers to inclusion and access to the NSF research portfolio include a lack of awareness and institutional resources to develop and support federal funding.

### Evidence Base to Support the COE Strategy

- NSF and NSB evidence: [National Science Board: Vision 2030 \(nsf.gov\)](#); [Diversity and STEM: Women, Minorities, and Persons with Disabilities 2023 | NSF - National Science Foundation](#); and [Reports, Studies and Analyses - Broadening Participation in STEM | NSF - National Science Foundation](#) – For example, the US National Science Board describes the gap in STEM talent that is needed for the US to remain a world leader in science and engineering, while biennial reports to Congress submitted by the Committee on Equal Opportunities in Science and Engineering (CEOSE) address challenges to broadening participation, inclusion, and access in STEM.
- The National Academies of Science, Engineering, and Medicine has produced multiple reports that address barriers and challenges such as [Minority Serving Institutions: America's Underutilized Resource for Strengthening the STEM Workforce | The National Academies Press](#); [Barriers and Opportunities for 2-Year and 4-Year STEM Degrees: Systemic Change to Support Students' Diverse Pathways | The National Academies Press](#); and [Summary | Call to Action for Science Education: Building Opportunity for the Future | The National Academies Press](#).

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<sup>3</sup> [2013-2014-ceose-biennial-report-508\\_0.pdf](#)



## Actions to Achieve Equity

To address the barriers to COE, NSF will:

- **Broaden the STEM Ecosystem** by expanding NSF's programmatic efforts and highlighting existing funding opportunities to under-resourced and underserved communities (K-12, undergraduate, graduate, and post-doctoral students) using Dear Colleague Letters, Program Solicitations, and other funding mechanisms.
- **Strengthen educational institutions through collaborative programs and partnerships** by augmenting leadership development and advancement opportunities for faculty at minority-serving institutions and other emerging research institutions to foster PI and institutional success through initiatives such as Growing Research Access for Nationally Transformative Equity and Diversity ([GRANTED](#)) and other directorate-specific activities.
- **Accelerate inclusion and access in NSF's research portfolio** by increasing and strengthening institution and faculty engagement in NSF's many research programs and activities from those institutions not currently well represented in NSF's research programs via the [GRANTED](#), [EPSCoR](#), and other targeted program efforts.

## Proposed Metrics (Outputs and Outcomes)

**Near- to Medium-Term (*Likely to be mainly outputs*):** These metrics will be measured against the FY 2023 baseline as part of the Agency Priority Goal: (1) Increase the proportion of proposal submissions from minority-serving institutions (MSI) (2) Increase the proportion of proposal submissions from diverse PIs.

**Program Metrics:** (1) Increase the number of K12, undergraduate, and graduate students reached by NSF awards designed to increase student success in STEM and STEM education from all NSF directorates and offices (2) Increase the number of postdoctoral associates and senior researchers reached by NSF awards (3) Increase the numbers and types of awards that focus on developing and sustaining pre- and post-award administration services at ERIs (4) Increased awards and obligations across NSF made to institutions in EPSCoR jurisdictions such that 15.5% (FY23) of NSF's obligations are made to these institutions.<sup>4 5</sup>

**Longer-Term (Outcomes):** If the COE strategy is successful, the capabilities and opportunities of those currently underrepresented and underserved will have been significantly enhanced, barriers to participation will have been reduced throughout the STEM ecosystem, and a more diverse range of

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<sup>4</sup> The baseline for Metrics 1 & 2 are the NSF budget numbers showing the [Number of People Involved in NSF Activities in FY 2023](#).

<sup>5</sup> [Broadening Participation Portfolio | NSF - National Science Foundation](#)



individuals and institutions will participate in the science, engineering, and STEM education research enterprise in both new and existing scientific fields, thereby expanding the productivity and creativity of the U.S. STEM ecosystem.

## Public Participation and Community Engagement

NSF created strategy teams to develop this strategy as part of the FY 2022-2023 APG. The teams focused on Policy, Data Analytics, External Engagement, and Internal Engagement/Capacity Building. The External Engagement strategy team conducted a series of listening sessions, while the others took on resource and data collection efforts and multiple leadership discussions. Also, input from directorate advisory committees, the National Science Board, and CEOSE contributed to the final development of the COE strategy and goals. Data gathered from listening sessions contributed to developing the APG Toolkit for Improving Representation to help NSF POs collaborate on outreach and engagement related to diversity programs. Historically, NSF invests over \$1 billion annually in its Broadening Participation (BP) programs and projects at institutions nationwide.[6] Programs already underway, such as GRANTED, EPSCoR, and other programs and activities in the NSF Broadening Participation portfolio, provide funding opportunities to support the described K12, undergraduate, graduate, post-doctoral, and institutional barriers.