

Diversity, Equity, and Inclusion in the STEM Workforce

INTRODUCTION

ASME strives to foster diversity, ensure equitable access and inclusive practices, raise awareness of unconscious bias, and promote cultural competence both within ASME and in the engineering field at large. ASME is committed to achieving a truly diverse, equitable, and inclusive science, technology, engineering, and mathematics (STEM) workforce in the United States and around the world and offers the following guiding principles and policy recommendations to achieve such a vision.

FINDINGS & POLICY RECOMMENDATIONS

The U.S. economy relies on the productivity, creativity, and entrepreneurship of all U.S. citizens, yet there is a significant underrepresentation of certain groups in STEM fields, including women, Black, Indigenous and People of Color (BIPOC), members of the LGBTQ+ community, and people with disabilities. According to the most recent data available put out by the National Science Foundation, in the United States women were awarded just 20.9% of engineering bachelor's degrees,ⁱ Black or African Americans were awarded only 3.9%, and Hispanics or Latinos were awarded only 10.4%.ⁱⁱ While these numbers represent significant gains from the 1980s, there is still much work that needs to be done for women and members of underrepresented groups to increase representation in the STEM workforce.

To address the issue of gender and racial underrepresentation in the engineering and STEM workforce more broadly, it is important to examine gender and racial disparities in overall postsecondary education. For instance, when it comes to racial diversity specifically, the underrepresentation of BIPOC groups in engineering and STEM can in large part be attributed to the lack of diversity in higher education in general.ⁱⁱⁱ However, the underrepresentation of women in engineering is specifically related to the field of study and not tied to the overall number of female postsecondary degree seekers. While racial underrepresentation is a systemic issue in postsecondary education, gender disparity is specifically a problem in engineering.

Understanding why and in which ways women and members of other underrepresented groups are significantly lacking in engineering is essential in making actionable, result-driven recommendations on how best to increase diversity, equity, and inclusion in STEM. Methods used to address racial disparities will differ from those used to address gender disparities. For instance, addressing racial disparities will ultimately require more equality in higher education and the workplace, while addressing gender discrepancies will require making engineering a more attractive option for women.

With the goal of diversifying the engineering workforce, and recognizing that this effort will require a broad spectrum of approaches, ASME would like to offer the following policy recommendations in order for the United States to fully realize the potential of its citizens to contribute to the nation's overall economic security and engineering prowess.

RECOMMENDATIONS

Make diversity, equity, and inclusion in the STEM workforce a national policy imperative. The participation of underrepresented groups in the STEM workforce must become a national priority. Doing so would require policymakers to take a strategic look at strengthening and re-examining existing legislation and programs aimed at broadening the participation of underrepresented groups in STEM fields. Policymakers must also address economic inequities that disproportionately restrict access to higher education among members of underrepresented groups.

Increases public awareness of STEM careers. Many STEM careers provide unique opportunities in technology areas that have advanced dramatically in recent decades. Careers that once lacked broad appeal are now seeing renewed interest as they adapt to take advantage of ever-evolving technology. Consider this: nearly 60% of undergraduate degrees are awarded to women, yet women only make up 20.9% of engineering bachelor's degrees. The lack of female participation in the field can in large part be traced to not incentivizing women to pursue STEM degrees in the first place. Therefore, supporting efforts to foster outreach to all students, teachers, parents, and K-12 guidance counselors to encourage increased participation in STEM fields to underrepresented groups will bring greater diversity, equity, and inclusion into the STEM workforce. One such effort ASME supports is the Congressionally recognized annual "Manufacturing Day," when organizations, companies, and workshops open their doors to students and the public for tours and presentations for the purpose of highlighting the many career paths available to young people in advanced manufacturing.

Enable all students to have access to a rigorous STEM curriculum in K-12 programs. Hands-on laboratory experiences and informal learning increases academic performance and interest in STEM careers. This is particularly helpful in addressing racial disparities in STEM, as BIPOC are less likely to seek postsecondary degrees because of lack of opportunity, exposure, and resources. In creating equal opportunity for all to access STEM curriculum in K-12 programs and participate in programs like Science Fairs, more members of underrepresented groups will likely engage with and pursue a STEM education. Additionally, teaching young girls and improving their interest in STEM education in the K-12 schools will lead them to pursue the STEM fields in the university and trade school areas.^{iv} For example, ASME works to increase student awareness and equitable access to high-quality experiences that foster problem-solving skills and overall engineering habits through the ASME K-12 INSPIRE program.^v The ASME INSPIRE program targets Title 1 schools (70% of schools that use the program are Title 1 qualified schools) and because of this strategy, the program has achieved near parity in gender use (46% female), with 59% of students from racial or ethnic groups that are underrepresented in STEM (29% African American, 22% Hispanic/Latino, 8% Native American). Now in its sixth year of national outreach, the program has engaged over 385,000 students across all 50 states and the District of Columbia.

Recognizing and acknowledging the contributions and technological achievements of women and members of underrepresented groups in STEM. Providing proper acknowledgment and recognition of the technological achievements and contributions of women and members of other underrepresented groups promotes equal opportunity and encourages them to fully participate in the STEM pipeline and workforce. To this end, ASME has been instrumental in supporting the “Hidden Figures Congressional Gold Medal Act,”^{vi} which was signed into law in December of 2019. The Act recommended that four female African American NASA mathematicians, engineers and researchers receive proper acknowledgement for their contributions during the Space Race through receiving Congressional Gold Medals. While each woman received her own Congressional Gold Medal recognition, a fifth Gold Medal was designated to honor all women who worked at NASA during the Space Race.

Promote mentorship and offer members of underrepresented groups incentives for pursuing an education and career in STEM. Mentoring has proven successful in encouraging underrepresented groups to pursue STEM coursework and careers. Additionally, providing professional advancement opportunities post-graduation and throughout their careers significantly increases the likelihood for retention in STEM fields. Specific Federal programs that support STEM mentorships at all levels of education include:

- NSF: Advancing Informal STEM Learning (AISL) – National Science Foundation (NSF)
- NIH: Science Education Partnership Award (SEPA) – National Institutes of Health (NIH)
- NOAA: Bay Watershed Education and Training Program (B-WET) – National Oceanic and Atmospheric Administration (NOAA)
- NSF: National STEM Education Distributed Learning (NSDL) – National Science Foundation (NSF)
- NSF: Innovative Technology Experiences for Students and Teachers (ITEST) – National Science Foundation (NSF)
- DOE: Laboratory Equipment Donation Program (LEDP) – U.S. Department of Energy (DOE)

SUMMARY

In pursuing the above recommendations, the United States can dramatically improve the participation of women and members of underrepresented groups in the STEM workforce. In doing so, the U.S. can leverage the diversity of these individuals to fuel the innovation necessary for sustaining global competitiveness, as well as meet the challenges of a changing world.

TERMINOLOGY^{vii}

Diversity: The ways in which we differ as individuals or organizations, and the commonalities and similarities that justify and motivate all people and entities to work collaboratively together in order to achieve mutually beneficial outcomes. Diversity encompasses Diversity of Experience (including personal and professional experiences, family and lifestyle backgrounds, and socioeconomic backgrounds), Diversity of Thought (including work styles, personality types, and skill sets), and Diversity of Demographic Groups (including differences such as age, race, color, ethnicity, sex (including pregnancy), gender, gender identity, gender expression, national origin, citizenship status, religion, sexual orientation, disability, and veteran or military status). Diversity that is recognized, valued and most importantly, strategically managed within and without an organization can drive successful outcomes and business results.

Inclusion: The creation of opportunities and the elimination of barriers that allow all people to participate in and contribute to ideation, planning, projects, programs, processes, teams, organizations, social activities, fun or any other meaningful opportunity, that helps achieve successful outcomes.

Strategic Diversity: The effective deployment of strategies that leverage the strengths of all people and/or of an organization in order to operate successfully within a diverse marketplace or within a uniquely different society, institution, partnership or similar entity.”

Managing Diversity: The ability to effectively inspire and enable all people to align to a common vision, communicate effectively and assure understanding, know and accept what is of value to others, leverage the strengths of others and trust their commitment to deliver as agreed, and appropriately recognize and celebrate successes often.

Equitable Access: is defined as providing the same (or otherwise equitable) resources to all people, particularly those with diverse identities.

ⁱ <https://nces.nsf.gov/pubs/nsf19304/digest/field-of-degree-women>.

ⁱⁱ <https://nces.nsf.gov/pubs/nsf19304/digest/field-of-degree-minorities>.

ⁱⁱⁱ Su, L. (2010). Quantification of diversity in engineering higher education in the United States Journal of Women and Minorities in Science and Engineering 16(2), 161–175.

^{iv} Su, L. (2010). Quantification of diversity in engineering higher education in the United States Journal of Women and Minorities in Science and Engineering 16(2), 161–175.

^v <https://www.asmefoundation.org/programs/stemeducation/asme-inspire/#:~:text=Classroom%2Dbased%20ASME%20INSPIRE%20is,the%20opportunities%20available%20in%20engineering.&text=ASME%20INSPIRE%20is%20offered%20free%20to%20schools>.

^{vi} <https://www.asme.org/about-asme/media-inquiries/press-releases/supports-hidden-figures-congressional-gold-medal>.

^{vii} ASME Policy 15.11: ASME Policy on Diversity and Inclusion.