Agency Priority Goal | Action Plan | FY 2022-2023

Improve Representation in the Scientific Enterprise

Goal Leaders:

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Goal Overview

Goal statement

- Impact: Improve representation in the scientific enterprise by making changes that will lead to an increase in proposal submissions led by individuals from underrepresented groups and from underserved communities.
- Achievement: By September 30, 2023, NSF will increase both the number and proportion of proposals received 1) with principal investigators from groups underrepresented in STEM and 2) from underserved institutions, each by 10 percent over the FY 2020 baselines.

Problem to Be Solved

- Among the awards NSF makes annually, the proportion of awards to principal investigators from groups underrepresented in STEM is not on par with their representation in the STEM workforce, which in turn is below the relative proportions of the total population.
- One reason for this disparity has to do with the gap that originates at the application stage. Internal analyses indicate that principal investigators from groups underrepresented in STEM do well in the merit review process, achieving funding rates similar to the overall NSF rates, but that proposals submitted to NSF do not reflect the diversity of the STEM workforce (let alone the population as a whole). NSF is working to understand differential participation and funding rates of principal investigators across a variety of dimensions, including disciplines, geographies, and demographics, which will help further focus efforts to address systemic barriers to full participation in STEM.

What Success Looks Like

- The aim of this APG is to improve representation in the scientific enterprise by pursuing actions that will lead to an increase in proposal submissions with principal investigators from groups underrepresented in STEM and from underserved institutions.

Tracking the goal

Goal Targets

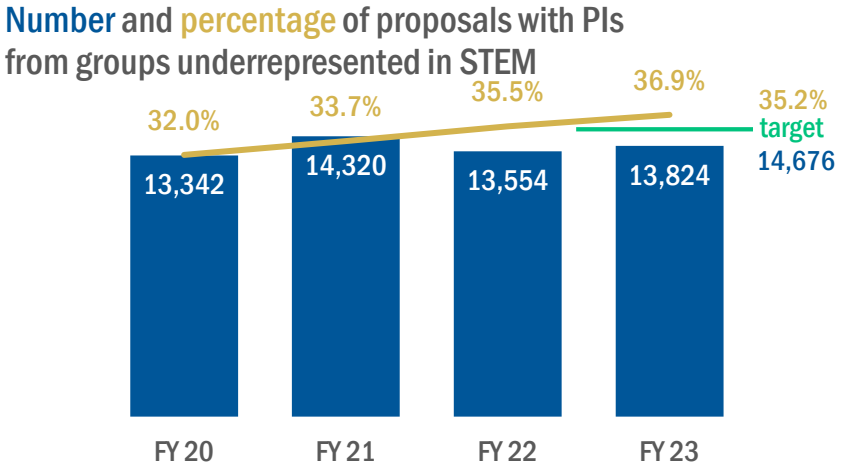
Achievement statement		Key indicator(s)	Quantify progress					Frequency
By…	**We will…**	**Name of indicator**	**FY 20 Baseline**	**FY 21 Actual**	**FY 22 Actual**	**FY 23 Target**	**FY 23 Actual**	**Update cycle**
09/30/23	Increase the number of proposals with principal investigators from groups underrepresented in STEM by 10% over FY 2020 baseline.	Number of investigator proposals	13,342	14,320	13,554	14,676	13,824	Annually
09/30/23	Increase the proportion of proposals with principal investigators from groups underrepresented in STEM by 10% over FY 2020 baseline.	Proportion of investigator proposals	32.0%	33.7%	35.5%	35.2%	36.9%	Annually
09/30/23	Increase the number of proposals from underserved institutions by 10% over FY 2020 baseline.	Number of institution proposals	6,176	6,632	6,005	6,794	6,002	Annually
09/30/23	Increase the proportion of proposals from underserved institutions by 10% over FY 2020 baseline.	Proportion of institution proposals	14.8%	15.6%	15.7%	16.3%	16.0%	Annually

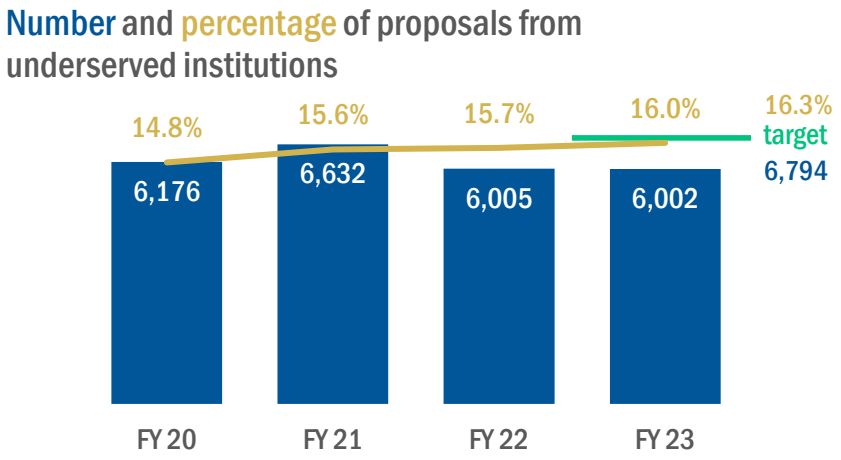
- **Investigators from groups underrepresented in STEM** are principal investigators on proposals who identify as:
  - Women[1]
  - Members of a racial and/or ethnic group underrepresented in STEM including African American/Black, American Indian/Alaska Native, Hispanic/Latino, and Native Hawaiian/Pacific Islander
  - Persons with disabilities
- **Underserved institutions** for the purposes of this APG are institutions that serve groups, communities, and regions with lower rates of participation in STEM. These are post-secondary educational institutions and other entities submitting proposals for NSF award funding classified as Minority-Serving Institutions (MSIs), or that are located in states and territories that have historically received lower levels of NSF funding (i.e., EPSCoR jurisdictions). For this Agency Priority Goal target we are focusing on the subset of these institutions that have received an average of $50 million or less in federal research funds over the past 3 years.[2] For the duration of this goal, we will be focused on institutions that fall in these categories based on FY 2020 information, so that the results are not affected by changes in categorization during this period.

[1] For this goal, women are defined as those who select "female" in demographic data collection. Gender breakdown varies significantly by discipline, but overall, across all of the science and engineering fields that NSF supports, only 30 percent of proposals come from female investigators, according to NSF's 2020 Merit Review Report (https://www.nsf.gov/nsb/publications/2021/merit_review/FY-2020/nsb202145.pdf).

[2] As stated in the National Science Foundation Minority Serving Institutions Report FY 2020, institutions marked as a Minority-Serving Institution for NSF reporting are the following institution types: Disabled Serving, High African American Enrollment, Historically Black Colleges and Universities, High American Indian Serving, Native Alaskan Serving, Native Hawaiian Serving, Pacific Islander, Tribal Colleges, Majority Minority Serving, and Hispanic Serving. The Established Program to Stimulate Competitive Research (EPSCoR) was designed to strengthen research and education in the sciences and engineering with a focus on states and territories that have historically received lesser amounts of NSF Research and Development funding. For more information see https://www.nsf.gov/od/oia/programs/epscor/.

Key Indicators and Results





For proposals with principal investigators (PIs) from groups underrepresented in STEM, NSF met the goal of increasing the proportion of proposals by 10 percent over the FY 2020 baseline, but did not meet the goal to increase the number of proposals by 10 percent over FY 2020.

For proposals from underserved institutions, NSF did not meet the goals for either number or proportion increase by 10 percent over FY 2020. The proportion of proposals from underserved institutions did increase over FY 2020 levels, but narrowly missed the 10 percent growth target.

One important consideration when analyzing these results is that the overall number of proposals submitted to NSF in 2023 decreased, falling 10 percent below the 2020 level. This drop was not anticipated when NSF set its initial targets for the FY 2022-2023 APG, and likely contributed to NSF missing both the targets for number of proposals.

NSF will be continuing this goal in the FY 2024-2025 APG cycle, with key indicators focused on increasing the proportion of proposals with PIs from groups underrepresented in STEM and from emerging research institutions. Continued work on this goal will build on the work done by this APG, as well as programs focused on building institutional capacity, including GRANTED and EPSCoR.[3]

Note: As described in the Data Accuracy and Reliability section, the FY 2020 baselines, FY 2021 and 2022 results, and FY 2023 targets have been recalculated to account for improvements in demographic data collection and institutional flags.

[3] Growing Research Access for Nationally Transformative Equity and Diversity (GRANTED) is an initiative that seeks to improve the Nation's research support and service capacity at emerging and underserved research institutions. For more information see https://new.nsf.gov/funding/initiatives/broadening-participation/granted. The Established Program to Stimulate Competitive Research (EPSCoR) was designed to strengthen research and education in the sciences and engineering with a focus on states and territories that have historically received lesser amounts of NSF Research and Development funding. For more information see https://www.nsf.gov/od/oia/programs/epscor/.

Goal Team

Steering Group

- **Membership:**
- Includes executive agency leadership from several offices key to NSF's diversity, equity, inclusion, and accessibility work.
- Directorate for Social, Behavioral, and Economic Sciences *goal co-lead
- Directorate for STEM Education
- Office of the Chief Diversity and Inclusion Officer
- Office of Equity and Civil Rights
- Office of Integrative Activities *goal co-lead
- **Duties**:
- Sets strategic direction, approves reports, briefs internal and external stakeholders

Strategy Leads

- **Membership**:
- Leaders from across NSF directorates and offices who are knowledgeable about and committed to advancing equity issues.
- **Duties:**
- Monitors strategy progress
- Prepares reports and briefings to NSF leadership, the National Science Board, and Office of Management and Budget

Strategy Team Members

- **Membership**:
- Subject-matter and technical experts
- **Duties**:
- Under direction of the Strategy Leads, work to implement the strategies outlined in the action plan.

Ex-officio Support

- **Membership**:
- NSF Performance team and other staff-level individuals
- **Duties**:
- Supports implementation through meetings of the Steering Group and establishing processes for compiling and clearing reports.

Goal Strategies

In order to successfully increase the number and proportion of proposals with principal investigators from groups underrepresented in STEM and from underserved institutions, NSF will need to employ the following comprehensive set of strategies:

Policy

Ensure the NSF policy, funding opportunities, and program guidance reflect diversity, equity, inclusion, and accessibility (DEIA) expectations.

Data Analytics

Leverage data and analytics to enhance NSF's understanding of APG goals and broader DEIA activities.

External Engagement

Improve ability of investigators from groups underrepresented in STEM and underserved institutions to identify funding opportunities and support application for those opportunities through effective engagement.

Internal Engagement/Capacity Building

Provide NSF staff and proposal reviewers with the knowledge and resources to effectively support DEIA in the merit review and post-award management.

Key Milestones – Policy

Strategy 1: Increase the number of programs that include diversity, equity, inclusion, and accessibility (DEIA) expectations in funding opportunities and program guidance.

Objective: Ensure that NSF policy, funding opportunities, program guidance, and the merit review process reflect expectations that underscore the agency's commitment to DEIA. Incorporate language, tools, resources, and practices that support DEIA, especially for investigators from groups underrepresented in STEM and underserved institutions, and mechanisms to hold NSF programs accountable.

In order to improve consistency in the way programs across NSF incorporate and convey expectations around DEIA, there is a need to infuse these principles into funding opportunities and program guidance. For example, in a recent analysis of program documents published from 2018-2021, NSF found that fewer than 15 percent of such documents included DEIA language related to racial equity, and only about 40 percent of solicitations for grant proposals included such language. Making available sample DEIA language that satisfies complex policy and legal requirements, for example, will facilitate adoption of such language in funding opportunities, and provide accountability for ensuring DEIA expectations are met. More prominent and consistent use of DEIA expectations across NSF would signal to the scientific community that DEIA is an NSF priority and encourage more submissions by individuals from groups underrepresented in STEM and underserved institutions.

Milestone Summary

Key Milestone	Milestone Due Date	Milestone Status	Comments
Develop sample DEIA expectations language based on examples from key federal policy documents, such as Executive Orders, agency policy documents, funding calls, and program guidance documents.	Q1, FY 2023	Completed	Developed DEIA expectations language, and internal socialization plans, for NSF grants policy documents.
Disseminate pre-approved funding opportunity and program guidance language throughout the agency for voluntary use.	Q3-4, FY 2023	Completed	Disseminated language for funding opportunities. Finalized FAQ for staff developing funding opportunities for APG Toolkit.
Approve and incorporate DEIA expectations in NSF grants policy documents.	Q4, FY 2023	Completed	Updated DEIA language for 2024 external policy guide currently in clearance. Developed summary of proposed changes to NSF policy documents for further discussion.

Key Milestones – Data Analytics

Strategy 2: Establish data analytics capabilities to track key indicators and monitor progress towards achievement of the APG goal.

Objective: Leverage data and analytics to enhance NSF's understanding of APG goals and broader DEIA activities.

In order to track progress toward the APG goal of increasing proposals, there is a need to improve data collection on key demographic factors of individual investigators, as well as institutional characteristics. In addition to measuring proposal submission rates, NSF leadership will also monitor proposal outcomes and funding rates. Finally, the agency will increase access to, and transparency of, these data for use in enhancing and guiding agency-wide DEIA efforts.

Milestone Summary

Key Milestone	Milestone Due Date	Milestone Status	Comments
Establish definitions and metrics around DEIA for underrepresented investigators and institutions. Establish initial baselines for key indicators.	Q2, FY 2022	Completed	In Q1, recalculated and documented baselines to account for improved demographic and institutional data.
Expand pilot to improve demographic data collection from investigators across NSF.	Q3, FY 2022	Completed	Pilot was expanded in May 2022 and new demographic data are continuously being incorporated into NSF systems.
Improve the linkage in NSF systems between data on institutional characteristics and other NSF proposal and award data.	Q4, FY 2022	Completed	
Develop and disseminate data-related tools/resources that can be used to improve DEIA activities and achievement of the APG goal to increase proposals.	Q3, FY 2023	Completed	Internal NSF dashboard with PI and institutional data finalized. Disseminated dashboard and other tools for assessing demographic portfolio balance and reviewer demographics. Added recommendations for data practices to help directorates and divisions enhance their use of data to APG Toolkit.

Key Milestones – External Engagement

Strategy 3: Extend intentional, coordinated, and strategic outreach to investigators from groups underrepresented in STEM and to underserved institutions.

Objective: Improve ability of investigators from groups underrepresented in STEM and underserved institutions to identify and successfully submit applications to funding opportunities through effective engagement.

NSF successfully engages with investigators and institutions that have a track record of obtaining NSF awards. To increase proposals led by individuals from groups underrepresented in STEM and from underserved institutions, however, the agency needs to more comprehensively recognize, reach out to, and build relationships with a broad and diverse group of investigators and institutions, through initiatives such as the Established Program to Stimulate Competitive Research (EPSCoR), Centers of Research Excellence in Science and Technology (CREST), and the recently-established program Growing Research Access for Nationally Transformative Equity and Diversity (GRANTED).[4] There are many promising initiatives in motion across NSF, but they could be strengthened through integrated and strategic engagement activities and a harmonized collection of resources that are accessible to our external stakeholders (specifically investigators from groups underrepresented in STEM). Combined, these efforts will improve coordination and dissemination of resources that help the community identify and apply to funding opportunities.

Milestone Summary

Key Milestone	Milestone Due Date	Milestone Status	Comments
Gather NSF documents, program guides, and lessons learned on effective outreach to investigators from groups underrepresented in STEM and underserved institutions.	Q4, FY 2022	Completed	Resources collected from across the agency. Analyzed results and currently planning for dissemination.
Conduct listening sessions and workshops with institutions that historically have had low participation in NSF programs.	Q3, FY 2023	Completed	Conducted 14 listening sessions with HBCUs and EPSCoR principal investigators.
Create resources to present and make accessible the information from the engagement strategies.	Q3, FY 2023	Completed	Developed content for APG Toolkit on effective outreach to institutions and groups new to NSF; how to make outreach inclusive.
Update NSF's webpage to help investigators better identify funding opportunities of interest and connect with relevant NSF staff.	Q4, FY 2023	Completed	NSF launched new.nsf.gov with improved "Funding" section designed to make funding information more accessible.

[4] GRANTED is an initiative presented in the FY 2023 Budget Request to Congress. See description on page 13.

Key Milestones – Internal Engagement and Capacity Building

Strategy 4: Build NSF capacity to support DEIA and broaden participation of investigators from groups underrepresented in STEM and underserved institutions in NSF programs.

Objective: Provide NSF staff and proposal reviewers with the knowledge and resources to effectively support diversity, equity, inclusion, and accessibility (DEIA) in the merit review process and post-award management.

In order to improve DEIA across NSF's programs and encourage proposal submissions by individuals from groups underrepresented in STEM and underserved institutions, the agency will engage in culture change activities at all levels of the organization. One dimension of this work will be to invest in change management and to ensure that DEIA policies, processes, and resources are readily accessible to NSF staff and proposal reviewers. Additionally, NSF will enhance the recruitment of program officers and proposal reviewers from the underserved institutions that are the focus for this APG.

Milestone Summary

Key Milestone	Milestone Due Date	Milestone Status	Comments
Perform environmental scan and gap analysis of existing NSF resources for addressing DEIA issues in NSF programs.	Q1, FY 2023	Completed	Completed environmental scan and collection and clustering of existing resources. Circulated draft report with findings and recommended next steps.
Develop resources for NSF internal processes on how to equitably engage with research proposals from underserved institutions.	Q2, FY 2023	Completed	Aligned collected DEIA resources with journey maps, including those for program officers and reviewers.
Disseminate the resources, and establish practices to ensure continued dissemination of policies, resources, and best practices across NSF.	Q3, FY 2023	Completed	Finalized APG Toolkit text for "Ensuring Reviewer Diversity" and "Running Equitable Reviews." Developed plan and materials for rollout of APG Toolkit, beginning at NSF Equity Ecosystem Expo.

Narrative

Over the course of this Agency Priority Goal, NSF made significant progress on diversifying the pool of proposals with respect to both investigators and institutions. The proportion of proposals with principal investigators from groups underrepresented in STEM grew from 32 percent to 36.9 percent, surpassing the target level, while the proportion of proposals from underserved institutions grew from 14.8 percent to 16 percent, nearly meeting the target level. In addition, NSF made advances in many areas related to encouraging and tracking broader participation in STEM.

On the policy front, NSF updated internal and external policy documents to encourage proposal submission from a broader range of investigators and institutions. NSF also incorporated an equity principle into its evaluation policy and developed a new Language Access Plan. During this APG, NSF hired its first Chief Diversity and Inclusion Officer, who will oversee the policy development going forward.

In the data arena, NSF improved the collection of demographic data for investigators, improved tagging of institutional characteristics in NSF systems, and constructed an APG dashboard that allows leaders and program staff throughout the agency to delve into proposal and award data for individuals and institutions across time and at various organizational levels.

As part of this APG, NSF conducted external listening sessions to better understand challenges and barriers to accessing NSF funding and developed a guide for other programs to conduct similar sessions in the future. During this period, NSF established the GRANTED program, which aims to improve the research support and service capacity at emerging and underserved research institutions. NSF also kicked off an agency-wide planning effort to meet the targets for funding to institutions in EPSCoR jurisdictions in the CHIPS and Science Act.

The APG teams worked to understand and collect what resources NSF has and needs for further advancing this goal. Existing and new resources were collected into an online Toolkit for NSF staff for improving representation in STEM.

Due to the timing of NSF’s proposal cycle, the effects of many of these changes on proposal submissions have not yet been realized. NSF will continue to monitor these metrics and pursue this goal into the next round of APG.

Data Accuracy & Reliability

Data on the number and proportion of proposals from investigators and institutions are from NSF's Enterprise Information System (EIS) as of November 2, 2023. EIS is a reporting and analysis system that provides trend analysis, financial management, and personnel information on a variety of topics, organized into modules. The EIS is refreshed on a regular update cycle using data from NSF's financial system and from core transactional systems, including those related to accepting and awarding proposals.

At the start of this APG, NSF data on principal investigator demographics had two limitations; some individuals did not answer demographic questions when applying for or reporting on NSF award funding, while others answered that they do not wish to disclose this information. Prior to work on this APG, NSF did not have data on one or more of the reported demographic characteristics (gender, disability status, or race and ethnicity) for at least 25 percent of principal investigators. To address the first issue, one of NSF's strategies under this APG has been to improve response rates to better gauge the effectiveness of our efforts to increase proposals with principal investigators from groups underrepresented in STEM. All demographic questions are now required as part of a user's profile, though respondents still have the option to answer that they do not wish to disclose this information. These demographic data improvements were successfully piloted beginning in 2021 and rolled out more broadly in May 2022, with improvements realized over the following 12 months. As of October 2023, around 10 percent of proposals to NSF during FY 2023 had unknown PI demographic characteristics for one or more categories, because the principal investigator chose not to disclose this information. In order to ensure that the measures presented in this APG accurately reflect broader representation in the scientific enterprise, NSF recalculated its FY 2020 baseline, FY 2021 and FY 2022 results, and FY 2023 targets at the end of FY 2023.

For the definition of an underserved institution, NSF referenced: (1) NSF's list of Minority Serving Institutions based on 2020 enrollment information from the Department of Education; and (2) the list of EPSCoR states and territories, defined by NSF using the FY 2022 update. These were further limited to those receiving $50 million or less in federal research funds over the past three years, based on data from the FY 2020 Survey of Federal Science and Engineering Support to Universities, Colleges, and Nonprofit Institutions.[5]

[5] https://www.nsf.gov/statistics/srvyfedsupport/

Additional Information

Contributing Programs

Program Activities:

- **Broadening Participation** at NSF includes a portfolio of programs solely focused or with an emphasis on increasing participation from individuals from underrepresented groups and diverse institutions throughout the United States in all NSF activities and programs.[6] Specifically, NSF is committed to broadening participation by:
  - Preparing a diverse, globally engaged STEM workforce;
  - Integrating research with education, and building capacity;
  - Expanding efforts to broaden participation by individuals from groups underrepresented in STEM and diverse institutions across all geographical regions in all NSF activities; and
  - Improving processes to recruit and select highly qualified reviewers and panelists that reflect the Nation's diversity.

  The Broadening Participation portfolio provides numerous examples of the types of programmatic elements, resources, and engagement strategies that can be adopted more widely across NSF to achieve the APG. Moreover, both Broadening Participation and the APG support NSF's Strategic Plan Objective 1.1 – Ensure accessibility and inclusivity: Increase the involvement of communities underrepresented in STEM and enhance capacity throughout the Nation.[7]
- **GRANTED**: Growing Research Access for Nationally Transformative Equity and Diversity, or GRANTED, is an initiative that seeks to improve the Nation's research support and service capacity at emerging and underserved research institutions. The GRANTED initiative uses a variety of mechanisms to further NSF's reach in advancing the geography of innovation and engaging groups underrepresented in STEM.[8]

[6] More information on Broadening Participation is available at https://www.nsf.gov/od/broadeningparticipation/bp.jsp.
[7] NSF's FY 2022-2026 Strategic Plan, Leading the World in Discovery and Innovation, STEM Talent Development, and the Delivery of Benefits from Research is available at https://www.nsf.gov/about/performance/strategic_plan.jsp.
[8] More information on GRANTED is available at https://new.nsf.gov/funding/initiatives/broadening-participation/granted.

- **EPSCoR:** The Established Program to Stimulate Competitive Research (EPSCoR) was designed to strengthen research and education in the sciences and engineering with a focus on states and territories that have historically received lesser amounts of NSF Research and Development funding.[9]

Stakeholder / Congressional Consultations

National Science Board: This APG complements a priority of the National Science Board to close the STEM talent gap in part by accelerating progress in increasing the diversity of the science and engineering workforce to be representative of the U.S. population as a whole.[10]

Committee on Equal Opportunities in Science and Engineering (CEOSE): CEOSE is a panel of external advisors to NSF on policies, programs, practices, and activities to encourage full participation of women, underrepresented racial/ethnic populations and persons with disabilities within all levels of the Nation's STEM enterprise. By elevating the goal of improving representation in the scientific enterprise to among the agency's highest priorities, the APG aligns with a recommendation CEOSE made in its 2019-2020 Biennial Report to Congress: "CEOSE recommends that NSF demonstrate and promote bold leadership actions to create, integrate and make visible elements within and across its programs to enhance broadening participation of underrepresented and underserved groups in STEM."[11]

[9] More information on EPSCoR is see https://www.nsf.gov/od/oia/programs/epscor/.
[10] More information can be found in the National Science Board's Vision 2030 report: https://www.nsf.gov/nsb/NSBActivities/vision-2030.jsp.
[11] More information on CEOSE and its 2019-2020 Biennial Report to Congress is available at https://www.nsf.gov/od/oia/activities/ceose/.