



Agency Priority Goal | Action Plan | FY 2022-2023

Improve Representation in the Scientific Enterprise

Goal Leaders:

Sylvia Butterfield, Deputy Assistant Director, Directorate for STEM Education
Alicia Knoedler, Office Head, Office of Integrative Activities

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 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.

Goal Targets

| Achievement statement | | Key indicator(s) | Quantify progress | | | | Frequency |
|-----------------------|--|--------------------------------------|-----------------------------|---------------------------|--------------|---------------------------|--------------|
| By... | We will... | Name of indicator | FY 20 Baseline ¹ | FY 21 Actual ¹ | FY 22 Actual | FY 23 Target ¹ | 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 | 12,916 | 13,846 | 13,127 | 14,208 | 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 | 31.0% | 32.6% | 34.4% | 34.1% | Annually |
| 09/30/23 | Increase the number of proposals from underserved institutions by 10% over FY 2020 baseline. | Number of institution proposals | 6,169 | 6,623 | 6,000 | 6,786 | 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% | Annually |

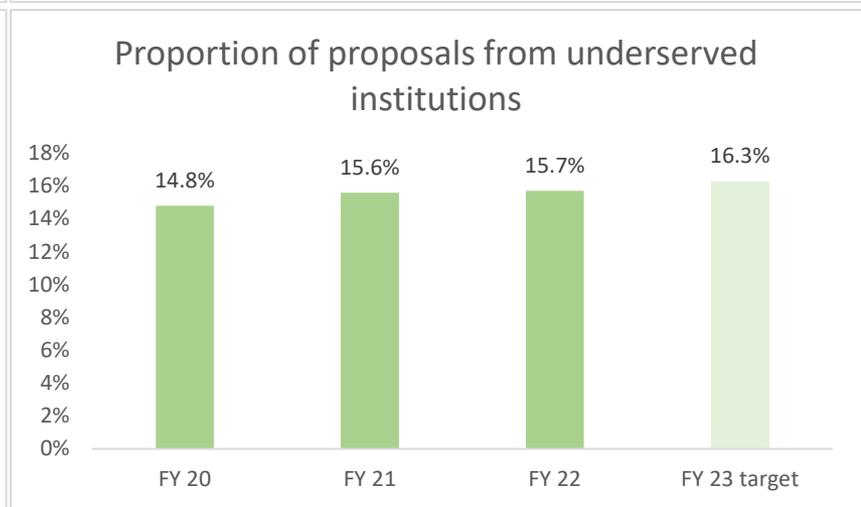
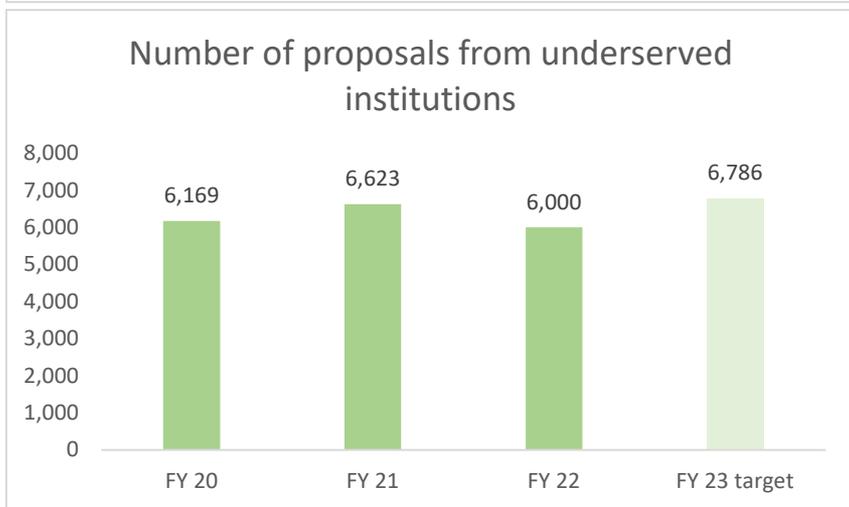
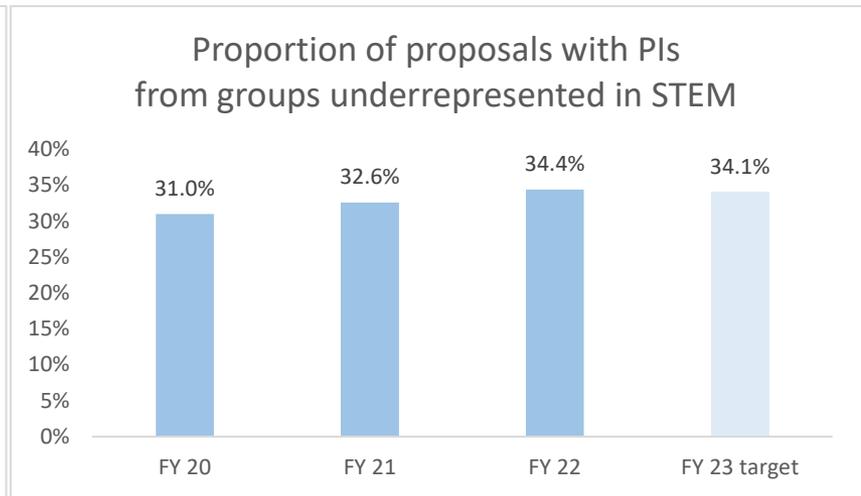
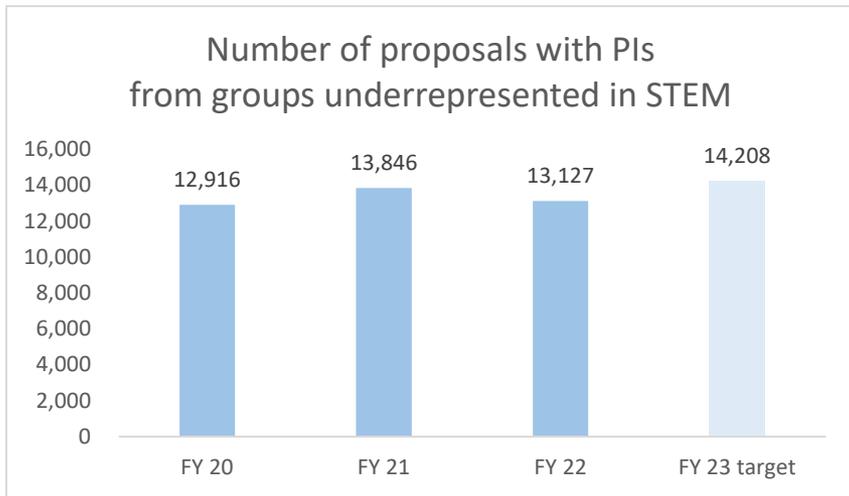
- **Investigators from groups underrepresented in STEM** are principal investigators on proposals who identify as:
 - Women²
 - Members of a racial and/or ethnic group underrepresented in STEM including African American/Black, American Indian/Alaska Native, Hispanic/Latino, and Native Hawaiian/Pacific 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, territories, or commonwealths 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.³ 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 The FY 20 baselines, FY 21 results, and FY 23 targets have been updated since the Q3 update. See rebaselining information on page 5.

² 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).

³ 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, territories, and commonwealths, that have historically received lesser amounts of NSF Research and Development funding. For more information see <https://www.nsf.gov/od/oiia/programs/epscor/>.

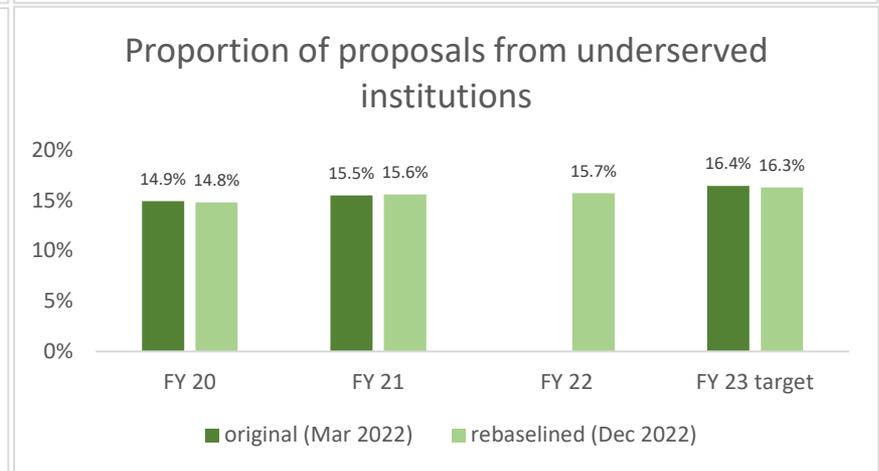
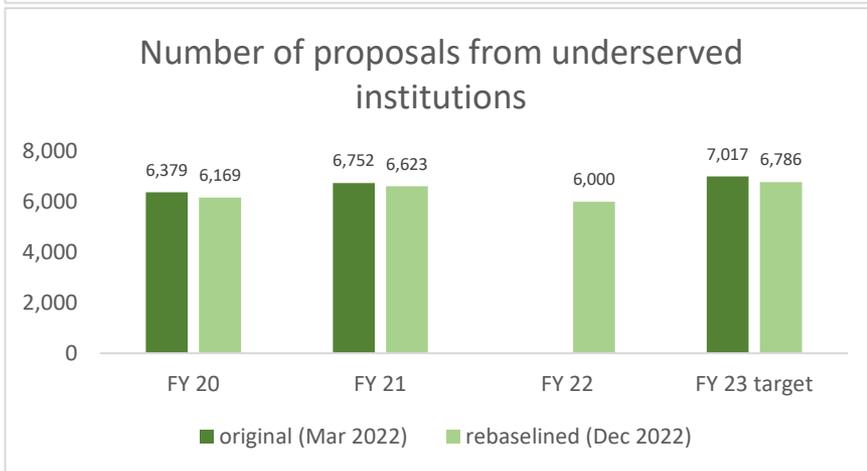
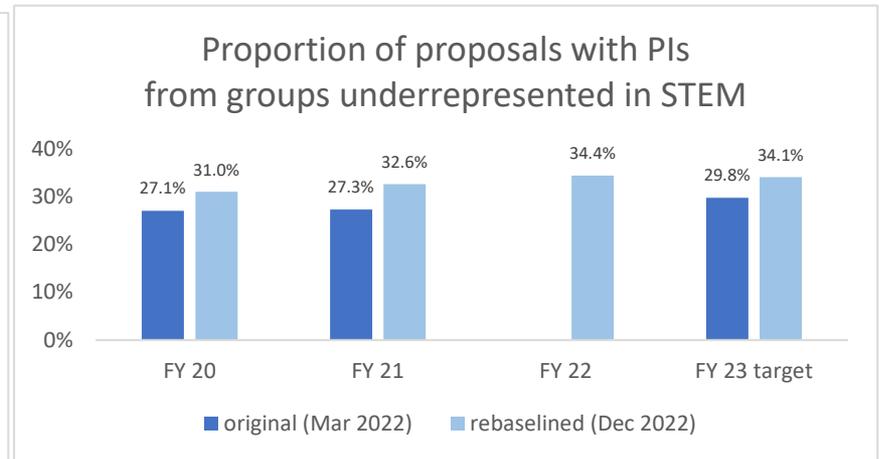
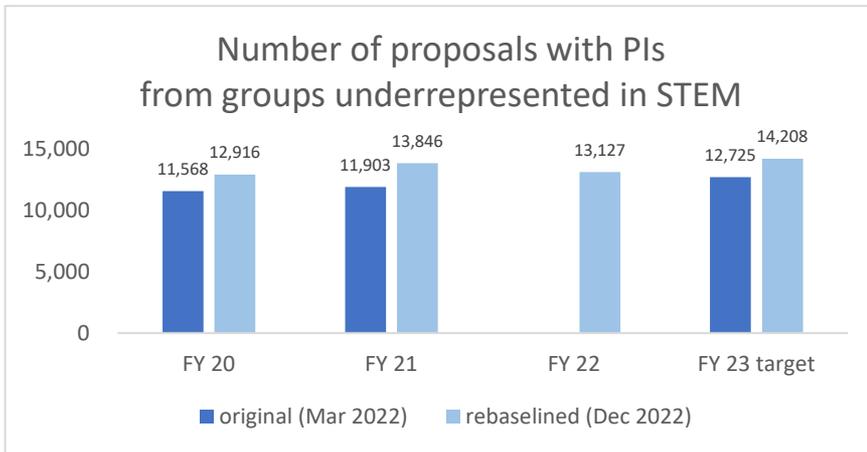
Key Indicators



Note: As described on the following page, the FY 2020 baselines, FY 2021 results, and FY 2023 targets have been recalculated to account for improvements in demographic data collection and institutional flags.

Rebaselining

Since the original FY 2020 baselines, FY 2021 results, and FY 2023 targets were calculated, NSF improved its demographic data collection for individuals and its flagging of institutional characteristics. In order to ensure that the measures presented in this APG accurately reflect broader representation in the scientific enterprise, rather than just improved data collection, NSF has recalculated its FY 2020 baseline, FY 2021 results, and FY 2023 targets as shown below.



Goal Team

Steering Group

• **Membership:**

- Includes executive agency leadership from several offices key to NSF's diversity, equity, inclusion, and accessibility work.
- Office of Equity and Civil Rights
- Office of Integrative Activities *goal co-lead
- Directorate for STEM Education *goal co-lead
- Directorate for Social, Behavioral, and Economic Sciences

• **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 | In progress | Gathering language resources for use by program staff in developing funding opportunities. |
| Disseminate pre-approved funding opportunity and program guidance language throughout the agency for voluntary use. | Q2, FY 2023 | | Discussed initial dissemination approach with plans to refine during FY 23 Q1. |
| Approve and incorporate DEIA expectations in NSF grants policy documents. | Q4, FY 2023 | In progress | Preliminary changes moving through clearance for incorporation into NSF grants policy document in early Q1 FY 23. More extensive edits are planned for Q4 FY 23. |

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 | Recalculating and documenting 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 and new demographic data are in the process of 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 | In Q3 NSF linked internal institutional databases to IPEDS (Dept of Education) institutional codes. This will lead to improved tracking of MSIs over time. |
| 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 | In Process | Internal NSF dashboard with PI and institutional data is in acceptance testing. Finalizing report on improving diversity in panel composition through access to better data. |

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. Currently working on analyzing and planning for dissemination. |
| Conduct listening sessions and workshops with institutions that historically have had low participation in NSF programs. | Q2, FY 2023 | | Planning to begin in Q1, FY 2023. |
| Create resources to present and make accessible the information from the engagement strategies. | Q3, FY 2023 | | |
| Update NSF's webpage to help investigators better identify funding opportunities of interest and connect with relevant NSF staff. | Q4, FY 2023 | | |

⁴ GRANTED is an initiative presented in the FY 2023 Budget Request to Congress. See description on page 14.

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 | In progress | Completed environmental scan. Gap analysis work originally planned for completion in Q4 carried over into Q1. Currently finalizing gap analysis, aligning use cases and resources available. |
| Develop resources for NSF internal processes on how to equitably engage with research proposals from underserved institutions. | Q2, FY 2023 | | Development to begin in Q1, FY 2023. |
| Disseminate the resources, and establish practices to ensure continued dissemination of policies, resources, and best practices across NSF. | Q3, FY 2023 | In progress | Drafted Communications Plan. |

Narrative – FY 2022 Q4

With this update, NSF is providing FY 2022 results, as well as updated data for the FY 2020 baselines, FY 2021 results, and FY 2023 targets, capturing improvements made in demographic data collection and institutional characteristics.

- Improved demographic data indicate that NSF has been receiving a larger number and proportion of proposals with principal investigators from groups underrepresented in STEM than previously reported.
- The number of proposals with principal investigators from groups underrepresented in STEM and from underserved institutions decreased from FY 2021 to FY 2022. This result was in the context of a reduction in the total number of proposals submitted to NSF.
- The proportion of proposals with principal investigators from groups underrepresented in STEM and from underserved institutions both increased, and the proportion of proposals on the investigator key indicator surpassed the FY 2023 target.

In the fourth quarter of FY 2022, NSF made progress in all four areas:

- **External Engagement and Internal Engagement/Capacity Building:** Collected resources used across the agency when engaging underrepresented groups and underserved institutions. Completed environmental scan of internal resources and began gap analysis. Drafted internal communications plan.
- **Policy:** Gathered language resources for use by program staff in developing funding opportunities. Examined opportunities to use various policy mechanisms to promote DEIA and BP more intentionally, including NSF grants policy documents and program guidance for funding opportunities intended to broaden participation of individuals from underrepresented groups and diverse institutions in NSF activities and programs.
- **Data Analytics:** Engaged with the NSF community on diversity considerations in the composition of expert panels convened to review project proposals. Outreach included two surveys and two listening sessions with a total of 200 participants. From the information collected, the team is preparing a report with recommendations on data-related activities to address identified challenges.

In response to community feedback, the language of the goal was also updated in a collaborative process to reflect greater respect and inclusivity.

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 December 9, 2022. 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.

NSF data on principal investigator demographics have two limitations; some individuals do not answer demographic questions, while others answer that they do not wish to disclose this information. In recent years, this has resulted in NSF not knowing the gender, disability status, or race and ethnicity of at least 25 percent of principal investigators. To address the first issue, one of NSF's strategies under this APG is to improve response rates to better gauge the effectiveness of our efforts to increase proposals with principal investigators from groups underrepresented in STEM. These demographic data improvements were successfully piloted beginning in 2021 and rolled out more broadly in May 2022. The resulting data improvements are expected to be realized over the following 12 months.

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, 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 a new initiative that will improve the Nation's research support and service capacity at emerging and underserved research institutions. The GRANTED initiative will use 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://beta.nsf.gov/funding/initiatives/broadening-participation/introducing-nsf-granted>

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.⁹

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."¹⁰

⁹ More information can be found in the National Science Board's Vision 2030 report: <https://www.nsf.gov/nsb/NSBActivities/vision-2030.jsp>

¹⁰ More information on CEOSE and its 2019-2020 Biennial Report to Congress is available at <https://www.nsf.gov/od/oia/activities/ceose/>