

## **Work in Progress: Perception of the Culture of Disengagement by Minoritized Students**

**Mr. Luan M. Nguyen, Iowa State University of Science and Technology**

Luan M. Nguyen is an MA/Ph.D. student in Anthropology/Civil Engineering, who completed his Master of Science in Biochemistry at Iowa State University and his Bachelor of Science in Chemistry at Hartwick College. His first master's thesis focused on the structural analysis of the schizophrenic gene DISC1 using transmission electron microscopy and hydrogen-deuterium exchange mass spectrometry. For his second master's thesis, he focuses on identifying the individual and institutional factors that contribute to a "culture of disengagement" from the ethical dimension of engineering work among students in the engineering profession. His Ph.D. project is funded by the NSF and is concerned with promoting and improving engineering students' ethical behavior and sensitivity through on-campus student organizations. His academic interests include mental health, international development, human rights, and engineering ethics. Currently, his ambition is to work within an international organization such as UNESCO and to be an advocate for promoting science and technology as critical tools of sustainable development as well as to participate in the dialogue between scientists, policy-makers, and society. Luan enjoys traveling, reading, and watching documentaries.

**Dr. Nell Gabiam**

**Dr. Cristina Poleacovschi**

Dr. Poleacovschi is an Assistant Professor at Iowa State University. She researches issues of diversity and focuses on intersectional aspects of microaggressions.

# **WORK IN PROGRESS—PERCEPTION OF THE CULTURE OF DISENGAGEMENT BY MINORITIZED STUDENTS**

## **KEYWORDS**

Minoritized Students, Culture of Disengagement, Engineering Education, Minorities, Microaggressions

## **1. INTRODUCTION**

Engineering students are often taught to apply ethical codes when making engineering and professional decisions. However, ethical codes often concern technical matters such as only undertaking assignments in their areas of competence and professional matters such as acting as faithful agents or trustees for their clients [1], with little regard to sociopolitical matters such as addressing discriminations and inequalities in the field of engineering and beyond. This disregard of sociopolitical matters might contribute to the large amount of discrimination in the forms of microaggressions facing engineering students of minoritized backgrounds. For example, a study found that different groups of racially minoritized students experience university campus differently in some ways [2]. The term “minoritized” is used to refer to the process of student minoritization that suggests an understanding of “minority” status as that which is socially constructed in specific societal contexts [2]. Microaggressions in general are deniable acts of racism or sexism that reinforce pathological stereotypes and inequitable social norms [3]. We want to investigate how minoritized engineering students understand microaggressions and how their experiences with microaggressions affect their experience in engineering programs.

Because the disengagement of engineers from public welfare considerations perpetuates unequal structures and practices for disadvantaged groups within that public[4], we want to move away from a Eurocentric perspective to focus on the views of minoritized engineering on the role of sociopolitical engagement within engineering education. We focus on minoritized students because minoritized groups are often at the center of sociopolitical debates regarding issues such as sociopolitical inequalities and gender or racial discriminations. In addition, they are often the ones directly affected by these sociopolitical matters. Engineering is still very much a white male-dominated field and inequities for women and underrepresented groups in engineering education persist [2]. In this study, minoritized student groups include Black, Latinx, Women, and LGBTQIA+. We do not focus on male Asian students in this study, however, because even though they are a socially minoritized group, they are often considered overrepresented in engineering [5].

Research has shown that minoritized engineering students experience a significant amount of microaggressions [6]–[8]. Microaggressions are defined as “the subtle and stunning assaults that people face because of their membership in social groups such as race, gender, and sexual orientation” [9]. For example, expressions such as “You are Asian; you must be very good at math!” or “You are so good at math for a girl!” are microaggressions because they are subtle assaults to the people on the receiving end of these expressions. These are subtle because they are often not intentional or the micro-aggressors often do not realize they are doing harm. However, microaggressions provide a way to normalize discrimination, leading to a new form of

racism and sexism. We want to see whether these students view microaggressions as a serious sociopolitical issue that they face as students that needs to be addressed and how engineering education could address it. In other words, during the interview, minoritized students are asked general questions regarding their view on microaggressions to see if they believe, based on their own experience, that these microaggressions are a serious sociopolitical issue that needs to be addressed in engineering education.

Little work has been done to explore the possible applications of anthropology and anthropological perspectives to engineering education. This work attempts to bridge anthropology and engineering education in an effort to understand how an anthropological perspective can contribute to promoting awareness of microaggressions among engineering students, faculty members, and administrators. Anthropology focuses on human behavior, beliefs, and values. Here, we focus on the views and beliefs of minoritized engineering students. In addition, anthropology is concerned with social difference, inequality, and the everyday experiences of marginalized groups [10]–[12]. By employing interviews as an ethnographic method from the field of anthropology, we aim to contribute to the understanding of minoritized students' experience with microaggression and the effort to combat these microaggressions from the perspective of these minoritized students. The significance of this project lies in its study of minoritized engineering students' understanding of microaggressions, moving away from a dominant Eurocentric perspective to provide a different angle of looking into how engineering education could address this issue.

In this paper, we first provide an overview of the experience of minoritized students with microaggressions. Then, we will discuss the idea that engineering education might lead to students being disengaged from sociopolitical matters over the course of their study. In addition, we will make an argument on whether engineering should be asocial or apolitical and how the disregard of sociopolitical matters might contribute to the large amount of discrimination in the forms of microaggressions facing engineering students of minoritized backgrounds. Finally, drawing on interview conducted with 11 minoritized students, we provide an overview of how minoritized engineering students understand microaggressions and how their experiences with microaggressions affect their experiences in engineering programs.

## **LITERATURE REVIEW**

### ***1.1. Minoritized Engineering Students and Microaggressions***

Race and gender inequalities remain a challenge in STEM education. In addition to the challenges stemming from the consequences of these disparities, minoritized engineering students often face racial and gendered microaggressions that could lead them to consider changing their majors or leaving college altogether [6]–[8]. For example, a study by Lee et al. (2020) suggests that racial microaggressions are not isolated incidents but are ingrained in the campus culture. These racial microaggressions specifically target students of color, with Black students reported to be the more likely targets of these microaggressive behaviors [8]. Another type of microaggressions that affects minoritized students in STEM is gendered microaggressions. Women remain underrepresented in both STEM workforce and academia [7],

[13]. Many societal gender stereotypes assert that men are more suited for STEM than women and these stereotypes lead to women facing microaggressions from peers and colleagues [13]. Another study by True-Funk et al. (2021) showed, using an intersectional approach to analyze the effects of microaggression on undergraduate engineering students, that reduced self-esteem, racial/gender isolation, and stereotype threat are the most experienced effects of microaggressions among minoritized students. For example, Latinx students were reported to experience reduced self-esteem more commonly than other intersectional identities while Asian women and Latino men reported racial/gender isolation more than any other intersectional identity [6].

Furthermore, there are processes operating at multiple levels that can lead to the devaluation of LGBTQIA+ members [14]. For example, heterosexism, which operates at the macrolevel, leads to policies, actions, and cultural ideologies that favor heterosexuality and cisgender status, leading to biases against sexually minoritized groups and non-cisgender individuals [14], [15]. Heterosexism at the institutional level often includes university policies that prevent same-gender partners from having health-care benefits [14]. Another example of processes that can lead to devaluation of LGBTQIA+ members is heteronormativity, which operates at the micro-level [14]. Heteronormativity includes subtle interpersonal and institutional beliefs; for instance, assumptions that there are only two biologically determined sexes [14], [16].

In the context of engineering, the devaluation of LGBTQIA+ individuals might be particularly increased; in fact, previous work has shown that LGBTQIA+ individuals in engineering are less open about their status with their colleagues and students compared to those in other STEM fields [17]. Because sexually minoritized groups have lower persistence in STEM fields such as engineering than heterosexual students and because they also face both overt and covert forms of biases, including blatant anti-LGBTQIA+ sentiments, it has been suggested that heteronormativity, heterosexism, and other sexual prejudices might be pervasive in engineering and engineering education [14]. These studies further suggest that there exists a culture in which LGBTQIA+ minoritized groups face difficulty in developing their engineering identity as well as in being seen as competent engineering students [14], [18]. Together, all of the studies above suggest that there is a need to focus on the experiences of minoritized engineering students in STEM education.

## ***1.2. The Culture of Disengagement in U.S. Engineering Education***

Previous work has found that the U.S. engineering education does not heavily focus on teaching students their professional responsibility to public welfare due to the presence of a culture of disengagement [4]. Within a culture of disengagement, students primarily engage with decisions made by individual engineers and the problems confronting the members of the engineering profession as a group; that is, they engage less with political discourse and policymaking processes regarding the use of engineering products [4]. In other words, students might consider problems such as socioeconomic inequalities in education, microaggressions experienced by their peers, professors, and staff members, and other sociopolitical concerns as “not relevant” to their engineering work.

The culture of disengagement is deeply embedded within the broader U.S. engineering culture and manifests itself at the organizational level of engineering education programs, even when these programs introduce social justice concepts and practices directly into their curricula [4]. Cech (2014) argues that there are three underlying ideological pillars within this culture of disengagement, namely depoliticization, technical/social dualism, and meritocracy. The ideology of depoliticization suggests that engineering work could and should be separated from social and political concerns because such considerations might lead to bias in engineering practice [4]. In other words, the ideology of depoliticization casts public welfare issues as irrelevant to "real" or "technical" considerations in day-to-day engineering work [4]. For example, problems such as microaggressions experienced by their peers, professors, and staff members are considered not directly related to the engineers' work.

### ***1.3. Is Engineering Asocial/Apolitical?***

Engineering work is often expected to be completed objectively and without bias, formulating the basis for logical positivism. Logical positivism is the belief that science and engineering work can be asocial and apolitical as long as proper methods of inquiry and design are followed [19]. Here, engineers are presumed to be neutral actors, deferring to the objectivity and value neutrality that are assumed to be a part of these methods [19], [20].

Nevertheless, Science and Technology Studies research literature has shown that even the most ostensibly objective and neutral aspects of engineering practice and design have social and ethical norms, culturally-informed judgments regarding what is considered truth, and ideologically-infused processes of defining problem and solution [19]. Therefore, engineering work should never be asocial or apolitical [19]. For example, prioritizing certain technical features such as faster, smaller, and cheaper vs. quality or sustainability over others is a social and political choice [19]. Indeed, the fact that there is a misconception that technical engineering work could, in some ways, be separated from the social, or rather depoliticized, suggests that this misconception is itself cultural [19]. That is, it frames the way engineers perceive sociopolitical issues such as microaggressions and inequalities. In fact, the issues of microaggressions and inequalities, in the frame of depoliticization, are irrelevant and thus culturally invisible because they are considered sociopolitical [19], [20]. In other words, the professional culture within engineering and engineering education delegitimizes the idea of these sociopolitical concerns as an inseparable part of engineering work.

### ***1.4. Consequences of Disengagement from Ethical and Sociopolitical Concerns***

The ideology of depoliticization leads many engineering students to regard justice issues as social and political and thus irrelevant to serious classroom materials or even study group conversations [4], [19]. In fact, social justice and ethical concerns become increasingly less important to engineering students over the course of their undergraduate education [4], [21]. This decreased importance of social justice and ethical issues to engineering students was directly influenced by the cultures within their engineering programs [4], [21]. Because the U.S. engineering education typically values teaching scientific and engineering concepts while overlooking ethical and sociopolitical dimensions of these concepts, students tend to be less

sensitive or indifferent to pervasive ethical and sociopolitical issues such as socioeconomic inequality and discrimination or community concerns during project implementation or operations [22]. A growing number of cases of engineering project failures suggests that engineers might be placing less emphasis sociopolitical context, partly due to an array of pressures (e.g. professional, organizational, financial, and political) [23]. In fact, previous literature has shown that engineers who do not take into account the ethical concerns about their projects are much more vulnerable to self-interest, self-delusion, and institutional pressures that contribute to unethical and substandard decisions, leaving negative impacts on society [23].

## 2. METHOD

In this study, women, LGBTQIA+, Black, and Latinx are considered minoritized engineering students [5]. Particularly, this project will look into microaggressions as a pressing sociopolitical issue to facilitate the discussions with minoritized students during interviews. We analyzed student responses to interview questions regarding microaggressions by identifying recurrent themes. In sum, this project seeks to investigate microaggressions in engineering education to contribute to generating solutions that will lead to more awareness of microaggressions engineering students from minoritized students’ perspectives.

### 2.1. Student Recruitment and Interviews

We focused on four minoritized groups of engineering students: women, LGBTQIA+, Black, and Latinx. Our goal is to interview between 20-25 minoritized engineering students. So far, we have interviewed 11 students and some students identify with more than one of the four groups (see **Table 1**). Using engineering student organizations as a mean of reaching out to students in these four groups, we contacted student leaders within these organizations and provided flyers and gift cards to encourage them to help us recruit participants for interview. In addition, some students were recruited through flyers. Participants who completed the interview were provided with a \$20 gift card as compensation for their time.

Interview protocol underwent review by the Institutional Review Board at a Midwestern university. The interview captures demographic information, perception of sociopolitical engagement in engineering and understanding of microaggressions.

**Table 1:** demographic distribution of minoritized students interviewed so far. Some students identify with more than one groups.

Minoritized Groups	Number of students identified with each group	Total number of students interviewed so far
Women	9	11
LGBTQIA+	3	
Black	5	
Latinx	1	

### 2.2. Qualitative Analysis

Interview responses collected were transcribed. We looked for repeated ideas and concepts emerging as themes based on students' understanding of microaggressions and whether these are an issue that should be discussed in engineering courses during the analysis.

### **3. RESULTS AND DISCUSSION**

We first wanted to grasp the experience of students with microaggression by asking if they have heard of the term microaggressions. Then, we employed thick ethical concept to see if students could provide descriptively specific and rich in content answers. Thick ethical concept here is used as a technique to see if students can further define microaggressions and provide specific examples, in contrast to thin ethical concept which only aims to see if students have heard of the term. When asked if they have heard of the term microaggressions, all minoritized students reported that they have heard of the term. In addition, they were able to define microaggressions and provide detail and specific examples of microaggressions.

“It's like borderline discrimination. It's not exactly a racism per se. Sometimes, it's just it's just the subtle indicators of how a person see other people and you can see the way they make generalizations. As a person in the LGBT community, I consider this a type of microaggression if a person tries to compliment me but ends up sounding really offensive, okay, like, oh, ‘you are too beautiful to be a lesbian’. It’s not because guys are not attracted to me. It’s just that it’s my choice or it just so happened that I am a lesbian. I don’t like how they perceive the community, you know, everyone is beautiful”—A female LGBTQIA+ engineering student.

“Another form of microaggressions that I have interacted with is that when I study with other male students, they just assume because I’m a female student that I’m flirting with them or there’s some type of romantic connection. I find it super difficult to have connections with my fellow students.”—A white female engineering student

“Microaggressions like, to me, it can be just a brief comment that someone says rather unintentionally or intentionally in a manner that may come off as, you know, a little bit hostile, derogatory or negative towards someone based off of their race or ethnicity..... I stepped into my first class in my sophomore year I got stared at. I didn't recognize even one person in the room. And my teacher was kind of shocked to see me. He's like, oh, I don't see many of you in my class. It's confusing because I was trying to think while I was looking at the class. Like, there's a decent amount of guys and girls. So it's not bad. Well, what can it be. It's not religion because she can't just look at me and know what my religion is this or that. I have no religion. So I had to go based off of how many cultural kids I saw in there and I saw four, and then I counted myself, so I was like, oh, that's so, that's what you mean. But then again, I have to look at it, she's not going to aim at that only but that is a big part. But then I saw that I'm the only black kid in the class. So, that's what she meant, ‘I don't see your kind in my class ever.’ So it's

kind of a big deal for a 16 year old. Like, how are you supposed to respond? Like, you don't want to be that stereotype of an angry black female? So I was like, okay, let me be calm. Let me just relax...”

Furthermore, we wanted to see if microaggressions are an issue that needs to be addressed in the engineering classroom. All 11 minoritized students believe that the issues of microaggressions should be a topic of discussion in their engineering classes.

“I believe that there are these subtle assumptions about how women should work in the industry. For example, you know, like, since you are a woman, you should just stay here in the office. I mean, like, why can't I go to the site? Those kinds of things and I'm sure there are even more microaggressions like this happening. I think the school should teach these things and add them as content to the courses.”—A female LGBTQIA+ engineering student

“Only just based on my experience, I feel like, yeah, they kind of have to be discussed because these things that you call jokes at us, but they're not really jokes. You're just kind of hitting a button that is still fake. There's no way for me to insult, like, a white person, unless I go for their money or how the fact their parents take care of them. Like, there's nothing that's going to be so derogatory that's going to hit them in a way that one comment will hit me in a way, like, oh, your skin is so different, like, and like, oh, your hair is curly. That's weird. Like, you always have to constantly do something with it like, and why do you always wear fake hair? Like oh, did you grow up in the hood? like, oh, you're from the South. So you constantly get called the N-word. I mean, people say the N-word to me thinking that it's funny. I've had friends even on this campus, say it to me and think that it's cool and funny. It's not. It's not a comfortable thing. Anyone who is within my race have been discriminated against and were seen as nothing more than a dog in a way. So, microaggressions have to be talked...”

In addition, because this study was conducted during COVID-19 pandemic, we wanted to see if they think this pandemic has intensified discriminations in the form of microaggression. When asked whether they believe COVID-19 pandemic has intensified certain microaggressions or discriminations against certain groups of people, every minoritized student in this study believes either that the COVID-19 pandemic has intensified social problems such as inequalities and discrimination or that the pandemic has led to more focus on these already existing social problems. They also all believe that the pandemic has led to an increase in microaggressions towards certain groups of students on campus, particularly Asian students.

“I don't think that it intensifies these social issues but I think that people are just able to see more of it [microaggressions and discrimination] because they have the time to actually see they are happening with social media and stuff.”—A Black female engineering student



“I could see that the pandemic has intensified discriminations against Chinese and Asian communities in general. They get a lot of discrimination for it. It’s just like, frustrating.”—A white female engineering student.

“I have seen microaggressions towards Chinese students or international students that look a certain way. So, there are definitely more microaggression and discriminatory cases like that.”—A Black female engineering student

#### **4. LIMITATIONS/FUTURE STUDY**

Because this is still a work in progress, we are still working on recruiting more participants. We are currently lacking Latinx students in this study. In addition, we realize that there are more female than there are male students in this study. Future study will include a more diverse group to students. We hope to recruit up to 25 minoritized students. Furthermore, future work will also include an analysis on minoritized students’ understanding of the importance of sociopolitical engagement in engineering as well as an effort to establish whether there is a connection between depoliticization and microaggressions.

#### **5. CONCLUSION**

Overall, minoritized students demonstrate an understanding and awareness of microaggressions. Additionally, they believe that microaggressions should be topics of discussion in engineering courses because they have sociopolitical implications. From these discussions, minoritized students viewed the relationship between engineering education and sociopolitical awareness as important. Here, the answers of minoritized students to the question of whether sociopolitical matters need to be introduced into engineering courses and their answers to the question of whether microaggressions should be a topic of discussions in engineering courses aligned with each other. This suggests that they did not only have a general understanding of microaggressions but also believe in addressing them. We believe that it is essential to understand minoritized students’ perspective because they are often the ones directly experience social discrimination in the form of microaggressions and inequality; that is, their view is important to fully understand microaggressions and to address them.

#### **6. ACKNOWLEDGEMENT**

This material is based in part on work supported by National Science Foundation grant #1926172 and #1926330. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the National Science Foundation.

#### **7. REFERENCES**

- [1] “Code of Ethics | National Society of Professional Engineers.” <https://www.nspe.org/resources/ethics/code-ethics> (accessed Apr. 19, 2021).
- [2] D.-L. Stewart, “Racially Minoritized Students at U.S. Four-Year Institutions,” *J. Negro Educ.*, vol. 82, pp. 184–197, Jul. 2013, doi: 10.7709/jnegroeducation.82.2.0184.
- [3] M. T. Williams, “Microaggressions: Clarification, Evidence, and Impact,” *Perspect. Psychol. Sci.*, vol. 15, no. 1, pp. 3–26, Jan. 2020, doi: 10.1177/1745691619827499.

- [4] E. A. Cech, "Culture of Disengagement in Engineering Education?," *Sci. Technol. Hum. Values*, vol. 39, no. 1, pp. 42–72, Jan. 2014, doi: 10.1177/0162243913504305.
- [5] 1615 L. St NW, Suite 800 Washington, and D. 20036 USA 202-419-4300 | M.-857-8562 | F.-419-4372 | M. Inquiries, "Diversity in the STEM workforce varies widely across jobs," *Pew Research Center's Social & Demographic Trends Project*, Jan. 09, 2018. <https://www.pewresearch.org/social-trends/2018/01/09/diversity-in-the-stem-workforce-varies-widely-across-jobs/> (accessed Apr. 19, 2021).
- [6] A. True-Funk, C. Poleacovschi, G. Jones-Johnson, S. Feinstein, K. Smith, and S. Luster-Teasley, "Intersectional Engineers: Diversity of Gender and Race Microaggressions and Their Effects in Engineering Education," *J. Manag. Eng.*, vol. 37, no. 3, p. 04021002, May 2021, doi: 10.1061/(ASCE)ME.1943-5479.0000889.
- [7] Y. Yang and D. W. Carroll, "Gendered Microaggressions in Science, Technology, Engineering, and Mathematics," p. 18.
- [8] M. J. Lee, J. D. Collins, S. A. Harwood, R. Mendenhall, and M. B. Huntt, "'If you aren't White, Asian or Indian, you aren't an engineer': racial microaggressions in STEM education," *Int. J. STEM Educ.*, vol. 7, no. 1, p. 48, Dec. 2020, doi: 10.1186/s40594-020-00241-4.
- [9] C. Poleacovschi, S. Feinstein, S. Luster-Teasley, and M. Berger, "An Intersectional Perspective to Studying Microaggressions in Engineering Programs," *ASEE Annu. Conf. Proc.*, Jun. 2019, Accessed: Mar. 08, 2021. [Online]. Available: <https://par.nsf.gov/biblio/10129189-intersectional-perspective-studying-microaggressions-engineering-programs>.
- [10] "Duke University Press - Encoding Race, Encoding Class." <https://www.dukeupress.edu/encoding-race-encoding-class> (accessed Apr. 19, 2021).
- [11] "Social class and the cultural turn: Anthropology, sociology and the post-industrial politics of 21st century Britain - Gillian Evans, 2017." <https://journals.sagepub.com/doi/10.1177/0081176917693549> (accessed Apr. 19, 2021).
- [12] "The Caste of Merit — Ajantha Subramanian." <https://www.hup.harvard.edu/catalog.php?isbn=9780674987883> (accessed Apr. 19, 2021).
- [13] D. Sekaquaptewa, "Gender-Based Microaggressions in STEM Settings," *NCID Curr.*, vol. 1, Nov. 2019, doi: 10.3998/currents.17387731.0001.101.
- [14] "LGBTQ Inequality in Engineering Education - Cech - 2018 - Journal of Engineering Education - Wiley Online Library." <https://onlinelibrary.wiley.com/doi/abs/10.1002/jee.20239> (accessed Apr. 19, 2021).
- [15] C. Kitzinger, "'Speaking as a Heterosexual': (How) Does Sexuality Matter for Talk-in-Interaction?," *Res. Lang. Soc. Interact.*, vol. 38, Jul. 2005, doi: 10.1207/s15327973rlsi3803\_2.
- [16] G. M. Herek, "Confronting Sexual Stigma and Prejudice: Theory and Practice," *J. Soc. Issues*, vol. 63, no. 4, pp. 905–925, 2007, doi: <https://doi.org/10.1111/j.1540-4560.2007.00544.x>.
- [17] J. B. Yoder and A. Mattheis, "Queer in STEM: Workplace Experiences Reported in a National Survey of LGBTQA Individuals in Science, Technology, Engineering, and Mathematics Careers," *J. Homosex.*, vol. 63, no. 1, pp. 1–27, Jan. 2016, doi: 10.1080/00918369.2015.1078632.
- [18] "Navigating the heteronormativity of engineering: the experiences of lesbian, gay, and bisexual students: Engineering Studies: Vol 3, No 1."

<https://www.tandfonline.com/doi/abs/10.1080/19378629.2010.545065> (accessed Apr. 19, 2021).

- [19] E. A. Cech, "Ideological Wage Inequalities? The Technical/Social Dualism and the Gender Wage Gap in Engineering," *Soc. Forces*, vol. 91, no. 4, pp. 1147–1182, Jun. 2013, doi: 10.1093/sf/sot024.
- [20] W. Faulkner, "Dualisms, Hierarchies and Gender in Engineering," *Soc. Stud. Sci.*, vol. 30, no. 5, pp. 759–792, Oct. 2000, doi: 10.1177/030631200030005005.
- [21] "Perceiving Glass Ceilings? Meritocratic versus Structural Explanations of Gender Inequality among Women in Science and Technology | Social Problems | Oxford Academic." <https://academic.oup.com/socpro/article/57/3/371/1663699> (accessed Mar. 08, 2021).
- [22] L. M. Nguyen, "Conceptualizing a Theory of Ethical Behavior in Engineering," 2020.
- [23] Y. Lambrinidou and M. Edwards, "Learning to Listen: An Ethnographic Approach to Engineering Ethics Education," Jun. 2013, p. 23.860.1-23.860.6, Accessed: Mar. 08, 2021. [Online]. Available: <https://peer.asee.org/learning-to-listen-an-ethnographic-approach-to-engineering-ethics-education>.