

# Whiteness and Race in the Engineering Workplace

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**Abstract—** This Work in Progress Research paper examines the role of race in the engineering workplace. Despite many efforts, participation in engineering by women and People of Color remains well below their proportion of the population. There is a need to move beyond creating programs to support underrepresented groups, and instead examine the structural issues that limit their participation. In this paper we examine the ways in which White engineers discuss the role of diversity and inclusion in the workplace. We interviewed nine White engineers, five men and four women. Interviews were semi-structured and asked about their workplace culture and experiences. Both the men and women talked about racial minorities in a way that minimized the importance of race. At the same time, the women recognized their own status as minorities in engineering. Our findings show that the way White engineers frame the role of race in the workplace can serve to limit the opportunities for People of Color.

**Keywords—**diversity, inclusion, gender, race

## I. INTRODUCTION

In the United States, the demographics of the engineering profession do not reflect the population as a whole. For example, Black individuals make up 12% of the overall population but only 4% of the engineering workforce [1]. Various explanations for this disparity include lack of academic preparation, a “leaky pipeline”, and lack of role models [2]. Many programs have been enacted in schools to support minority students interested in engineering. Despite these efforts the number of minority professionals in engineering has remained consistently low.

Increasingly, deficit-based explanations are being replaced with a consideration of the culture of engineering that disadvantages Black (and other minority) professionals. Kendi provides an historical account, showing that racist policies stem not from ignorance or hate, but from a desire on the part of the White population to maintain economic or other advantages [3]. Critical Race Theory (CRT) highlights how racism is engrained in the fabric of US culture and facilitates maintenance of White power [4-6]. Bonilla-Silva has described four frames that White people use to talk about race without being overtly racist [7]: 1) abstract liberalism, the use of liberal tenets to explain or counter racial issues; 2) naturalization, explaining racial issues as natural occurrences; 3) cultural racism, explaining racial issues as

having roots in cultural practices; and 4) minimization of racism, suggesting that discrimination and bias are no longer relevant. Through these frames White people practice color-blind racism, further minoritizing non-White people without engaging in overt acts of racism.

We are interested in understanding how the experiences of both Black and White engineers in the workplace are impacted by and impact both individual and structural racism. In this presentation we focus on preliminary data from White engineers. While most research on minorities in engineering has focused on women and People of Color, there is growing recognition of the need to interrogate Whiteness. Understanding the ways that White people think about race has been important to uncovering the structural aspects of racism [7-9], including in engineering [10]. Our research addressed the following question:

*How is Whiteness manifested in the engineering workplace?*

## II. LITERATURE REVIEW

Black professionals face multiple barriers in the workplace, including bias in hiring practices, salary inequity, unfairly negative performance evaluations, fewer advancement opportunities, token hiring and placement into positions not associated with core company activities (e.g., human resources), and perceptions of incompetence [11, 12]. Some studies have examined predictors of success in the workplace for Black professionals. Johnson and Eby found that human capital (e.g., education, training) and demographic variables (e.g., marital status, age) were the most important predictors of career success, while social capital (e.g., networks and relationships) and individual difference variables (e.g., personality factors, motivation) were less important [13]. These results suggest that there is at least some objectivity in advancement and other opportunities for Black employees, but these opportunities are also limited by the lack of mentoring and networking opportunities. In another study Black professionals were rated lower on performance evaluations by supervisors, had lower career satisfaction, and were more likely to have reached a career plateau [14]. Interestingly, race had a direct effect on performance evaluation rather than being mediated by organizational experiences, suggesting that supervisors exhibited bias in rating their Black employees.

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#### IV. FINDINGS

Surprisingly little research has been conducted on the experiences of Black engineers in the workplace. A number of authors all point to a lack of literature on this topic [15-18]. The few studies that exist have used several constructs to frame their work, including identity [15, 19], self-efficacy [16], tokenization [20], and inclusion/exclusion [21, 22]. Several of these studies have identified cultural mismatch as an important factor impacting Black engineers [15, 17, 19, 21]. In Dotson's study of Black engineers in the semiconductor industry, cultural mismatch led these engineers to bifurcate their work and social lives, leading to feelings of exclusion [21]. In contrast, their White coworkers considered the work environment to be a place to socialize. As a result social cliques developed which excluded the Black engineers and limited their advancement opportunities. Gibbs also found that cultural mismatch limited advancement opportunities [17]. In contrast, Hofacker found that even though his Black engineer participants experienced some workplace and social segregation, it did not appear to impact them [16].

There has been very little interrogation of Whiteness in engineering. In one study, changes in a long-time professor's understanding of his own privilege was followed as he entered and moved through a STEM education doctoral program [23]. Other authors have called for more application of critical race theories to engineering [24, 25] and for making Whiteness (and maleness) more visible in engineering education research [26]. This study is intended to contribute to that conversation through an examination of White engineers in the workplace.

#### III. METHODOLOGY

This paper is part of a larger project in which we aim to understand the experiences of Black engineers in the workplace. For the full study we are interviewing engineers at the intersections of Black/White and male/female. For this paper we focus on preliminary results from just the White engineers, five men and four women. While this number is roughly half of what we intend for the full study, it is within the range that is typical for similar studies [15, 17, 18].

All participants came from the computer and information technology industry. Participants were identified through personal contacts of the research team and by emailing alumni of the electrical and computer engineering department of a large, public university in the US. The selection criteria were: engineer working in a computer and information technology company (hardware or software); male or female; Black or White. This paper discusses results from only the White engineers interviewed so far. Two semi-structured interviews were conducted with each participant. The first interview focused on the participant's background that led them to engineering: childhood influences, decisions to enter engineering, and schooling. The second interview asked about workplace experiences and was the primary source of data. The research was approved by the University of Florida Institutional Review Board. All names given in this paper are pseudonyms.

Analysis of the full dataset is being conducted through narrative analysis, involving iterative readings through different theoretical lenses [27, 28]. Data for this paper comes from an initial reading to identify broad themes.

For the men, two types of diversity existed. When racial diversity was discussed it was often unrelated to people who are considered underrepresented in science and engineering. For example, John described the diversity of his team as "pretty diverse. We're about a 50-50 split, I'm going to say we're exactly a 50-50 split between men and women. Maybe half white and then the other half is Asian and Indian. . . There's like three Canadians on the team as well." Carl's company had a similar type of diversity, which he attributed to the company's location on the West Coast of the US, saying "when you're in the South you have a lot of African Americans. When you're on the West Coast you're going to have a lot of Asians."

Men translated this diversity as being important due to "diversity of experience". John provided an example of how this can be important by recalling a story he had heard: "One of the stories that I always hear about is like the people who make the automatic soap dispensers and everybody on the team was White so the soap dispenser couldn't identify dark skin. And it's not a malicious thing but the people just never had that experience so they had no idea to even think about it. So that's what we try to get here on this team is various life experiences that we can bring on board." David explained how this diversity of experience can lead to better problem solving: "This isn't a cultural thing, in terms of ethnicity, but it's a company culture thing and how problems have been solved, you get all that brought together from all this diverse group of people and you end up with a lot more interesting options to solve problems."

The men also expressed the view that hiring should only consider expertise or potential, and not race. As stated by Joel, the reason was that "they want to hire the top talent. And forcing, or accepting people under the bar is not a very good compromise just for getting those diversity numbers up, but then you have less talented employees potentially."

When asked directly about bias in the workplace, the men acknowledged that it could occur. Most of the men had heard of some instances of bias, but said they had never observed it themselves. When it was observed it was generally minimized. For example, Bill heard sexual jokes in the workplace, but did not think they rose to a level of concern, as shown in the following exchange:

*A Well, they could cross the line sexually or you know, things of that nature. Where a female, I've heard a few jokes where a female may be uncomfortable. Not threatened, I don't think, but maybe uncomfortable at some of the jokes.*

*Q Were there women around when those jokes were said?*

*A Typically not.*

*Q Okay.*

*A Or if they were they were women who had indicated that they were comfortable.*

*Q Did anybody express discomfort at those kinds of jokes?*

*A No, not that I heard.*

John observed women being interrupted in meetings, but attributed it to “people that are more senior, more experienced, people that are a little bit more open and outgoing in general, might have a tendency to interrupt and jump in...I think those same people might interrupt me if I was talking, for instance, but I don’t think it really matters.”

The women were more cognizant of diversity and inclusion issues due to their own status as a minority in engineering. They described their own experiences of not fitting into workplace culture, such as Heather who said, “It was very much a boys club.” Now that she is at a different company that is more diverse, she said, “I’m a lot more comfortable... working with people who are like me...I’m less likely to hear, in the background, people talking about women in what really is sexual harassment; I used to see that a lot more often.” Emily also described her initial workplace as “mostly White males” and that “it would not be unusual for me to sit in a meeting and for me to be the only female.”

Mentoring was seen as an important approach to deal with these experiences, both being mentored and acting as a mentor. Emily explained that initially she didn’t fit into the workplace because she felt that “I have nothing in common with these people who are at least 10 years older than me, have families, a different stage in their life.” She described combatting this in saying, “I bonded with people just in learning from them, in finding mentors who could help me understand the industry since I was very new to it.” Mary also described mentoring as a way to create a more inclusive culture by stating, “I think we have a great culture of helping others, and there’s a big focus on mentoring as well as looking for people that are early career, giving them opportunities...And I would say it’s more like a family than it is like work, at least in the groups I worked in which I think is really awesome. People really care about you as a person. Obviously you need to do your work, too, but they also care about you as a person.”

Although the women at times felt a lack of inclusion, like the men they minimized hiring of racial minorities, although for a different reason. Women recognized the importance of hiring for diversity, but blamed a lack of non-White applicants for their company’s inability to do so. Hana discussed this issue in depth, describing the important role of faculty in helping students to network. As she explained it, at “an elite school, [the faculty] are going to tell you, these are the companies they have networked, they have connections, they’re going to hook you up. [At a non-elite school] the instructor doesn’t know anyone, the instructor himself doesn’t know any better, how is he going to help you find those jobs and reach out and get the connections? And then how are you going to have the confidence that you’re good enough for these jobs?” Hana recognized that this lack of support intersects with race, because there are “a lot of Black [people] and others that are not going to those elite schools that are still fighting poverty and other issues, so they don’t apply.”

Another theme that appeared was the issue of work-life balance. Several of the men described a workplace in which they were expected to work beyond business hours, and if you didn’t you were not pulling your weight. For example, in David’s start-up company there is an expectation that you will work evenings and weekends, and “people who don’t contribute as much to

[what the company is developing] they will get noticed and there will eventually be some repercussion of that in terms of whether you’re employed, the amount that you get paid, the amount of stock that they choose to give you, etc.” In other companies the focus was less on the amount of time worked and more on the employees getting the required work done. At John’s company “nobody’s watching the clock, nobody’s watching you, judging you for coming in late or leaving early. It’s more about the work that you’re doing. Are you getting your job done? And if you are then I’m not really going to give you a hard time as long as you’re doing it.”

In contrast, the women tended to place greater value on family and life outside of the workplace than the men did. Mary reflected on her work-life balance, saying, “I think from a perspective, for me right now where I’m in my life...it’s the work-life balance piece of it and the flexibility. And I think if you look in terms of what work-life balance is, it looks different for everybody.” She recognized that “it’s not cookie cutter, okay, this is what work-life balance is for everybody, it’s more that everyone has a different situation and so it’s that flexibility piece.” She appreciated that she could have flexibility and said that her “manager is supportive of that” which “is very positive”. Similarly, Emily valued part-time flexibility when she looked to start a family. Early on in her career, her company “put a policy in place that said no one’s working part time.” She was “deflated” because she and her husband wanted to start a family. She described the discussion with her husband, saying, “My husband and I had agreed that if I couldn’t work part time I would quit altogether because one of us would stay at home with the kids, either he or myself, at least part of the time.” Because of the value she placed on her family, she worked with HR to obtain part time flexibility for the rest of her career.

## V. DISCUSSION AND FUTURE WORK

The findings presented here are part of a larger study examining the experiences of Black engineers in the workplace [29]. In that study we are analyzing the data through two theoretical frameworks: Faulkner’s concept of in/authenticity [30-33] and Kendi’s description of the history of racist ideas [3]. The results of that study will provide guidance on how to make the engineering workplace culture more welcoming and open to all.

The participant’s attitudes towards diversity and inclusion shared here can be understood through the lens of Bonilla-Silva’s concept of racism without racists [7]. Both the men and women used the frame of abstract liberalism to account for the lack of diversity in their workplaces. Abstract liberalism “involves using ideas associated with political liberalism (e.g., ‘equal opportunity’, the idea that force should not be used to achieve social policy) and economic liberalism (e.g., choice, individualism) in an abstract manner to explain racial matters” (p. 56). Abstract liberalism was used by the men when they discussed hiring the best person regardless of race. Espousing this policy of ‘equal opportunity’ allowed them to assert their own color blindness while at the same time ignoring structural inequities that disadvantage People of Color. Abstract liberalism was also used by the women when they explained that they wanted to hire minorities, but there weren’t sufficient applications. In this case, the women were able to assert their

support for diversity in an abstract sense, while at the same time framing the lack of diversity as a choice made by People of Color.

The men also used the frame of minimization when discussing instances of bias in the workplace. Minimization “suggests that discrimination is no longer a central factor affecting minorities’ life chances...More significantly, this frame also involves regarding discrimination exclusively as all-out racist behavior...” Use of this frame is seen most clearly in Bill’s discussion of sexual jokes in the workplace. His evidence that these jokes were not a problem was that women who were present appeared to be comfortable with them and there were no complaints. This evidence ignores the power issues that often prevent women from reporting sexist incidents.

Although the women used these frames to explain the lack of diversity, they were also aware of issues that affected them directly. Thus, they occupied a liminal space where they could simultaneously discount the salience of race in the workplace while advocating for their status as women.

## VI. CONCLUSIONS

Our preliminary findings suggest that among our participants “Whiteness as property” remains essential in defining engineering workplace culture in the US. For the White women, their racial and gender identities create a liminal space where they have experiences that are reflective of both the majority (White) and minority (women). We are continuing to interview engineers, including Black men and women, to gain a broader understanding of individual and structural racism in US engineering workplaces.

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