ASEE AMERICAN SOCIETY FOR ENGINEERING EDUCATION

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Interactive Session: Exploring Scripts of Whiteness in Engineering

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Dr. Downey is an Assistant Research Scientist at the University of San Diego. He received his Ph.D. in Language, Literacy, and Culture in Education from the University of Massachusetts-Amherst. Dr. Downey focuses on critical qualitative inquiry with a discerning eye toward humanizing and culturally sustaining pedagogies. Currently, he is focused on uncovering and exposing scripts of whiteness within engineering education with an end goal to devise faculty development.

Dr. Joel Alejandro Mejia, The University of Texas at San Antonio

Dr. Joel Alejandro (Alex) Mejia is an Associate Professor with joint appointment in the Department of Biomedical and Chemical Engineering and the Department of Bicultural-Bilingual Studies at The University of Texas at San Antonio. His research has contributed to the integration of critical theoretical frameworks in engineering education to investigate deficit ideologies and their impact on minoritized communities. His work seeks to analyze and describe the assets, tensions, contradictions, and cultural collisions many Latino/a/x students experience in engineering through testimonios. He is particularly interested in approaches that contribute to a more expansive understanding of engineering in sociocultural contexts, the impact of critical consciousness in engineering practice, and the development and implementation of culturally responsive pedagogies in engineering education.

Dr. Diana A. Chen, University of San Diego

Diana A. Chen, PhD is an Associate Professor and one of the founding faculty members of Integrated Engineering at the University of San Diego. She earned her BS in Engineering from Harvey Mudd College, and MS and PhD in Civil Engineering from Clemson University. In collaboration with colleagues, Dr. Chen is designing a new engineering curriculum to educate changemakers who understand that engineering is an inherently socio-technical activity. Her passion is studying and encouraging culture change in engineering curricula and spaces to shift engineering to be a field more inclusive of diversity in all forms. Her scholarly interests include engineering education that contextualizes engineering sciences and design, exploring engineering boundaries for inclusive pedagogy, and sustainability and bio-inspired design in the built environment.

Prof. Gordon D Hoople, University of San Diego

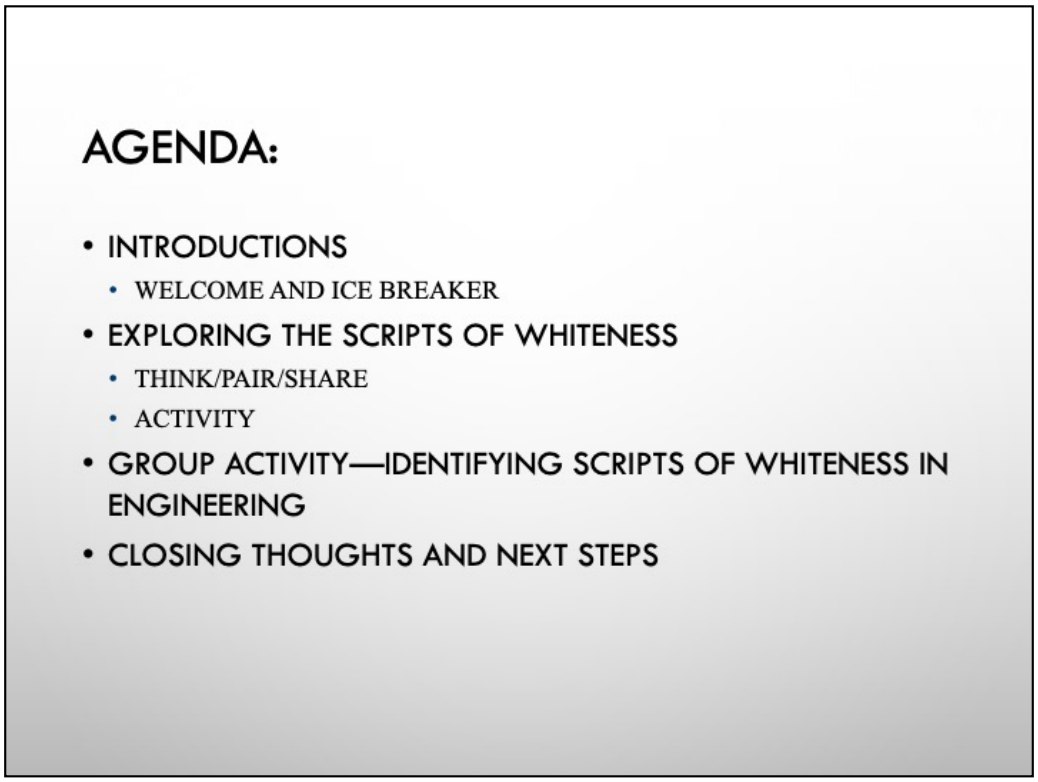
Dr. Gordon D. Hoople is an assistant professor and one of the founding faculty members of integrated engineering at the University of San Diego. He is passionate about creating engaging experiences for his students. His work is primarily focused on two ar

Dr. Susan M Lord, University of San Diego

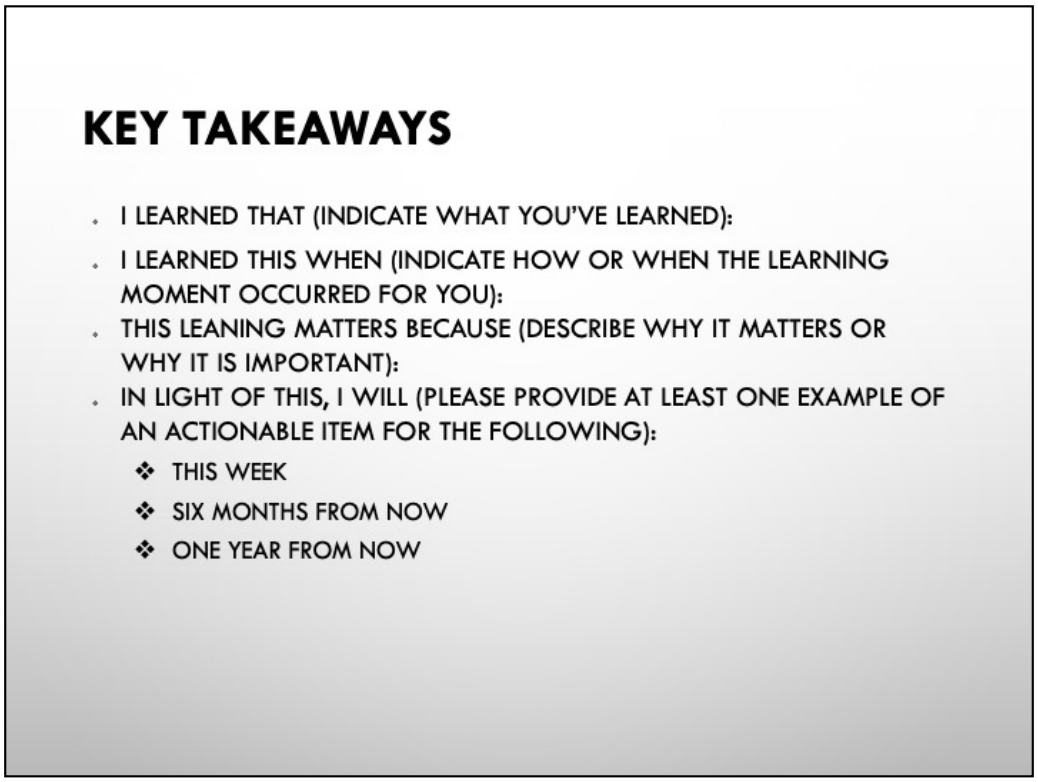
Susan Lord is Professor and Chair of Integrated Engineering at the University of San Diego. She received a BS from Cornell University in Materials Science and Electrical Engineering (EE) and MS and PhD in EE from Stanford University. Her research focuses on the study and promotion of equity in engineering including student pathways and inclusive teaching. She has won best paper awards from the Journal of Engineering Education, IEEE Transactions on Education, and Education Sciences. Dr. Lord is a Fellow of the IEEE and ASEE and received the 2018 IEEE Undergraduate Teaching Award. She is a coauthor of The Borderlands of Education: Latinas in Engineering. She is a co-Director of the National Effective Teaching Institute (NETI).

EXPLORING SCRIPTS OF WHITENESS IN ENGINEERING: DECONSTRUCTING WHITENESS IN ENGINEERING

By: Drs. R. Jamaal Downey, Joel Alexandro Mejia, Diana A. Chen, Gordon D. Hoople, Susan M. Lord



- Basic intro of the authors and what drove them to this work.
  - This work builds upon an NSF grant that is tasked with exploring the scripts of whiteness in engineering. It derives from the team wanting 2 things: a space for PoC to connect with other PoCs to build community as they navigate whiteness in academia, and 2: faculty development for white faculty to help raise their critical consciousness. Research has suggested that critical consciousness — the ability to recognize and analyze systems of inequality and the commitment to take action against these systems — can be a gateway to academic motivation and achievement for marginalized students.
- Review agenda
  - In this interactive workshop, we will be defining whiteness along with asking you to be reflexive in your positionality within the academy. We will be pairing you up so that you might build a mini-community with your partner in an attempt to engage on a deeper level.
- answer any questions that may arise



At the end of the workshop, we will be asking you the following questions in an anonymous google document. Based upon the discussion on whiteness, the discussion, the activities, and what you have learned so far about power, privilege and whiteness, and as part of your commitment to constant reflexivity, complete the following:

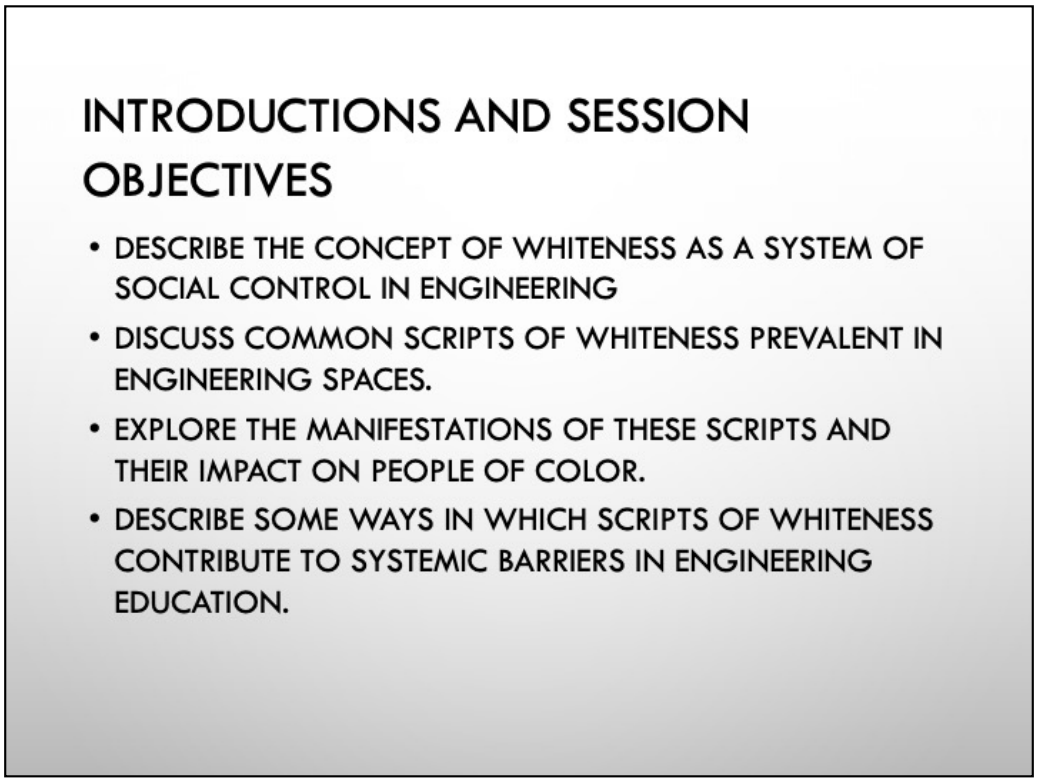
- I learned that (indicate what you learned) ….

- I learned this when (indicate how or when the learning moment occurred for you) ….

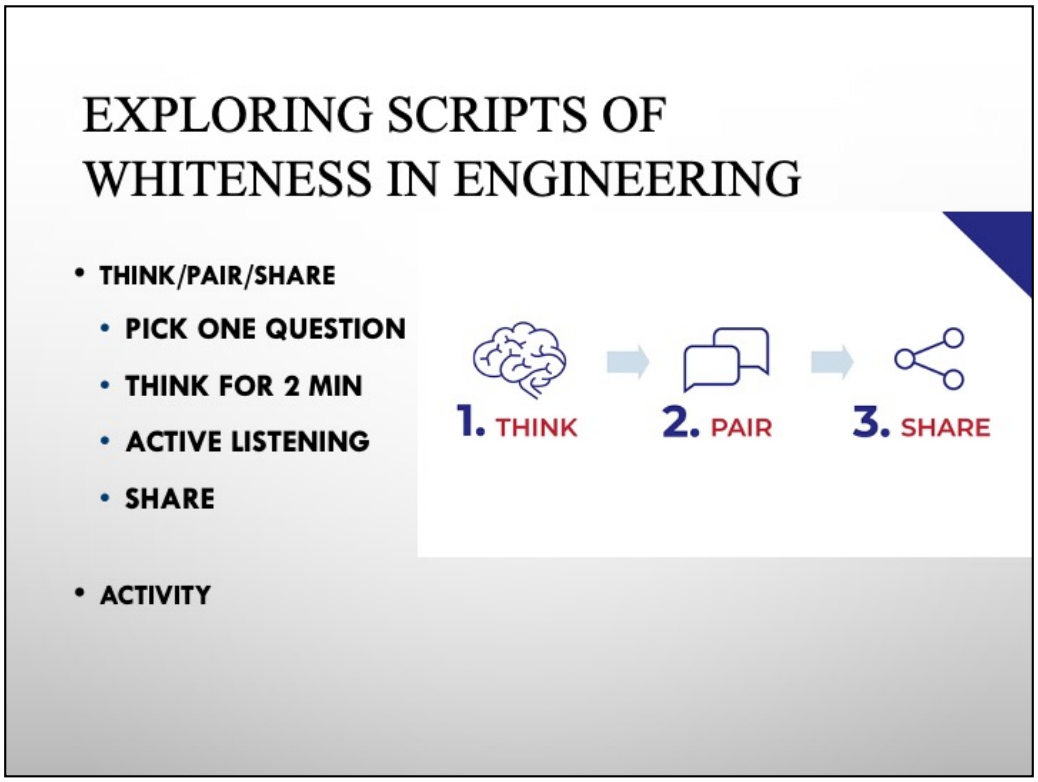
- This learning matters because (describe why it matters or why it is important) ….

- We will also be asking you to look forward by asking:
    - In light of this, I will (provide at least one example of an actionable item for the following)….

- This week
- Six months from now
- One year from now



- We will be moving forward with an icebreaker. For this, we will be:
  - Divide the participants into teams.
  - Give each team a paper bag filled with assorted objects, such as a wooden spoon, a screw, a bar of soap, a computer disk, etc.
  - Give the teams five minutes to introduce each other, where they are currently working.
  - All of them will come up with an impromptu story using the props provided. The story should come from participants' personal experiences, observations, and interactions. No names need to be included, and the story should not be extremely long. It is recommended that the story should be summarized in less than 3 sentences (just to make the point across).



- Think/Pair/Share discussion regarding perceptions and notions of whiteness.
    - Introduce yourself and think about how you went about finding your place in engineering, who or what encouraged you to be an engineer, or instances where you found dissonance in engineering spaces. understanding your identity in engineering can be either positive or negative - it is your own sense making of what it means to be in engineering, doing engineering, or inhabiting engineering spaces.
- Activity:
    - For this activity, we will be watching 2 short video that explains the concept of race and whiteness on an individual level (the first video). We will then watch a second video that allows us to better understand whiteness as a structure– an institution. We felt these videos were important in order to have common definitions moving forward. After each video, we will spend some time in our pair/share groups to unpack along with some self-reflexion. The guiding questions for the discussion are:
        - (video 1):
            - What are some common ways white people think about race and their own racial identities?
            - What are my students' attitudes and beliefs about

whiteness?
- What surprised you about what the person selected by you or selected by others?
- To what extent did their comments match what you expected based on their profile picture?

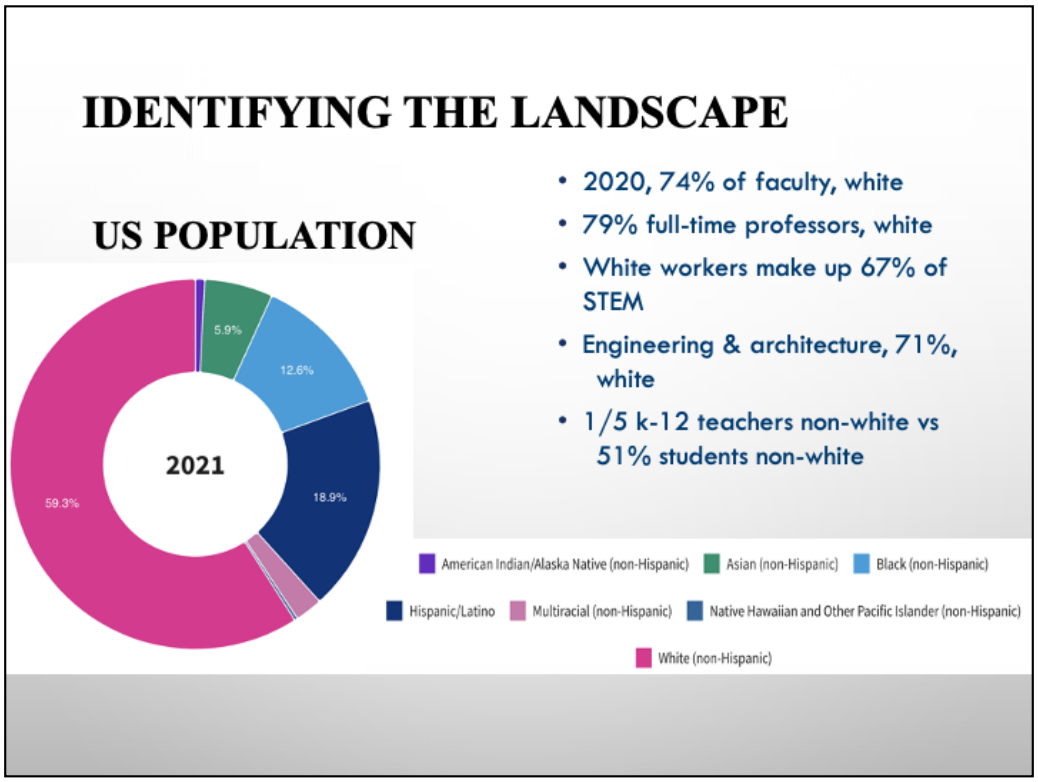
How do you think this kind of predicting and assuming might play out in this person's everyday life? In engineering?

- (video 2):
  - How do you think whiteness presents itself in engineering as a structure or institution?

- Once we have completed this activity, we will get a rundown of the current state of the race demographics in STEM, industry, and engineering faculty.

VIDEO 1: RACE AND WHITENESS

VIDEO 2: WHITENESS AS A STRUCTURE

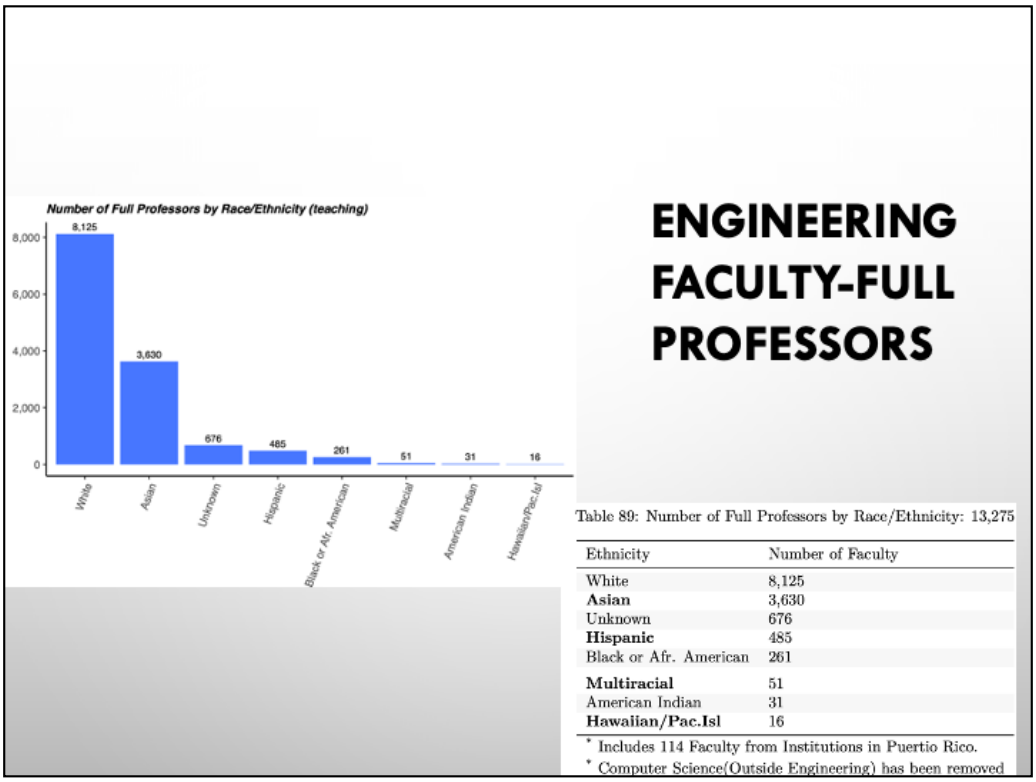


- To show how whiteness as a structure is evidenced in engineering, we are going to look into the numbers. As engineers, we all love numbers, so why not do a deep dive on the numbers? There is something structurally that continues to uphold whiteness, and even though the number numbers do not show all that happens in engineering, it is a good indicator that whiteness continues to be predominant in engineering. Then, we can shift to identifying those "scripts" that make whiteness so pervasive.

- Facilitated presentation of the literature on ideology of whiteness and concept of scripts
    - Pulling from the lit review
        - Current demographics of whiteness in STEM, both students and faculty
            - Due to a decade-long decline in the number of white Americans, new census demographic data shows that "all of the nation's 2010-2020 growth is attributable to people of color—those identifying as Latiné or Hispanic, Black, Asian American, Native Hawaiian or Pacific Islander, Native American, and as two or more races" (Brookings). White people comprise 59% of the

US population yet white workers make up 67% of STEM workers. In engineering and architecture, the disproportionate number of white workers is an astounding 71%.

- In fall of 2020, almost three-quarters of faculty in the USA were white (39% white males, 35% white females) [X]. Of the full-time professors, 51% were white males, 28% white females, with Black males and females, Latiné males and females only being 2% each. Within the STEM industry, white workers make up two-thirds of workers while in engineering and architects, white workers are overrepresented at 71% [X]. These disparities show a system that advantages whiteness over Othered identities. Not only is there an overrepresentation of whiteness within STEM, there is a wage disparity that continues to grow. Black full-time and year-round workers from the age of 25 and up only make 78% of their white counterparts median earnings. In comparison, Latiné STEM workers of the same age make 83% of their white counterparts [X]. The trends we find have seeped down to k-12 also where only one-in-five teachers are nonwhite whereas 51% of the public school students are nonwhite.



As we look at the numbers provided by ASEE for the year 2019, we can see the sharp decline once you get beyond white fulltime professors. (13,275 total)

- 61% white
- 27% Asian
- 5% unknown
- 4% Latino
- 2% Black
- .4% multiracial
- .2% Native American
- .1% Hawaiian

ENGINEERING FACULTY-ASSISTANT PROFESSORS

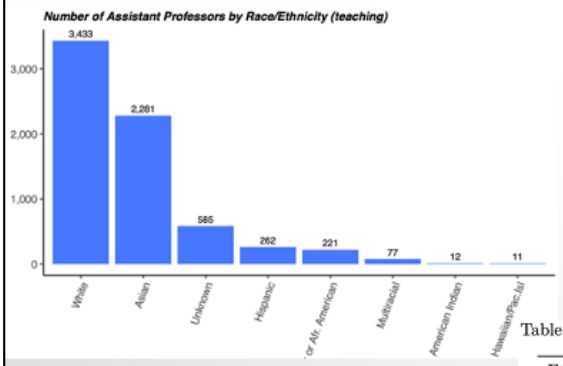


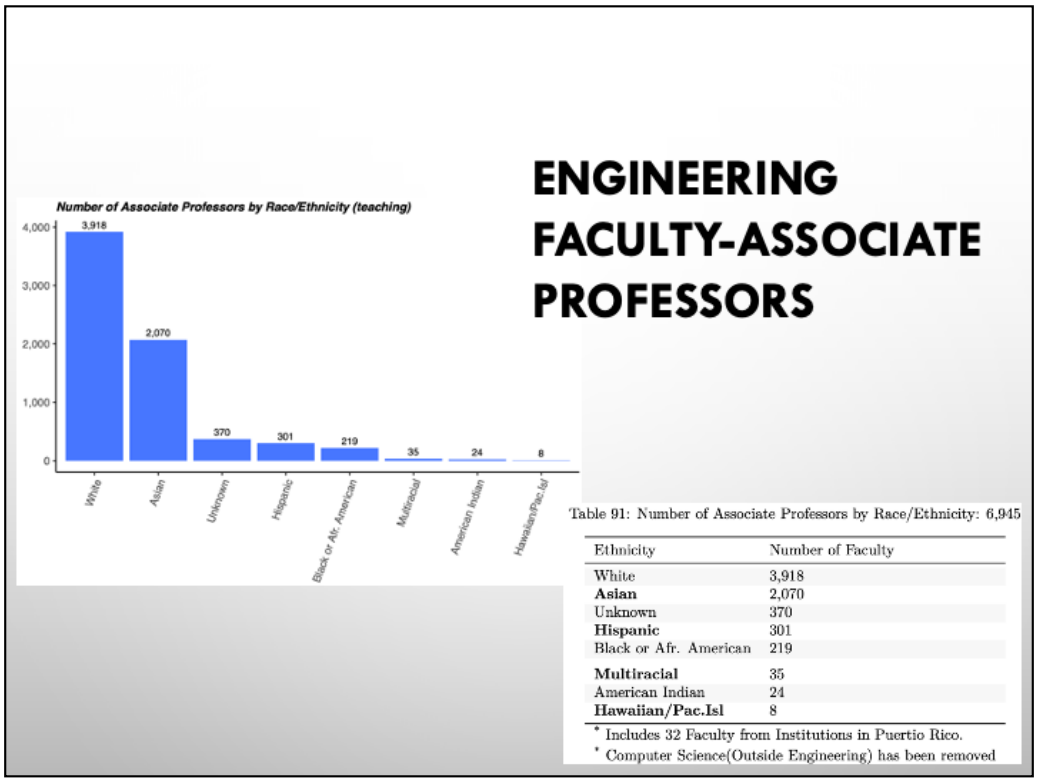
Table 90: Number of Assistant Professors by Race/Ethnicity: 6,882

Ethnicity	Number of Faculty
White	3,433
Asian	2,281
Unknown	585
Hispanic	262
Black or Afr. American	221
Multiracial	77
American Indian	12
Hawaiian/Pac.Isl	11

* Includes 20 Faculty from Institutions in Puertio Rico.
* Computer Science(Outside Engineering) has been removed

Here we see a decline in the percentage of white assistant professors, and a small increase in Asian professors, and an infinitesimal increase in the other racial identities. (total of 6,882)

- 50% white
- 33% Asian
- 9% Unknown
- 4% Latino
- 3% Black
- 1% multiracial
- .2% Native American
- .2% Hawaiian



Next is associate faculty. It's interesting that this space is closer aligned with full professors (61/56% white) while assistant professors is less so (50% white). We are unsure of the increased diversity among assistant professors, but overall, the persistence and domination by white bodies is prevalent (6,945 total)

- 56% white
- 30% Asian
- 5% unknown
- 4% Latino
- 3% Black
- .5% multiracial
- .3% Native American
- .1% Hawaiian

ENGINEERING TENURED FACULTY BY RACE

Percentage of Black/African American Tenured/Tenure-Track Faculty by Rank

Rank	Percent
All Faculty	2.5%
Full Professor	1.9%
Associate Professor	3%
Assistant Professor	2.9%

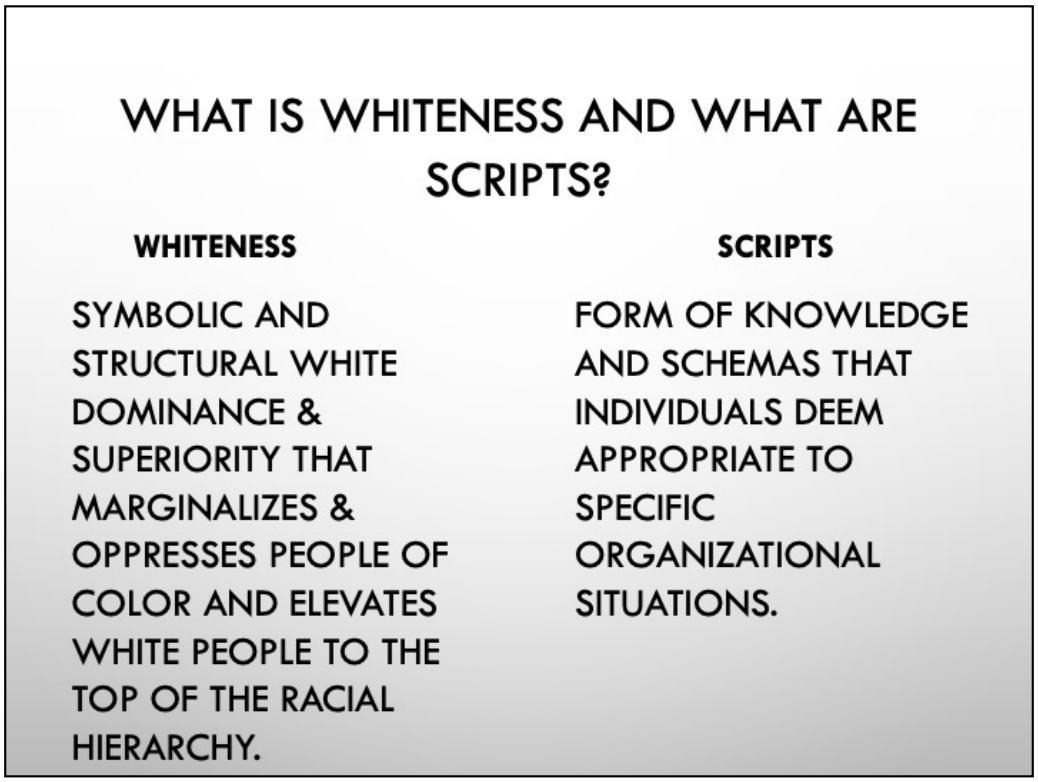
Percentage of Hispanic Tenured/Tenure-Track Faculty by Rank

Rank	Percent
All Faculty	3.7%
Full Professor	3.6%
Associate Professor	4.3%
Assistant Professor	3.4%

Percentage of Asian Tenured/Tenure-Track Faculty by Rank

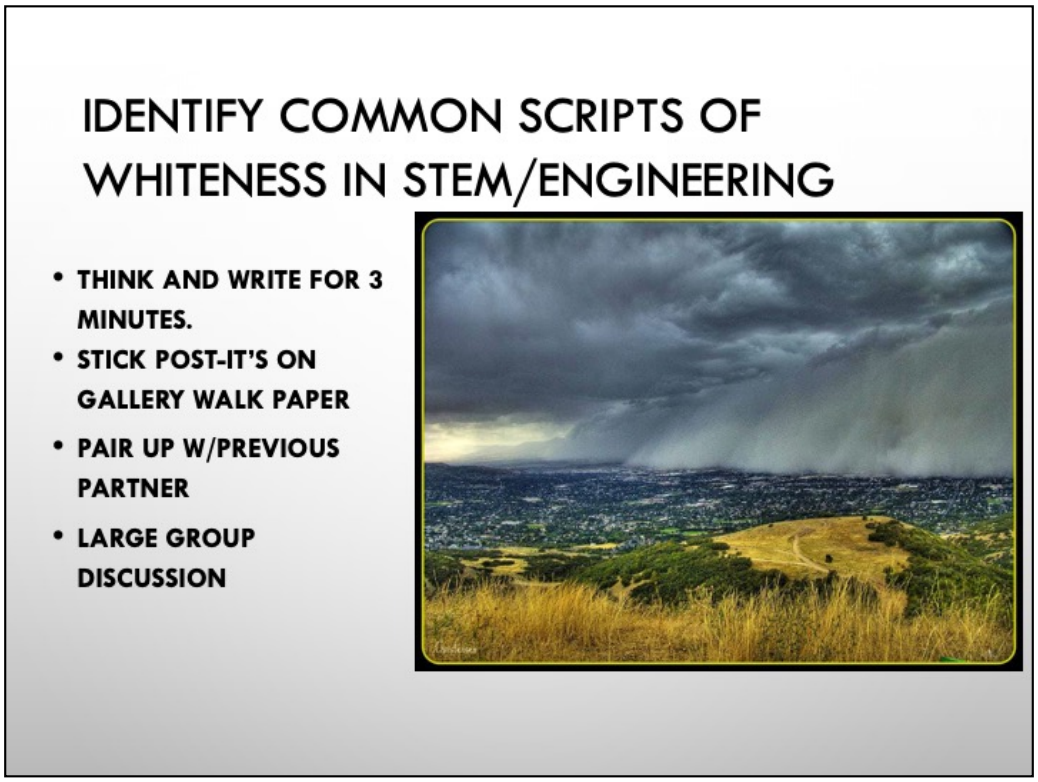
Rank	Percent
All Faculty	28.7%
Full Professor	27.3%
Associate Professor	29.3%
Assistant Professor	30.9%

This slide is to gives a more focused look at PoC tenured faculty in engineering. What stands out to you?



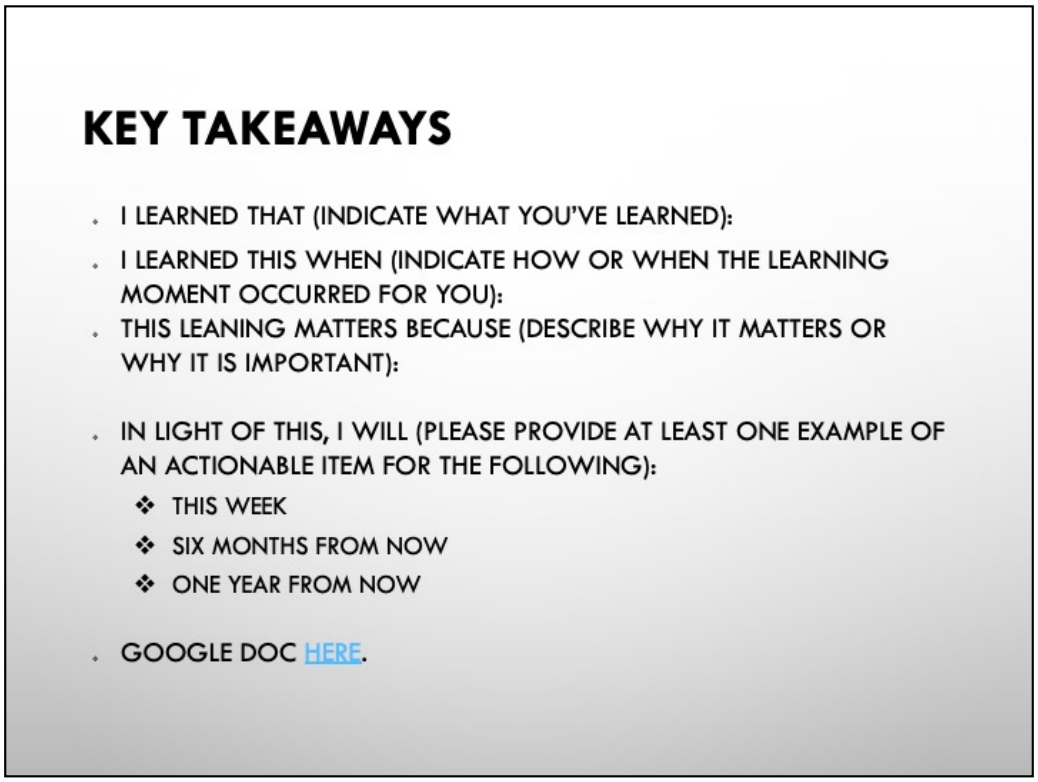
- Ask for people's definition of Whiteness. Write answers on whiteboard. Then provide some/all of the definition below:
    - Whiteness: A false ideal, historical mechanism of power, and privileged social position that benefits white people (DuBois, 1999); a social concept that has "historically stratified and partitioned the world according to skin color" (Leonardo, 2002, p. 32); a (dominating) worldview and discourse; a racial category and socially constructed identity supported by hegemonic and flexible material practices and institutions (Leonardo, 2004); an epistemology (DuBois, 1999; hooks, 1992; Mills,1997; Leonardo, 2009) characterized by an unwillingness to name "contours of racism" and includes "the avoidance of identifying a racial experience or group, and the minimization of racist legacy[ies]" (Leonardo, 2002, pp. 31-32); symbolic and structural white dominance and superiority that marginalizes and oppresses people of Color and elevates white people to the top of the racial hierarchy (Matias & Newlove, 2017; McIntyre, 2002); a representation of terror (hooks,1992)
- Open by asking what people think a script might be but we don't need to write anything down/more informal than above.

    - In the realm of engineering, learning how to become an engineer is shaped through these norms, professionalism, and standards as well as the hidden curriculum—everyday interactions and the cognitive dynamics that are involved in those interactions [X]. These cognitive dynamics are called scripts and they involve the schemas and frames of reference that build one's engineering identity. As individuals engage with the field, they develop scripts (i.e., assertions, attitudes, ways of being and doing) by adopting the behaviors and traits that are recognized as traditional characteristics of engineers by their mentors, professors, peers, industry leaders, and others within the engineering community. Young engineers learn to employ the language, phrases, practices, skills, values, and beliefs that signify their acquisition of the social – often racialized – constructs associated with the engineering world while allowing them to acculturate within their respective field.
- Define what scripts/discourses are and how structures perpetuate them (seemingly unbeknownst to most actors?).
    - Give the participants post-it notes, ask them to think about common scripts and post them on the wall… then ask them to combine them into themes.



- Participants discuss and identify common scripts of whiteness in engineering spaces.
    - Individual gallery walk reflexivity activity to scripts of whiteness.
        - Take 3 minutes to write to yourself: based on what you've heard so far, what are some traits and trends of whiteness that you imagine can occur based on this info, what themes have you seen for yourself *and potentially* you've committed yourself? These are anonymous so please feel free to really get deep.
        - Please post your thoughts on the large pieces of paper attached along the walls. Feel free to engage directly with a post that resonates with you.
        - Pair up (with same pair from before to continue a rapport). Discuss with your partner some of the comments from the gallery walk that stuck with/struck you. Have you seen those ones play out in front of you before? What did you do? What didn't you do? What would you do if you could redo it?
    - Large group sharing and reflection on the identified scripts.
        - What are some potential remedies for these scripts?
- Potential fall-back questions to spark conversation:

- How has whiteness been defined historically? What purposes have changing definitions of whiteness served in America?
- Why is colorblindness problematic in addressing racism? Is it possible to address racism without taking account of race?



We mentioned at the beginning of the workshop that we would be asking you the following questions that you should answer on the google document that the above QQ CODE brings you. Based upon the discussion on whiteness, the discussion, the activities, and what you have learned so far about power, privilege and whiteness, and as part of your commitment to constant reflexivity, complete the following:

- I learned that (indicate what you learned) ….

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- We will also be asking you to look forward by asking:
    - In light of this, I will (provide at least one example of an actionable item for the following)….

- This week
- Six months from now
- One year from now

We have a QR code that we will lead people to more info.

- Summary of key takeaways from the workshop.
- Closing remarks and resources for further learning.
- Note: This workshop is designed as a starting point for deeper engagement and ongoing efforts to challenge scripts of whiteness in engineering. It is recommended to follow up with additional sessions, training, or initiatives to foster long-term change and promote racial equity in the field.

THANK YOU!

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