MAKING VISIBLE THE INVISIBLE

> This report illuminates the dynamics of intersectionality in the STEM enterprise and how more information about intersectional identities is needed to remove barriers to participation in STEM.

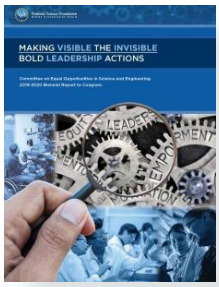
It is increasingly recognized that diverse and inclusive scientific teams can lead to amplified innovation, productivity and impact **(National Academies of Sciences, Engineering and Medicine 2023)**. Recognizing and trusting the abilities, perspectives and expertise of our fellow humans is essential for effective collaborations in science, technology, engineering and mathematics fields. Most scientists and engineers work with others in teams to solve problems facing our nation and conduct research to find revolutionary discoveries. STEM professors and teachers work with students from all backgrounds to help create the next generation of leaders. However, decades of research have illustrated the many barriers to enter into STEM education pipelines and the STEM workforce, particularly for women, minoritized racial and ethnic populations, and those with disabilities.

> The most significant and harmful barrier to participation in STEM is discrimination and disparity, which leads to the prejudicial treatment of another human's social identity, such as race, age, ability, gender, sexual orientation, and other attributes, including intersections thereof, and deprivation of opportunities.

Bias and discrimination towards interconnected and overlapping social categorizations create compounded complexities and challenges for those with "**intersectional**" identities, including psychological and physical challenges for individuals and communities (Crenshaw 1991).

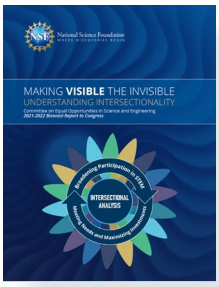
This report by the **Committee on Equal Opportunities in Science and Engineering (CEOSE)** illustrates actionable activities that STEM institutions and organizations can improve collection and analysis of intersectional data to remove barriers to broader participation in STEM. Removing barriers will allow diverse and authentic participation in safe and inclusive environments that foster innovative scientific discovery. A better understanding of the contributions of intersectionally diverse identities and experiences in the STEM enterprise will also help the U.S. National Science Foundation in catalyzing scientific discovery and promoting its benefits at speed and scale.

The current work of the committee aligns with the plans set forth in the 2019-2020 CEOSE report, **Making Visible the Invisible: Bold Leadership Actions**. The ongoing work of the committee to advance broadening participation (BP) in STEM and science and engineering (S&E) aligns with the themes articulated in the National Science Board's (NSB) Vision 2030 report[1] and NSF's current strategic plan[2]. An additional activity during this reporting period was the formation of a subcommittee to envision the future of NSF's **Established Program to Stimulate Competitive Research (EPSCoR)**. The Envisioning the Future of NSF EPSCoR report from the subcommittee was submitted to NSF in August 2022.



2019-2020
CEOSE Report

Future of NSF EPSCoR Report



2021-2022
CEOSE Report

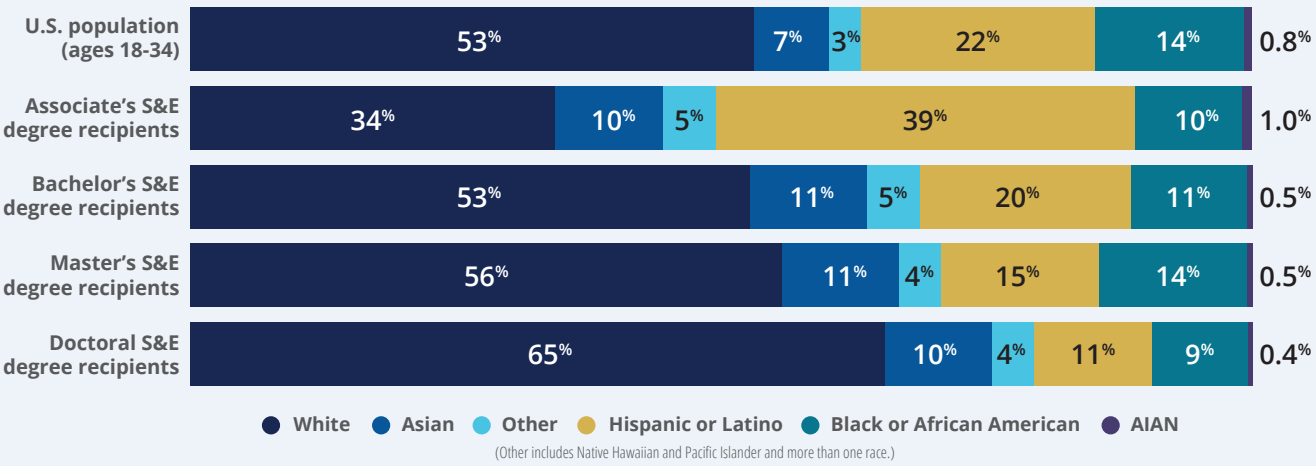
[1]*https://www.nsf.gov/nsb/publications/2020/nsb202015.pdf* [2]*https://www.nsf.gov/pubs/2022/nsf22068/nsf22068.pdf*

UNDERSTANDING INTERSECTIONALITY

CEOSE recognized NSF's critical leadership role in developing the STEM pathways and S&E ecosystems that undergird the discovery and innovation vital to our nation's competitiveness and security. However, the agency must strive to become more responsive and inclusive to the myriad intersecting identities that make up our society. Focusing on and emphasizing intersectionality provides a means for illuminating and making visible the barriers that must be addressed and removed. Therefore, CEOSE recommends that NSF should respond to the following two actions to advance intersectionality in STEM:

- *Utilize intersectional analysis to remove barriers to the participation of persons from various populations historically underrepresented in STEM fields, so as to meet more effectively the needs of society and maximize the nation's scientific investment. This requires that NSF invest in obtaining and analyzing higher resolution data about investigators' identities, demographic characteristics and institutions to develop strategies and programmatic interventions.*
- *Develop metrics and utilize an intersectional analytical framework in implementing and assessing the recommended actions for the NSF EPSCoR portfolio from the future of NSF EPSCoR report. Recommendations and suggestions in the report are exemplary strategies that can be undertaken nationally to promote broadening participation and institutional transformation in the STEM enterprise.*

U.S. female population ages 18-34 and female S&E degree recipients, by degree level, race, and ethnicity: 2021



(Other includes Native Hawaiian and Pacific Islander and more than one race.)

> ***It is important to address intersectional identities not as discrete characteristics that are occupied in different contexts and situations, but rather as dynamic and integrated identities that are constantly interacting, contradicting and reinforcing everyday lived experiences (Crenshaw, 1991).[1]***

Please visit www.nsf.gov/od/oia/activities/ceose to view the full report.

[1]Crenshaw, K. "Mapping the margins: Intersectionality, identity politics, and violence against women of color." In Stanford Law Review 43, (1991): 1241.