The Women of Color in Engineering Collaborative

Dr. Roberta Rincon, Society of Women Engineers

Dr. Roberta Rincon is the Associate Director of Research with the Society of Women Engineers, where she oversees the organizationâ™s research activities around issues impacting girls and women from elementary through college and into the engineering work

Dr. Rochelle L Williams, National Society of Black Engineers

Rochelle L. Williams, Ph.D. is Chief Programs Officer at the National Society of Black Engineers (NSBE) and is responsible for supporting the strategic outcomes and implementation of NSBE programs from the Pre-Collegiate, Collegiate and Professional demographics. She is also responsible for the Society's sponsored programs and research efforts. Prior to joining NSBE, Dr. Rochelle served as Project Director and Co-Principal Investigator for the ADVANCE Resource Coordination (ARC) Network with the Association for Women in Science (AWIS) and Research Scientist in the Office for Academic Affairs at Prairie View A&M University. In 2016, Rochelle was selected as a Christine Mirzayan Science and Technology Policy Fellow with the National Academies of Science, Engineering, and Medicine in Washington, DC. As a fellow, she supported the Committee on Women in Science, Engineering, and Medicine on the initial phases of the study that led to the Sexual Harassment of Women: Climate, Culture, and Consequences in Academic Sciences, Engineering, and Medicine report. Dr. Rochelle received her B.S. in physics from Spelman College and both her M.Engr. in Mechanical Engineering and Ph.D. in Science and Mathematics Education from Southern University and A&M College.

Dr. Dayna Lee Martínez, Society of Hispanic Professional Engineers, Inc.

Dayna currently serves as a Manager of Research & Innovation at SHPE. In this role, she oversees the design and development of the Equipando Padres program as well as graduate and advanced students programming.

An industrial engineer by training, before joining SHPE, Dayna was a faculty member in the Mechanical and Industrial Engineering Department at Northeastern University in Boston, MA after working at their Healthcare Systems Engineering Institute (HSyE) as a post-doctoral research fellow.

Native from San Juan, Puerto Rico, Dayna graduated with a bachelor's degree in Industrial Engineering from the University of Puerto Rico, Mayagüez Campus (¡Colegio!) and then she completed a master's and PhD degree in Industrial Engineering from the University of South Florida in Tampa.

Being Hispanic and an engineer herself, Dayna has a passion for increasing Hispanic representation in STEM. She currently lives with her husband Andrés, their two sons David and Sebastián, and their miniature schnauzer Lucca in Winter Garden, Florida.

The Women of Color in Engineering Collaborative

ASEE CoNECD Conference

February 26 - March 1, 2023

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Purpose: We are often asked how we were able to bring almost 30 organizations together to develop a shared vision and strategic plan. Specifically, others want to know how to work across multiple organizations with different missions but a shared interest to come together and work in a way that allows each organization to have a voice in the process. We want to share with you how we developed our strategic plan collaboratively, never having the benefit of meeting in person over the year that it took to create the plan.
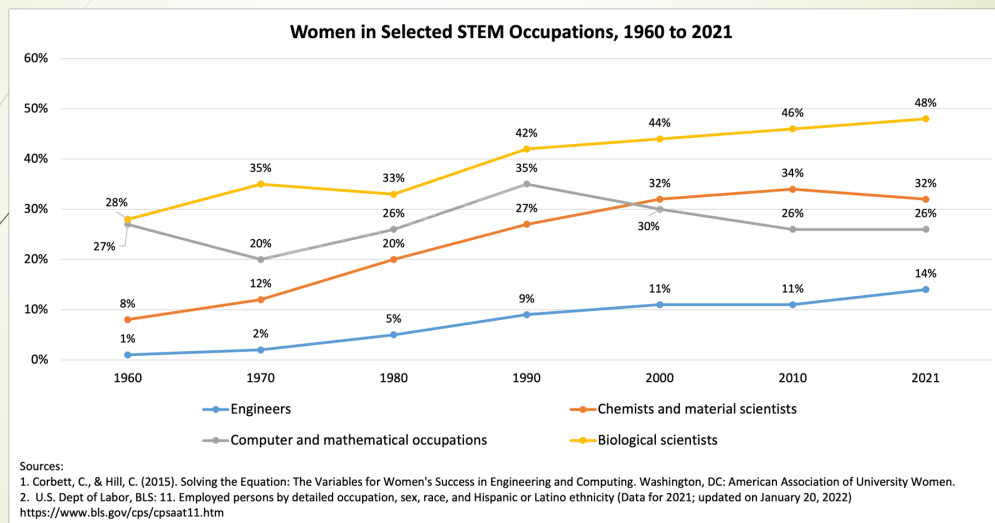
Session Agenda

- Overview of the problem
- What is the WCEC?
- Strategic planning process and outcomes
- Next steps
- How to get involved

The Problem: Few Women in the Engineering Workforce

Women in Selected STEM Occupations, 1960 to 2021

Sources:
1. Corbett, C., & Hill, C. (2015). Solving the Equation: The Variables for Women's Success in Engineering and Computing. Washington, DC: American Association of University Women.
2. U.S. Dept of Labor, BLS: 11. Employed persons by detailed occupation, sex, race, and Hispanic or Latino ethnicity (Data for 2021; updated on January 20, 2022)
https://www.bls.gov/cps/cpsaat11.htm

- Only 24% of engineering bachelor's degrees are earned by women, and white women earn ½ of these. Black, Hispanic, and Native American women earn about ¼ of the 24% (about 6% of all degrees).
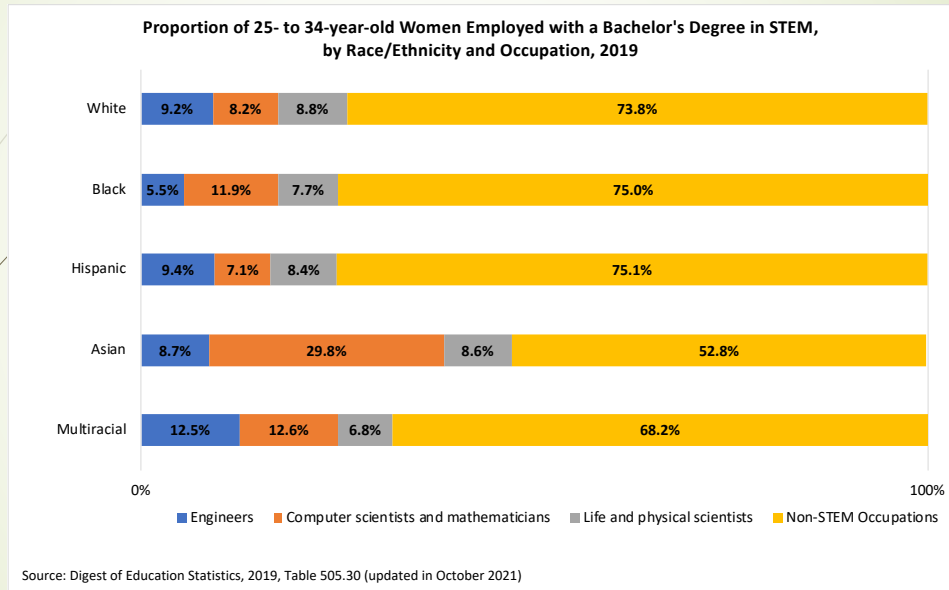
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The Overlooked Problem: Retention

Retention in Engineering, by Gender, 2010
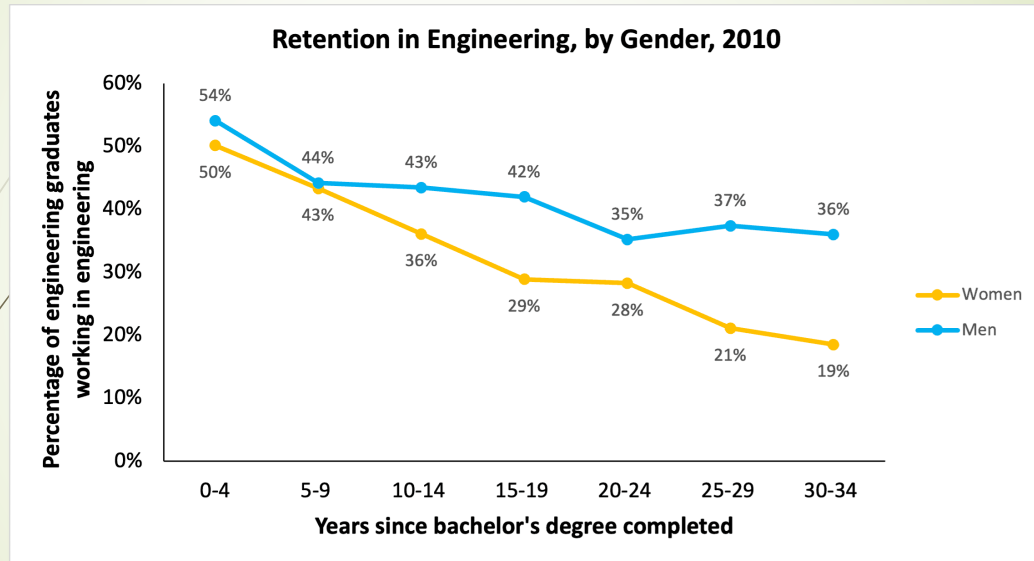
- We spend a lot of time and resources focused on outreach or trying to encourage girls to pursue engineering (or STEM) degrees. But the chilly climate that is often discussed when researching academic spaces is also affecting women in other workspaces, including the public and private sectors.
- Women leave the engineering workforce at much higher rates than their male counterparts. And as shown in this graph, it does not often happen in early career.

The Overlooked Problem: Retention

Proportion of 25- to 34-year-old Women Employed with a Bachelor's Degree in STEM, by Race/Ethnicity and Occupation, 2019

Race/Ethnicity	Engineers	Computer scientists and mathematicians	Life and physical scientists	Non-STEM Occupations
White	9.2%	8.2%	8.8%	73.8%
Black	5.5%	11.9%	7.7%	75.0%
Hispanic	9.4%	7.1%	8.4%	75.1%
Asian	8.7%	29.8%	8.6%	52.8%
Multiracial	12.5%	12.6%	6.8%	68.2%

Source: Digest of Education Statistics, 2019, Table 505.30 (updated in October 2021)

- The retention problem exists regardless of race/ethnicity. Women are leaving STEM at higher rates than their male counterparts.
  - Women seek equal pay
  - Women seek fair performance evaluations
  - Women seek equal access to high-caliber assignments
  - Women seek career advancement opportunities
- Can mention Fouad & Singh research on Why Women Leave Engineering.
- Can mention SWE's research on Why Women Stay

What is the WCEC?

- The WCEC is a collaborative effort to address systemic barriers that prohibit equitable work environments for women engineers of color.
- 29 professional engineering associations (PEAs), STEM societies, and STEM-based companies
- Supported by an NSF INCLUDES planning grant received in 2020
  - Shared vision
  - Partnerships
  - Definition of Women of Color in Engineering
  - Strategic plan
  - WCEC member demographic data

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How it Began

- Three professional engineering associations
  - Interested in the intersection of race and gender
  - Recognized a need to focus on workforce retention
- Observed a gap in NSF INCLUDES portfolio
  - Most funded projects focus on the education sector

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- PEAs and programs often do not adequately address the needs of women of color. Focus on women OR focus on persons of color.
- Education sector includes K-12, college students, faculty
- Knew that there were many other organizations offering programs and services for women engineers of color, but not the main focus.

NSF INCLUDES

"The vision of NSF INCLUDES is to catalyze the STEM enterprise to work collaboratively for inclusive change, resulting in a STEM workforce that reflects the diversity of the Nation's population."
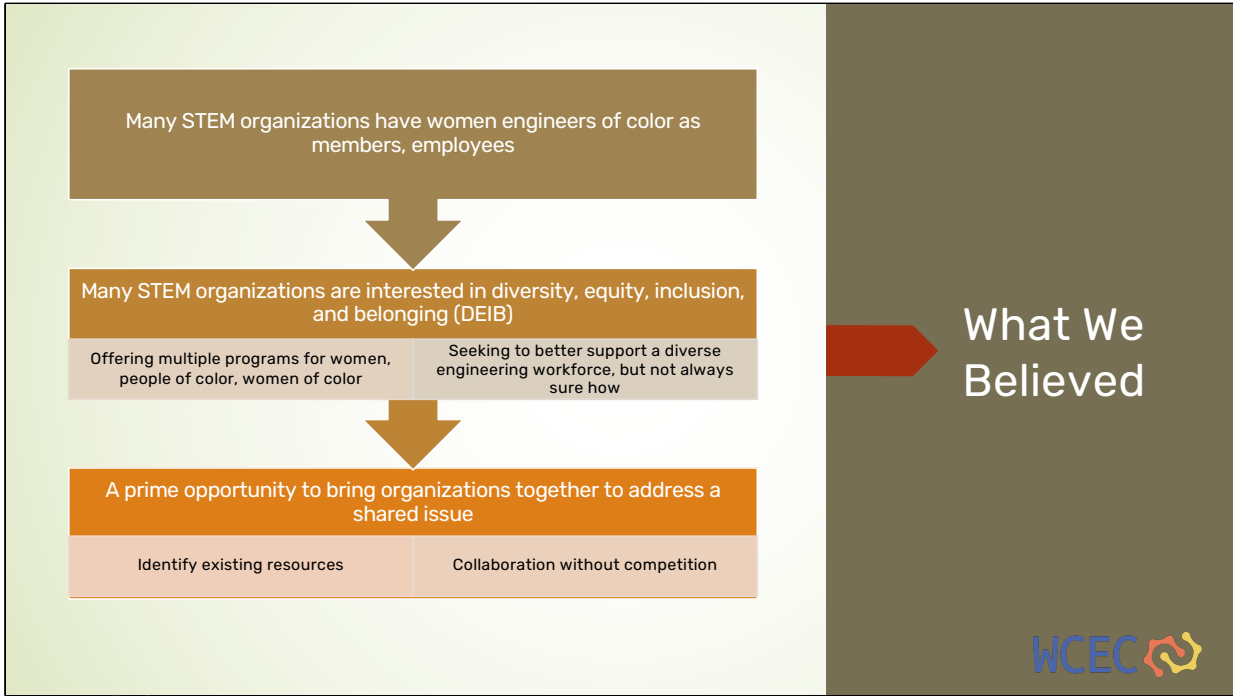
Five design elements:

Shared Vision

Partnerships

Goals & Metrics

Leadership & Communication

Expansion, Sustainability, and Scale

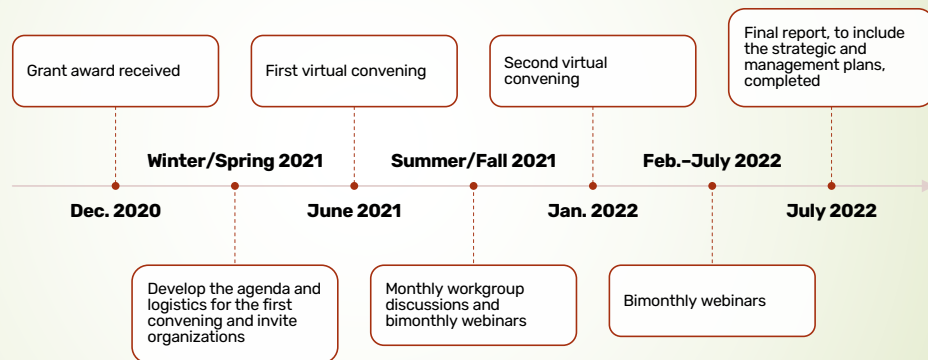**Focus on creating systemic change to broaden participation in STEM**

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Submitted a proposal for an NSF INCLUDES planning grant.

- Focusing on what professional STEM associations can do, recognizing that many engineers in industry are members of these associations – reason why we invited industry organizations.
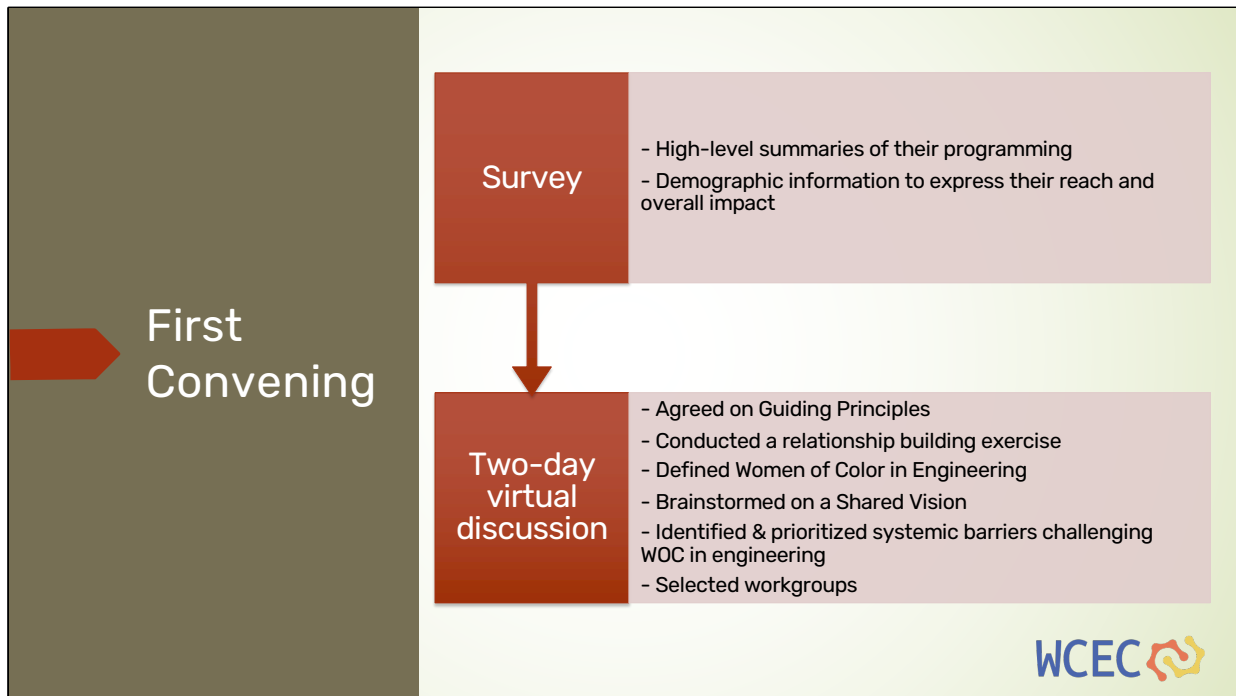
Project Timeline

Grant award received

First virtual convening

Second virtual convening

Final report, to include the strategic and management plans, completed

Winter/Spring 2021

Summer/Fall 2021

Feb.–July 2022

Dec. 2020

June 2021

Jan. 2022

July 2022

Develop the agenda and logistics for the first convening and invite organizations

Monthly workgroup discussions and bimonthly webinars

Bimonthly webinars

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First Convening

June 2021

First Convening

| Survey | - High-level summaries of their programming
- Demographic information to express their reach and overall impact |

| Two-day virtual discussion | - Agreed on Guiding Principles
- Conducted a relationship building exercise
- Defined Women of Color in Engineering
- Brainstormed on a Shared Vision
- Identified & prioritized systemic barriers challenging WOC in engineering
- Selected workgroups |

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- Invited 33 organizations, including the three leading organizations.
- 31 accepted the invitation and 28 showed up to the first convening (23 STEM societies + 5 companies). Became WCEC Founding Partners.
- An additional organization was invited to participate in the second convening, bringing the WCEC member total to 29 organizations.
- Hired an external evaluator to conduct a formative review of our project activities.

Guiding Principles

- **Be fully present**. Our time together is limited, and our success depends upon everyone's full participation in determining the direction of the WCEC. Leave egos and agendas at the door. Lead with cultural humility.

- **Remain committed.** For a truly collaborative outcome, everyone must remain committed to co-creating a shared vision, priorities, and strategies to benefit the WCEC.

- **Listen well and be respectful.** Listen to, and respect, all voices, perspectives and lived experiences. Consider the implications of intersectionality, particularly given our focus on women engineers of color. Critique ideas, not people.

- **Be collaborative.** Be mindful not to exert dominance that excludes others from belonging and having a voice. Differences in roles, responsibilities, and types of activities exist and are valuable to the WCEC. Pay attention to the tendency to dominate a conversation.

- **Practice respectful and inclusive conduct.** Be an active listener, be kind, and ask clarifying questions when you need more understanding, such as "Tell me more about that."

- **Imagine what is possible and work towards it.** The WCEC will be impactful in creating a diverse and inclusive engineering workforce.

- **Honor these principles and do not** demean, intimidate, coerce or harass/use hostile conduct or commentary, whether seriously or in jest. Violation will be justification for removal from the WCEC.

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- Introduced the guiding principles and ask for feedback. Emphasized that these Guiding Principles would be used for the convening and carried over to the smaller workgroups.
- The intention was to create a safe environment where all voices are heard and respected.

Defining Women of Color in Engineering

- ➤ Questions asked:
  - ➤ How does your organization define Women of Color in Engineering?
  - ➤ What other groups should be included?
  - ➤ What is the most inclusive definition of Women of Color in Engineering we can create?

WCEC definition of Women of Color in Engineering:

- Latina, Hispanic; Black/African American; Native American, American Indian/Alaskan Native; Asian & Pacific Islander, Asian/Asian American, Native Hawaiian (some may identify as White but are non-white by ethnicity)
- Underrepresented groups in the US
- How to include those who do not feel that they "fit" in any one category? There are women in the U.S. from other countries who do not consider themselves "Asian American" or "African American". May not live here indefinitely, but still part of the workforce.
  - ○ Domestic minorities vs. international minorities or underrepresented groups
- Engineer definition: Educationally or trained as engineer (not all that are trained are defined as engineers)
  - ○ How do we define engineering when needing to include computer scientist and other technology professionals?
  - ○ We should include those whose careers in engineering take them elsewhere by personal choice
- Those who "identify as women" – Not making binary or gender assumptions (language challenges our idea of inclusion
  - ○ Transgender
  - ○ Nonbinary
- How we experience the world through our intersectional identities/ "Women+ of Color" is NOT just about race; "intersectionality" is a way of recognizing and affirming all of the groups people belong to and that influence their experiences within and outside of the profession
- A Body of engineers and technologists whose lived experiences shape how they 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
-
- Women of color in engineering: Primary focus on engineers who identify as women of color, including but not limited to: Latina/Hispanic, Black/African American, Native American/American Indian/Alaskan Native, and Asian/Pacific Islander/Asian American/Native Hawaiian
-
- ASSE definition - using "nonwhite" is not as valuable as using "people of color", Hispanic people, Black people, etc.
- Other resources (outside of STEM) that we can learn from / partner with

Acknowledge allies - they are part of the solution but not part of the definition

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- Broke attendees into small groups to discuss
- Used Google Slides and asked each group to make notes
- Noted in our debrief what stood out. What should be included in our definition?
- End result: Poll and agreement on a definition.

WCEC Definition of 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.

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Developing a Shared Vision

- What is a Shared Vision?
  - Answers the question "What do we want to create?"
  - Is an ideal image of the future
  - Articulates people's hopes and dreams, touches their hearts and spirits
  - Provides focus for collective efforts

When women of color feel a sense of belonging and are fully included in engineering…

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- Small group discussions to brainstorm on the sentence starter.

Shared Vision Brainstorm

Commonalities from Vision Discussion

We are more creative, productive, collaborative, aligned, profitable and socially just.

Innovate/improve society/different engineering pr...

Empowerment

Leader/leadership/representation from top dow...

Broadened decision making; feminine style or e...

Equitable salaries

Valued/respected/worthy

Authentic selves

Connected

Able to be role models or mentors for futur...

- ...re inclusive designs
- intersectionality becomes a competitive advantage
- They stay and thrive in engineering
- It creates a path for their burdens to be lifted
- They are able to bring their authentic selves to work early on in their careers
- be recognized for their ability to contribute to the maximum of their abilities
- Normalized when women of color are being elevated to a position of influence
- foster a greater sense of connection and belonging
- Feel respected and valued
- Create a clear pathway
- Will be able to share with confidence and assurance
- Then our families, communities and country are economically strengthened
- Lead sooner, contribute greater
- Value different styles of leadership, including quiet leaders, questioning leaders, and those who use more feminie styles.
- Have credibility and will be taken seriously
- We are able to be more innovative

WCEC

- Broke attendees into small groups to discuss
- Used Google Slides and asked each group to make notes
- Noted in our debrief what stood out.
- Volunteers worked with the planning committee to wordsmith the vision statement after the convening.

Identifying Systemic Barriers

- What is a system?
- What is a systemic barrier?

Systemic barriers may be defined as aspects within the system that are more favorable towards a dominant group.

The WCEC is not about fixing the women, but fixing the system.

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- The system components are employees, policies, procedures, norms, culture and the interactions between these elements.

Identifying Systemic Barriers

- What systemic issues in the workplace stand in the way of achieving our vision?
  - Use the lens of professional associations.
- Of all the issues that can be named, which are the ones that Professional Associations can impact?

1. Pathways to internships, scholarships, or jobs in engineering: Traditional recruitment continues to pull from the same sources, overlooking diverse talent pools
2. Processes for recruitment, hiring and promotion processes
3. Network exclusivity and sponsorship: Who are senior people choosing to train/mentor? Do they gravitate to sponsor people like themselves?
4. Leadership norms that are seen as required or expected, and may exclude diverse talent.
5. Are inclusive policies in place to support work-life balance? Are employees penalized for utilizing them?
6. Compartmentalizing DEI, focusing on compliance and not seeing it as a collective, organization-wide responsibility
7. Lack of strong reporting, enforcement, and accountability systems; uneven enforcement of rules and policies
8. Need access to data to diagnose inequities/disparities, and need better transparency around those inequities

9. Bias and lack of clarity in job descriptions and postings, including lack of knowledge on the path to advancement
10. Devaluing the priorities of women of color in financing projects and programs (DEI, sustainability, healthcare, childcare, family, community)
11. Gendered expectations of women (maternal wall bias, care giving roles, roles in the workplace)
12. Women of color are expected to adapt to default professional norms
13. Microaggressions and sexism in the workplace ("the male echo", interruptions, etc.) that leads to a lower level of credibility for women of color
14. Hierarchism and power imbalances
15. Backlash to DEI efforts: Fear of change, resistance, white fragility. Idea that by giving other groups opportunities I am taking away personal opportunities
16. Lack of structure in smaller organizations that utilize highly informal processes are vulnerable to biases
17. Available funding opportunities for mid-career women of color in engineering sciences including venture capitalists

- Numerous systemic barriers identified during small group discussions.
- After Day 1 concluded, the planning team reviewed the barriers and narrowed them down to 17.
- Day 2: Used polling to narrow down the list to five barriers that the WCEC members felt we were best positioned to tackle in the next few years.

Five Areas of Focus

01
Improve Pathways to Internships, Scholarships, and Jobs in Engineering

02
Reduce Microaggressions, Racism, and Sexism in the Workplace

03
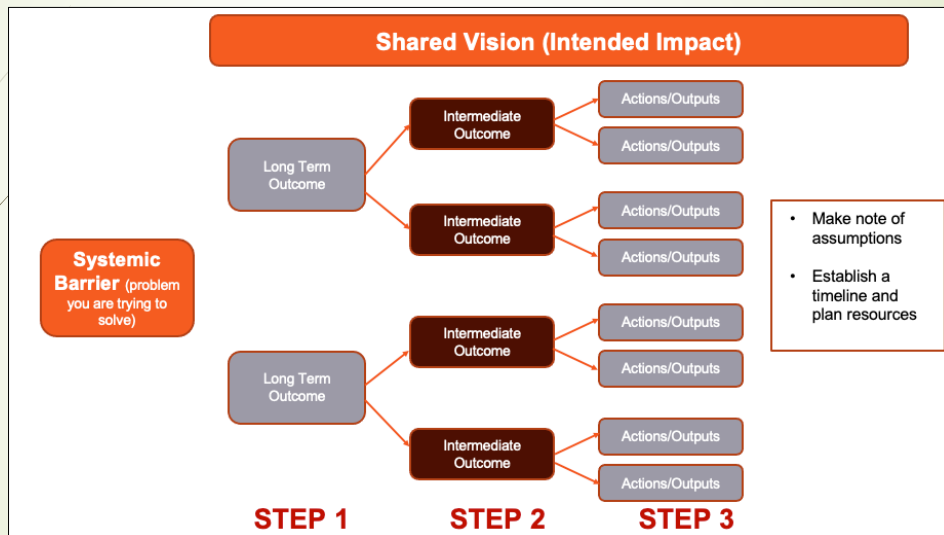Retain and Amplify Women of Color in the Workplace

04
Increase Network Inclusivity and Sponsorships for Women of Color

05
Raise Openness and Reduce Backlash to Diversity, Equity, and Inclusion (DEI) Practices

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Working Groups: Applying Theory of Change

- What long-term outcomes under the shared vision are impacted by the systemic barrier you are working to address?
- What can the WCEC accomplish in this area that individual/siloed organizations cannot?

Second Convening

January 2022

- Prior to the second convening, workgroups met periodically to develop their outcomes and actions.
- Bimonthly webinars were held to bring together the WCEC members to discuss progress, ask questions, etc. as they worked to finalize their goals and action items.

Workgroup Outcomes

Systemic Barrier: Backlash to DEI Efforts

Discipline-specific organizations become DEI champions and help build a pipeline of champions who can address some of the fears within their peer groups.

Discipline-specific organizations increase support for their DEI committees, helping them educate/create champions in their group.

Build greater Allyship/Advocacy through a **5 Step program for Allyship** or **Advocacy Toolkit**

Create an online community/forum of allies of Women of Color in Engineering

Rewards and recognition to celebrate those who do champion and show the example

STEP 1: Long Term Outcome

STEP 2: Intermediate Outcomes

STEP 3: Actions/ Outputs

Assumptions
- Backlash is seen when people question the need for DEI statement/ intersectionality focus
- Backlash is seen when people assume that people who are given support/ mentoring are less qualified
- Backlash is seen when there is a belief that addressing equity is lowering a standard
- Backlash is caused when men fear they will get in trouble for doing something wrong, causing them to take a step back

Timeline
6 months to create the toolkit and configure the platform

Resources needed:
- An assessment tied to DEI with a "before and after"
- Online platform (existing) to use for the forum and to store the toolkit resources

- An example from the Backlash to DEI Efforts workgroup
- Planning team pulled all the intermediate/short term goals and action items together and asked WCEC members to rank (within small groups) the Importance, Innovation, and Impact of each item.
- Planning team noted that some action items would address more than one barrier.

Ranking the Action Items

Short Term Goals	Action Items	Groups	Rankings		
			Importance	Innovation	Impact
Reduce microaggressions and sexism.	Develop, pilot and provide training that includes a common language and impact of microaggressions, sexism and micro-affirmations.	Group 1:	3	4	3
		Group 2:	1	1	1
		Group 3:	3	2	2
Celebrate and recognize WOC and proactively give credit for their expertise and contributions to the field.	Increase the visibility of WOC in private- and public-facing education and research roles, such as webinars and conferences.	Group 1:	1.5	1.5	1.5
		Group 2:	3	4	3.5
		Group 3:	2	6	1
Same as above	Identify profiles of successful WOC.	Group 1:	1.5	1.5	1.5
		Group 2:	4	5	6
		Group 3:	5	1	5
Gather data and influence decision-makers with the data.	Leverage society members in the WCEC to collect and analyze data to build a business case with respect to a variety of retention outcomes. Develop and hone the messaging for a primarily STEMM audience.	Group 1:	9.5	9.5	9.5
		Group 2:	6	3	3.5
		Group 3:	5	1	5
Increase understanding around differences (race and gender).	Identify and provide non-violent communications training.	Group 1:	7	6	4
		Group 2:			
		Group 3:	3	2	2

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- An example from the Backlash to DEI Efforts workgroup
- Planning team pulled all the intermediate/short term goals and action items together and asked WCEC members to rank (within small groups) the Importance, Innovation, and Impact of each item.
  - Discussed goals & action items of two barriers at once, requiring groups to prioritize action items that could address.
  - Groups noted when action items could be combined, or would address more than one goal. Groups asked clarifying questions.
- Full group discussions followed each small group discussion. Total of 3 conversations.

Work Continued…

Planning team reviewed the rankings

Average rankings across groups to identify highest priorities

Consolidation of similar action items

Hosted bimonthly webinars

Obtained feedback on mission statement, strategic plan

Synthesized goals and action items

Created a website for the WCEC

WCEC

- Invited 33 organizations, including the three leading organizations.
- 31 accepted the invitation and 28 showed up to the first convening (23 STEM societies + 5 companies). Became WCEC Founding Partners.
- An additional organization was invited to participate in the second convening, bringing the WCEC member total to 29 organizations.
- Hired an external evaluator to conduct a formative review of our project activities.

Jamboards from February 2022 Webinar

- February webinar collected feedback directly on the goals and action items

WCEC Strategic Plan
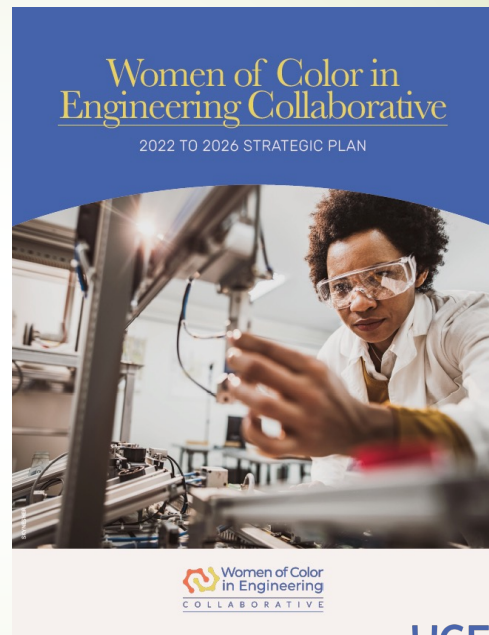
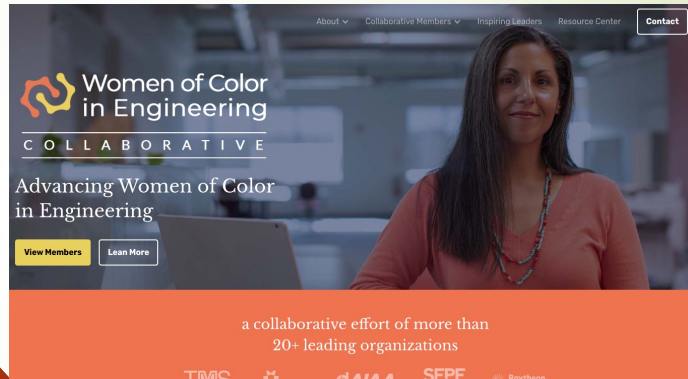- Includes our shared vision, mission statement, five major challenges that the WCEC will address, the goals and strategies under each, and our list of partners.
- Achieved our goals under the NSF INCLUDES planning grant.

WCEC
Website

https://www.womenofcolorengineers.org/

List of some of our WCEC partner organizations.

How to Get Involved

- Visit the WCEC website
- Fill out the Contact form to join the WCEC community
  - Subscribe to Newsletter
  - Inclusion in our WOC Profiles Database
  - Speak to a WCEC Representative
  - Stay informed about the WCEC Resource Center
- Apply for membership
  - Membership is for companies & organizations
  - Must meet certain criteria

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- Organizations must support our mission and strategic plan
- Organizations must be in the U.S.
- Members must contribute resources to the Resource Center
- Organizations must commit to be active members of the WCEC