

CREATE OPPORTUNITIES EVERYWHERE

Description and Rationale

Create Opportunities Everywhere (COE) is a comprehensive whole-of-NSF strategy for inspiring, attracting, supporting, and advancing people underrepresented in science, technology, engineering, and mathematics (STEM). COE engages the research and education community in activities to reduce inequities and barriers to participation in the STEM enterprise. It addresses disparities in access to meaningful resources, information, connections, opportunities, and experiences for groups underrepresented in STEM. To that end, it aims to expand diversity, access, and inclusion in STEM along individual, institutional, and geographic lines, including investigators and institutions in urban, rural, and other isolated regions of the country.

NSF is committed to supporting the science and engineering community to identify and address barriers to innovation, partnerships, and opportunities in STEM, and to ensuring fairness and integrity in how it delivers its programs. Historically, NSF invests over \$1 billion each year in its Broadening Participation (BP) activities nationwide. The Agency recognizes that there is unrealized STEM potential across the Nation; therefore, it plans to build upon its investments to incorporate this talent using various STEM pathways. The NSB, in its *Vision 2030* report, estimates that, in order for the S&E workforce to be representative of the U.S. population in FY 2030, the number of women in STEM must nearly double, Black or African Americans must more than double, Hispanic or Latinos must triple, and the number of American Indians or Alaska Natives needs to quadruple those in the 2020 U.S. S&E workforce.¹

NSF aims to fund projects that inspire, nurture, and advance diverse, domestic STEM talent from all communities, jurisdictions, and territories across the country. Eliminating disparities in cultivating STEM talent involves a wide set of stakeholders, from *individuals* traditionally identified as underrepresented or underserved, to *institutions of higher education and informal science education institutions* that serve groups underrepresented in STEM, to those *communities (e.g., urban and rural), lands, and jurisdictions* across the country that currently lack resources and opportunities for robust education, workforce development, and regional innovation. To be effective in creating opportunities everywhere, NSF is identifying and embedding guiding principles for COE across NSF's portfolio of programs.

NSF has identified four guiding principles for creating and implementing opportunities everywhere: (1) address research equity, (2) build capacity, (3) foster collaborations and partnerships, and (4) support the next generation of researchers. A focus on research equity ensures accessible and inclusive spaces for all STEM educators and researchers. To that end, investing in research to understand the science of broadening participation and other dimensions of equity science provides additional evidence-based approaches to support long-term efforts in this area.

Historically, NSF investments in capacity building have begun with support for PreK-12 students and teachers at high-need schools in rural, urban, and suburban communities, and continue at the undergraduate and graduate levels to enhance the quality of STEM education and build research infrastructure at Minority Serving Institutions (MSIs) and emerging research institutions (ERIs). These

¹ www.nsf.gov/nsb/publications/2020/nsb202015.pdf

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investments collectively aim to improve STEM representation and success rates (i.e., graduation rates) among underserved students and increase diversity in STEM doctoral programs among domestic populations, which will contribute immensely to diversifying the U.S. STEM education and workforce enterprise. Capacity building also includes strategic investments in organizational infrastructures that support the application for and stewarding of funding in support of STEM research and training. Initiating strategic partnerships, networks, and alliances as part of the COE strategy can lead to the development of national and international collaborations to scale research-based BP and equity efforts while fostering systemic change that addresses the intersection of multiple social identities, such as gender, race, ethnicity, and disability. The final guiding principle focuses on the Next Generation Researchers and STEM professionals, comprising current investments that are designed to support greater inclusion and equity in STEM professions. The facilitation of training, mentoring, and professional development opportunities are essential in building knowledge, expertise, and confidence as individuals move through multiple types of STEM career trajectories. Using this comprehensive approach to create opportunities everywhere, NSF will integrate diversity, equity, inclusion, and access into all program efforts to strengthen U.S. STEM education, research, and workforce pathways and infrastructures by drawing on the full extent of the Nation's talent and resources.

NSF's guiding principles for COE directly support the CHIPS and Science Act (P.L. 117-167) and enable NSF to build a strong domestic and diverse STEM workforce through a variety of partnerships and investments. Examples include: (1) expanding the geographic and institutional diversity of research institutions and the students and researchers they serve through NSF's capacity building and broadening participation programs; and (2) promoting STEM equity through supporting research on STEM participation, understanding bias and discrimination, as well as building the tools, surveys, and infrastructure necessary for understanding the impacts of Federally-funded research on society, the economy, and the workforce, including domestic job creation.

In FY 2025, NSF intends to continue applying the four guiding principles to create opportunities everywhere by strengthening and scaling investments, expanding beyond the BP portfolio, and increasingly incorporating COE's guiding principles into NSF's core research portfolio. COE will strengthen the established NSF and broaden the STEM talent pool across all disciplines. For *individuals*, NSF will continue to make investments in democratizing STEM education and workforce. Stated differently, it will double down in its efforts to make STEM more diverse, inclusive, and accessible. For *institutions*, NSF will be more intentional about how it engages MSIs and ERIs in its formal and informal programs, starting with those institutions classified as MSIs, but also focusing on the importance of MSI-bridge programs (e.g., funding open to all institutions that encourage participation by MSIs). To ensure equity in access, preparation, experiences, and program delivery, NSF is continuing an Agency Priority Goal designed to improve representation and ensure success in the science and engineering (S&E) enterprise by actions that will increase proportion of proposals submitted by investigators that are underserved in STEM and from MSIs and ERIs.² For *jurisdictions* (e.g., U.S. states and territories), NSF will expand support for individuals and institutions in EPSCoR jurisdictions to ensure geographic diversity, by seeking to close representational and resource gaps within the most underfunded regions of the U.S.

² NSF FY 2023-FY 2024 Annual Performance Plan https://nsf.gov-resources.nsf.gov/2023-03/89_fy2024_0.pdf

Goal of Investment

Creating opportunities everywhere requires a strategic and tactical approach to confronting current grand challenges to equitable success within the STEM enterprise. Thus, NSF has identified the following set of goals to guide its efforts in creating meaningful opportunities in STEM, while expanding the reach of NSF investments throughout the Nation's S&E enterprise and STEM ecosystem. These goals also reach across and beyond all of NSF's FY 2025 priority themes to Build a Resilient Planet, Advance Emerging Industries for National and Economic Security, and Strengthen Research Infrastructure. FY 2025 goals for COE include:

- **Broaden the STEM Ecosystem:** Expand NSF's programmatic efforts to under-resourced and underserved communities that cover a wide set of stakeholders, from individuals traditionally identified as underrepresented or underserved, to institutions of higher education and informal science education organizations. These organizations serve groups, communities, lands, and jurisdictions that are underrepresented in STEM, are not large recipients of federal research funding, or lack resources and opportunities for robust education, workforce development, and regional innovation.
- **Accelerate Student Success in STEM:** Increase preK-12, undergraduate (2-year and 4-year institutions), graduate, and post-doctoral success in STEM disciplines among those from gender, racial, ethnic, geographic, and other groups who have been historically underrepresented in STEM disciplines and careers.
- **Strengthen Educational Institutions through Collaborative Programs and Partnerships:** Strengthen leadership development and advancement opportunities for faculty at MSIs and ERIs to foster PI and institutional success in STEM and STEM education research through a collaborative infrastructure of networks, alliances, and partnerships to broaden participation of individuals, groups, and localities/regions often excluded or underserved in STEM.
- **Accelerate Inclusion and Access in NSF's Research Portfolio:** Increase and strengthen institution and faculty engagement in NSF's many research programs and activities from those institutions not currently well represented in NSF's research programs through strategic outreach and engagement activities and programs intended to build capacity and competitiveness for these programs.
- **Develop an Evidence Foundation for COE:** Continuously inform COE efforts by supporting empirical research and the necessary and underlying research infrastructure. Such research provides theories, methods, and analytic techniques to better understand individual and compounding factors that enhance and impede the Nation's ability to expand participation in STEM education and the workforce and throughout all economic and social institutions in society. This will be an important foundation for realizing the goal of broadening participation in science and engineering. One key activity in support of this goal is the Analytics for Equity initiative, which was initiated in FY 2023. This initiative builds on the Evidence-Based Policymaking Act and E.O.13985³ by piloting a new way to support social, economic, and behavioral sciences research that leverages federal data assets (ensuring privacy is protected and data are secure) and scientific advances in researching equity-related topics for greater public benefit.

Achieving these goals will strengthen the capacity and capabilities of institutions and investigators who are frequently underrepresented and underserved in STEM and reduce barriers and inequities

³ www.federalregister.gov/documents/2021/01/25/2021-01753/advancing-racial-equity-and-support-for-underserved-communities-through-the-federal-government.gov

throughout the S&E enterprise and STEM ecosystem. These efforts are designed to enable greater access to all science and engineering research and education resources in emerging and novel STEM fields, enabling new technological innovations and cutting-edge modes of employment necessary for American prosperity, as articulated throughout the Multi-Agency Research and Development Priorities for the FY 2025 Budget.

Potential for Impact, Urgency, and Readiness

NSF has had a long-standing goal of cultivating a world-class, broadly inclusive science and engineering workforce while expanding the scientific literacy of all citizens. NSF has continuously invested in foundational, curiosity-driven, discovery-oriented research and use-inspired, solutions-oriented projects. As the Nation transforms and innovates while confronting grand challenges in reaching groups underrepresented in STEM, NSF's defining role in developing STEM talent everywhere benefits the U.S. global leadership in STEM and advances the Nation's science and engineering competitiveness through its ability to inspire curiosity, support creativity, and stimulate innovation.

NSF recognizes the historical and emerging challenges in the U.S. workforce and what that could mean for the STEM workforce of the future. Although we have made progress in promoting STEM education and a STEM workforce that includes all Americans,⁴ persistent disparities remain. Along with other inequities, those in education and employment are extremely salient.⁵ NSF must enhance and accelerate its efforts to diversify STEM education and the STEM workforce. Over the years, through its BP portfolio, NSF has intentionally focused on equity in science and engineering, and now NSF must ensure that these efforts are reaching all parts of the U.S., regardless of geographic location, or type of organization or institution. For more detail regarding investments in broadening participation, please see the table of BP programs in the Summary Tables chapter.

There is a critical need to acknowledge, understand, value, and study the aforementioned topics to fundamentally drive success in the Nation's S&E enterprise. To this end, FY 2025 investments in COE will continue to build on NSF's agency-wide annual investment to broaden participation in STEM, which has already created new knowledge and expanded research and training readiness across a diverse landscape of institutions. NSF has increasingly invested in BP programs over the past several decades, building individual and institutional capacity and a strong knowledge base. NSF is unique in that it supports all areas of science and engineering as well as encouraging interdisciplinary science, engineering, and education in the many programs that it supports. Science and engineering research communities are supportive and ready to tackle these challenges (see, for example, the biannual Committee on Equal Opportunity in Science and Engineering (CEOSE) reports to Congress, *Vision 2030* from the NSB, and the *Envisioning the Future of NSF EPSCoR* report).⁶ NSF has identified new areas for investments targeting disparities in STEM education and the STEM workforce and assists members of the STEM community in recognizing opportunities relevant to their needs.

In FY 2022, NSF published its FY 2022-2026 Strategic Plan *Leading the World in Discovery and Innovation*,

⁴ *Women, Minorities, and Persons with Disabilities in Science and Engineering*, NSF/SBE/NCSES. NSF 23-315, January 30, 2023. <https://nces.nsf.gov/pubs/nsf23315/>

⁵ www.bls.gov/emp/tables/stem-employment.htm; www.pewresearch.org/science/2021/04/01/stem-jobs-see-uneven-progress-in-increasing-gender-racial-and-ethnic-diversity/

⁶ CEOSE, <https://new.nsf.gov/od/oia/ceose>. NSB, www.nsf.gov/nsb/NSBActivities/vision-2030.jsp. EPSCoR, <https://nsf-gov-resources.nsf.gov/2022-08/Envisioning-The-Future-of-EPSCoR-Report.pdf>

*STEM Talent Development, and the Delivery of Benefits from Research.*⁷ The vision articulated in the plan is foundational to COE: A nation that leads the world in science and engineering research and innovation, to the benefit of all, without barriers to participation. And within the plan's first Strategic Goal, *Empower*, NSF defines the Agency Priority Goal: to improve representation in the S&E enterprise but also leverages its learning agenda goal (How can NSF grow STEM talent and opportunities for all Americans most equitably?) and a multitude of other activities, including responses to several equity-related Executive Orders on "*Advancing Racial Equity and Support for Underserved Communities Through the Federal Government*,"⁸ advancing equity in science and technology,⁹ and integrating outcomes from working groups throughout NSF that are increasing cross-agency collaboration and coordination to the benefit of groups that are underrepresented and underserved in STEM.

Through NSF's FY 2025 COE investments, NSF will leverage intentional alignment of strategy and actions to broaden participation of groups underrepresented in STEM to ensure that NSF's portfolio of programs is broadly accessible and inclusive. To this end, COE will enable the scaling of established programs and introduction of new initiatives to ensure that talent is energized across broad socioeconomic demographic and geographic diversity.

For example, NSF will pursue an expansion of STEM talent that builds on its already established broadening participation portfolio and core research programs. STEM talent expansion will promote access to traineeship experiences that will support STEM career development opportunities along the STEM pathway.

Anticipated Potential Contributors

NSF's investments in COE are crosscutting and will include contributions from all of NSF's directorates and offices.

⁷ NSF's FY 2022-2026 Strategic Plan: www.nsf.gov/about/performance/strategic_plan.jsp.

⁸ www.whitehouse.gov/briefing-room/presidential-actions/2021/01/20/executive-order-advancing-racial-equity-and-support-for-underserved-communities-through-the-federal-government/

⁹ www.whitehouse.gov/ostp/news-updates/2021/10/14/the-white-house-office-of-science-and-technology-policy-launches-the-time-is-now-advancing-equity-in-science-and-technology-ideation-challenge/
www.whitehouse.gov/ostp/news-updates/2022/05/26/new-guidance-to-ensure-federally-funded-research-data-equitably-benefits-all-of-america/

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