Introduction

The Women of Color in Engineering Collaborative (WCEC) is a collective entity dedicated to providing organizations with resources to create a supportive, encouraging, and inclusive environment for women of color in engineering. This strategic plan is the outcome of multiple meetings of representatives from over 20 STEM-focused organizations who have committed to ensuring a more diverse and inclusive engineering workforce, and one that is welcoming, supportive, and appreciative of women from all backgrounds for the talents and skills that they bring to their workspaces.

This document lays out goals and strategies to address five major challenges facing women of color in the engineering workplace:

1. Improve Pathways to Internships, Scholarships, and Jobs in Engineering
2. Reduce Microaggressions, Racism, and Sexism in the Workplace
3. Retain and Amplify Women of Color in the Workplace
4. Increase Network Inclusivity and Sponsorships for Women of Color
5. Raise Openness and Reduce Backlash to Diversity, Equity, and Inclusion (DEI) Practices

Through the WCEC, partner organizations will better leverage their resources to promote systemic change while working collectively to foster a more inclusive engineering culture and decrease the barriers that lead to women of color attrition from the engineering workforce.
**Vision**

The vision of the Women of Color in Engineering Collaborative is for women of color to feel a sense of belonging and to be fully included in engineering; for them to thrive and be valued as their authentic selves, empowering them to fully use their strengths to lead in positions of influence, innovate in their field, mentor and champion others.

**Mission**

The mission of the Women of Color in Engineering Collaborative is to work cooperatively to provide the resources that organizations need to create supportive, encouraging, and inclusive environments and extend opportunities to amplify for women of color in engineering.

**Definition of Women of Color (WOC) in Engineering**

Engineers and technologists who identify as a women+ of color and whose racial and ethnic identities shape how they experience and navigate the professional landscape.

- Intersectionality is a way of recognizing and affirming all of the groups that WOC belong to and that influence their experiences within and outside of the profession.
- Lived experiences shape how WOC navigate the world through intersectional identities that require the need for the removal of barriers to achieve equitable access, advancement, and retention in technical fields.
- Primary focus includes, but is not limited to: Latina/Hispanic, Black/African American, Native American/American Indian/Alaskan Native, and Asian/Pacific Islander/Asian American/Native Hawaiian.
Strategic Areas
Improve Pathways to Internships, Scholarships, and Jobs in Engineering

There is a critical need for academic institutions and professional organizations to consider how their approach to fostering pathways to internships, scholarships, and career opportunities in engineering may be stifled by structural and systemic barriers. The goals outlined in this section highlight the need for strategies that can facilitate sustainable change.

**GOAL 1**
Develop comprehensive and cross-sector strategies to improve the representation of WOC from Historically Black Colleges and Universities (HBCUs), Minority-Serving Institutions (MSIs), and Tribal Colleges and Universities (TCUs) among engineering company employees

While specialized accreditation for engineering programs is optional, many engineering companies require students to come from ABET-accredited programs. This directly impacts what programs and institutions companies provide financial support to and recruit from. As organizations try to diversify the engineering workforce, it is important to consider graduates from HBCUs, MSIs, and TCUs when recruiting talent. For example, the 15 ABET-accredited engineering programs at HBCUs graduate on average one-fifth of the Black engineers in the United States and constitute 22.6% of the undergraduate institutions for Black engineering doctorate recipients.

Strategies to bring visibility to HBCUs, MSIs, and TCUs include:
- Deploy campaigns that increase the number of HBCUs, MSIs, and TCUs with ABET accreditation by
  - increasing the number of WOC ABET program evaluators (PEVs)
  - increasing the number of ABET PEVs with HBCU/MSI/TCU backgrounds
  - designing and promoting the inclusion of DEI principles in ABET PEV training
- Elevate the profile of HBCUs/MSIs/TCUs with employers via the WCEC website
- Engage employers in training to disrupt bias against HBCU/MSI/TCU backgrounds

**GOAL 2**
 Equip professional societies with the tools necessary to stand-up reentry programs for companies within their respective fields

Strategies to provide pathways back into the engineering workforce include:
- Determine how companies working with other societies can be brought into existing reentry programs
- Ascertain what features of existing reentry programs, such as SWE’s Reentry Task Force, can be replicated in other societies
- Design a ‘Reentry Program in a Box’ like feature that can be deployed across societies

**GOAL 3**
Develop a systematic mapping of career pathways

Strategies to bring awareness and visibility to engineering careers include:
- Develop a Career Mapping Inventory (CMI) that brings disparate career initiatives together by
  - having WCEC members complete a self-assessment that outlines individual career paths
  - encouraging the professional societies to classify pathways for the respective fields
  - compiling CMIs across societies for systematic mapping
Reduce Microaggressions, Racism, and Sexism in the Workplace

Research has shown that microaggressions, racism, and sexism create an unwelcoming and uncomfortable environment for WOC in the engineering workplace. Reducing microaggressions, racism, and sexism in the professional spaces in every STEM-centered workplace will allow WOC to contribute their knowledge and skills safely and productively and be recognized for their achievements.

GOAL 1
Use data to inform and influence decision-makers and stakeholders

Strategies to leverage data for change:

- Leverage WCEC members to collect and analyze quantitative and qualitative data to build a business case for improving retention outcomes of WOC in Engineering.
- Develop and hone the messaging regarding the need to reduce microaggressions, racism, and sexism for a primarily STEM audience.

GOAL 2
Educate individuals in the engineering workplace about the impact of microaggressions, racism, and sexism

Strategies to provide learning and development resources for organizations:

- Curate existing training materials for organizations at various developmental stages.
- Develop guidance or culturally relevant training materials on equitable and inclusive workplace and professional society policies and processes. For example, develop and pilot training materials that provide a common language, including a terminology guide, and describe the impact of microaggressions, racism, sexism, and micro-affirmations.
Retain and Amplify Women of Color in the Workplace

Recent studies of women in engineering have highlighted real-world experiences of implicit bias and discrimination, including issues of retention and promotion in the workplace. These challenges are often multiplied for WOC in Engineering, who are typically held to stricter standards of competence than their counterparts. Most recently, the COVID-19 pandemic has introduced new challenges that negatively impact diversity and inclusion efforts. The goals identified below will significantly support the retention efforts.

GOAL 1
Value the voice, experience, and expertise of WOC in Engineering

Strategies to give more visibility to WOC in Engineering:
- Create an online database containing profiles of successful WOC to help organizations find speakers and celebrate accomplished WOC in Engineering.
- Increase the visibility of WOC in private- and public-facing education and research roles, including webinars, conferences, technical training talks, and keynotes.
- Increase WOC in technical talks/conferences.
- Promote the use of diverse review panels, committees, and science advisory boards for scholarships, awards, grants, technical talks, etc.
- Create a WCEC Leadership Task Force to promote WOC candidates for speaking engagements.

GOAL 2
Increase the role of professional societies in supporting, maintaining, sustaining and enhancing workplace retention efforts

Strategies to support professional societies’ DEI efforts for WOC in Engineering:
- Seek commitments from associations/societies to conduct self-assessments for inclusive careerbuilding processes, and then implement and act on the findings from the self-assessment.
- Spotlight leaders who are cultivating inclusive work environments for WOC in Engineering.
- Promote the advancement of WOC in Engineering by increasing their recognition through awards/scholarships.

GOAL 3
Gather data and resources about the unique issues and opportunities that WOC encounter within the workplace

Strategies to develop data-based resources to improve retention:
- Utilize the WCEC to identify reasons for the retention and attrition of WOC and ways to improve retention outcomes.
- Develop resources for STEM-centered workplaces on promising practices for retaining WOC in Engineering.
- Identify resources that higher education institutions can use to develop equitable and inclusive tenure practices. To support WOC in academia, provide resources on tenure and promotion for grad students and postdocs.

GOAL 4
Increase WOC in technical research, patents, and other intellectual property and commercialization activities

Strategies to benefit from the knowledge and creativity of WOC:
- Create metrics for key engineering innovation, commercialization, and entrepreneurship indicators.
- Gather intersectional data on these indicators by gender and race and help organizations determine benchmarks.
Increase Network Inclusivity and Sponsorships for Women of Color

An inclusive network is one in which an individual’s professional networks are diverse. These networks provide a safe space for colleagues to support each other and raise issues that could affect them personally and professionally. Sponsorships from societies for WOC should include providing opportunities and visibility in national conferences through keynotes, speaking engagements, and opportunities to be equitably published.

GOAL 1
Expand the understanding of workplace leaders for evaluating, deconstructing, and reconstructing inclusive retention processes

Strategies to provide learning and development for leaders:
- Develop educational programming based on data and resources to facilitate awareness of bias and the impact of privilege, building a business case to increase WOC retention in engineering.
- Recommend actions to mitigate bias in workplace policies, programs, and practices.

GOAL 2
Promote the advancement of WOC in Engineering, particularly in leadership roles and representation in engineering organizations

Strategies to recognize and support the contributions of WOC in engineering:
- Ensure awards and award processes are inclusive and promote WOC as pillars of excellence.
- Promote and market profiles/stories of WOC on STEM-centered workplace websites and social media (media campaigns).
- Create a WCEC panel to examine professional societies’ promotion and leadership selection processes and develop guidelines to mitigate bias and discrimination.
- Create workshops for STEM-centered workplaces on reviewing and updating their promotion and leadership processes.
- Increase the selection of WOC for boards of directors of professional societies, corporations, and nonprofit organizations.
- Provide resources to WOC to sharpen technical skills, improve communication skills, and build confidence.
Raise Openness and Reduce Backlash to Diversity, Equity, and Inclusion (DEI) Practices

Systemic changes to address diversity, equity, and inclusion in the workplace require cultural transformation, which can provoke opposition from those resistant to change. Engineering, in particular, is seen by many as a meritocratic occupation, and it can be difficult for people to acknowledge systemic or structural barriers that create an inequitable or unwelcoming environment for WOC. Recognizing and responding effectively to resistance to DEI efforts is critical to the sustainable success of DEI initiatives.

**GOAL 1**
Increase understanding around differences, specifically gender and racial differences, in the engineering workforce

Strategies to educate productively and effectively:
- Curate inclusive communications training to illustrate why DEI matters.
- Counter backlash with data that highlight disparities and refutes stereotypes.
- Capture changes in perception through data collection and reporting.
- Create a mentoring toolkit modeled from existing resources that considers reverse and multidirectional approaches.

**GOAL 2**
Expand support within discipline-specific organizations for their DEI efforts, and help educate and create DEI champions

Strategies to encourage allyship and advocacy:
- Build strong allyship and advocacy by creating a toolkit for Allyship and Advocacy, modeled from existing resources.
- Create an online community/forum for WOC and allies in Engineering.
- Develop rewards and recognitions to celebrate those who champion DEI and lead by example.
List of WCEC Partners

American Association for the Advancement of Science (AAAS)
American Council of Engineering Companies (ACEC)
American Indian Science and Engineering Society (AISES)
American Institute of Aeronautics and Astronautics (AIAA)
American Institute of Chemical Engineers (AIChE)
American Society for Engineering Education (ASEE)
American Society of Civil Engineers (ASCE)
American Society of Mechanical Engineers (ASME)
American Water Works Association (AWWA)
ASM International
Dupont
GE Aviation
GM
Institute of Electrical and Electronics Engineers (IEEE)
Institute of Transportation Engineers (ITE)
LatinaVida
National Society of Black Engineers (NSBE)
Northrop Grumman
Raytheon Technologies
SACNAS
Society of Asian Scientists and Engineers (SASE)
Society for the Advancement of Material and Process Engineering (SAMPE)
Society of Fire Protection Engineers (SFPE) and SFPE Foundation
Society of Hispanic Professional Engineers (SHPE)
Society of Petroleum Engineers, Inc. (SPE)
Society of Women Engineers (SWE)
TAPPI
The Minerals, Metals, and Materials Society (TMS)
Women in Engineering Pro-Active Network (WEPAN)
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