

Special Session: Exploring the Struggles of Diverse Engineering Students through Stories and Imagining a Future with an Inclusive Culture

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Abstract— Many engineering students from marginalized populations have had negative experiences regarding their identities (race/ethnicity, sexual orientation, gender expression, etc.) as a result of the culture in engineering. These negative experiences may range from microaggressions regarding a person's marginalized identity – “It's impressive for a woman to be in engineering” – to outright discrimination, such as being called a demoralizing slur by a peer. Often associated with these experiences is a lack of support or intervention from faculty, advisors, or staff, as well as difficulty finding mentors that students can identify with. This special session aims to share authentic stories from diverse engineering students to facilitate a discussion of solutions amongst attendees.

Keywords—diversity, intervention, faculty development

I. NOVELTY OF SESSION

There is a wealth of research exploring the experiences of engineering students from marginalized populations; however, this research is typically reported in the aggregate and loses the texture and emotion present in student's lived experiences. In this session, we will share students' stories told in a first-person point of view, reconstructed from interviews from a larger project [1], [2]. These stories are moving examples of blatant discrimination and outdated practices that serve as barriers of entry and access into engineering spaces and culture for students with marginalized identities wishing to feel like they belong.

For example, a black female engineering student is consistently confused with the only other black female in the engineering program. Another student is a transgender woman with depression struggling to navigate the social structure of her campus maker space in order to complete a class project. Each student's story will be introduced and read, and will be examined through the lens of how educators can intervene to improve the experiences of engineering students from marginalized populations.

II. GOALS OF THE SESSION

This special session aims to share experiences of women, racial and/or ethnic minorities, and students from populations with invisible marginalized identities – persons with

disabilities, LGBTQ+, veterans, low socio-economic status, and first-generational college students – navigating engineering spaces (classroom settings, maker spaces, study groups, etc.), with a focus on a solutions-directed approach with the audience to discuss ways of improving their experiences. For our session goals, participants will:

- Hear stories of students from marginalized populations.
- Work collaboratively to develop ways of influencing culture so that future students do not experience marginalization and discrimination.
- Leave inspired to make changes within their context to help engineering spaces become more inclusive.

III. AUDIENCE

The intended audience are engineering and computer science faculty who are interested in cultivating inclusive cultures in engineering and computer science education. Specifically, this could include engineering/ computer science educators, advisors, researchers, or staff managing engineering/ computer science spaces. This session is directed towards every engineering educator and researcher who seeks to foster inclusive cultures within their classrooms and research environments. More importantly, however, this session invites those who do not understand or agree with inclusion initiatives in engineering to be part of the discussion.

IV. DESCRIPTION OF SPECIAL SESSION

Part 1: The special session will begin with an introduction to the topic of the session and the facilitators. The session facilitators will then begin by reading a selected story of a student that identifies with a marginalized population while participants read along. After this story is shared, the facilitators will unpack the story by identifying the mode of discrimination that the student endured, identifying biases that the student was a victim of, and how the situation should have been addressed to promote a safe environment for the student who endured harassment.

Part 2: Following the facilitators' example, the audience will be asked to split into groups of 4-5, and will be assigned a story from a marginalized student. The groups will be asked to think deeply about the student's experience and discuss answers to the following questions: "*How was this situation problematic?*", "*What could I do or have done to alleviate or prevent the circumstance that this student has experienced as told from their story?*" and "*How could the culture be changed so that stories such as this one do not occur?*" The stories will feature issues that would require more extensive systematic changes than administering disciplinary action (or similar) to impact the outcome. This is in an effort to identify and address implicit biases present in the audience.

Part 3: Participants will then reconvene following their discussions to report out ideas and realizations that were generated. Ideally, participants will identify any implicit biases they may harbor, as well as come away with a fresh perspective of how students from marginalized identities experience engineering culture. These ideas, realizations, and discussions will be compiled and shared after the special session over email. Facilitators will add to this discussion by sharing best practices from their experiences observing engineering spaces and from the literature.

Part 1, consisting of introductions and discussion of the first story, will last around 15 minutes. Part 2, consisting of the interactive group session, will last around 30 minutes. Part 3, consisting of sharing stories and solutions discussed during groupwork, will last around 20 minutes.

V. EXPECTED OUTCOMES AND FUTURE WORK

The facilitators expect that participants will develop a deeper and more complex understanding of the experiences of engineering students from underrepresented groups after engaging in this special session. It is hoped that this special session will serve as a catalyst for future work exploring ways of creating a more inclusive culture in curricular and co-curricular spaces within engineering education. In addition, the facilitators expect that during this session, some participants may become aware of aspects of their own implicit biases, and this awareness may lead to more changes in the ways that these faculty, graduate students, and staff engage with students from marginalized identities.

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REFERENCES

- [1] M. Jennings, N. Kellam, B. Coley, and A. Boklage, "Listening to Engineering Student Makers: Exploring Recommendations to Create an Improved and Inclusive Makerspace," in *ASEE Annual Conference & Exposition*, 2019.
- [2] N. N. Kellam, A. M. Cirell, B. C. Coley, and A. Boklage, "Making a new path: Lessons learned during the 'making the data' phase of our project," in *ASEE Annual Conference*, 2018, pp. 1–12.