Cultural Scripts, Space, and Identity: Perspectives of Two LGBTQ+ Engineering Students on Inclusive Spaces

Jerry Austin Yang, University of Texas, Austin

Jerry Austin Yang is an electrical engineering student at the University of Texas at Austin. His interests include the experiences of marginalized groups in engineering and diversity and inclusion in engineering education.

Dr. Audrey Boklage, University of Texas at Austin

Audrey Boklage is research assistant in the Cockrell School of Engineering at the University of Texas at Austin. She is particularly interested in improving the culture and environment of undergraduate education experience for all students.

Mr. Maximilan Kolbe Sherard

Graduate student at the University of Texas at Austin studying STEM Education

Dr. Christine Julien, University of Texas at Austin

Christine Julien is a Professor of Electrical and Computer Engineering at the University of Texas at Austin, where she leads the Mobile and Pervasive Computing research group. She also serves as the Assistant Dean for Diversity, Equity, and Inclusion for the Cockrell School of Engineering. Her research is at the intersection of software engineering and pervasive computing systems.

Dr. Maura Borrego, University of Texas at Austin

Maura Borrego is Director of the Center for Engineering Education and Professor of Mechanical Engineering and STEM Education at the University of Texas at Austin. Dr. Borrego is Senior Associate Editor for Journal of Women and Minorities in Science and Engineering. She previously served as Deputy Editor for Journal of Engineering Education, a Program Director at the National Science Foundation, on the board of the American Society for Engineering Education, and as an associate dean and director of interdisciplinary graduate programs. Her research awards include U.S. Presidential Early Career Award for Scientists and Engineers (PECASE), a National Science Foundation CAREER award, and two outstanding publication awards from the American Educational Research Association for her journal articles. All of Dr. Borrego’s degrees are in Materials Science and Engineering. Her M.S. and Ph.D. are from Stanford University, and her B.S. is from University of Wisconsin-Madison.
Cultural Scripts, Space, and Identity: Perspectives of Two LGBTQ+ Engineering Students on Inclusive Spaces

Introduction

Companies, government institutions, and universities in engineering are increasingly turning their attention to initiatives that incorporate more diversity and inclusion in the workplace (National Academy of Sciences, 2011). More institutions are rewriting their diversity and inclusion statements, promoting diversity and inclusion both in society at large and in their respective workforces, and engaging in powerful conversations geared toward improving the status of marginalized groups (Davis, 2018). More recently, engineering programs in particular have paid significant attention to attracting a diverse population of students and developing inclusion-related programming to fit the needs of a diverse student body, embracing many different underrepresented identities such as race, gender, sexuality, disability, etc.

LGBTQ+ engineering students are one group of underrepresented minorities that are often targeted in these diversity and inclusion programs. Yet significant evidence indicates that LGBTQ+ engineering students still experience marginalization in engineering spaces. Many students experience a chilly climate and feel the need to navigate engineering spaces using a variety of techniques, such as passing, covering, and compartmentalizing (Cech & Waidzunas, 2011; Hughes, 2017; Farrell, 2017; Cech & Rothwell, 2018; Yoshino, 2006). This identity work causes significant strain on LGBTQ+ engineering students, often resulting in a lowered sense of belonging in engineering, higher levels of anxiety and stress, less engagement with engineering activities, and poorer academic performance (Cech and Waidzunas, 2011).

To alleviate this chilly climate, universities and engineering departments are creating designated diverse and inclusive spaces that intend to foster community among LGBTQ+ engineering students as well as students with other minority or underrepresented identities. Many of these programs include providing shared spaces for students to inhabit and interact with each other, such as multicultural engagement centers, department-sponsored minority student organizations, and gender and sexuality centers. These spaces present an interesting physical locale and cultural context to explore the experiences of LGBTQ+ engineering students, as they are inherently intended to make engineering feel more inclusive for LGBTQ+ engineering students.

This study, part of a broader project on the experiences of LGBTQ+ engineering students more generally, attempts to answer the following research questions:

1. How do LGBTQ+ engineering students utilize and experience inclusive spaces?
2. What are some ways we can reconceptualize inclusive spaces to be even more inclusive?

Drawing on social script theory (Goffman, 1959), communities of practice (Lave & Wenger, 1991; Wenger, 1998, 2000), and the outsider-within perspective (Collins, 1986), we argue that inclusive spaces are imbued with dominant cultural scripts that often characterize marginalized communities. However, not all people within the marginalized community identify with these scripts. LGBTQ+ engineering students who do not subscribe to the dominant cultural scripts about LGBTQ+ people may feel isolated in those spaces. We propose that inclusive spaces take a more radical intersectional approach to building community and consider ways to disrupt
dominant narratives of marginalized groups to ensure that everyone can utilize inclusive spaces to their full benefit.

Literature Review

This section describes the various theoretical constructs that will be used to contextualize the experiences of LGBTQ+ students in inclusive spaces. We begin by discussing inclusive spaces and how they catalyze the formation of communities of practice, then define and describe cultural scripts, and finally contextualize engineering culture in queer theory, intersectionality, and the outsider-within perspective.

Inclusive Spaces and Communities of Practice

As universities and engineering colleges embrace diversity and inclusion initiatives, one key initiative that universities turn to is the establishment of inclusive spaces for marginalized populations, including LGBTQ+ students. These inclusive spaces are intended to be safe spaces for marginalized people to “‘go and just be [them]selves without feeling the pressures and constraints of an ever-present white world’” (Pittman, 1994). As hubs for LGBTQ+ and other marginalized people to socialize, inclusive spaces become places where marginalized students build communities of practice surrounding their marginalized identities (Lave & Wenger, 1991; Wenger, 1998, 2000). In inclusive spaces, students with marginalized identities can share knowledges, resources, and experiences that come from their lives as well as discuss culturally significant ideas and trends relevant to their identities (Ikeda, 2018). They can leverage inclusive spaces as safe spaces to meet other people of similar identities and places of sanctuary to escape from the outside world (Pittman, 1994).

For LGBTQ+ students, these inclusive spaces include a variety of venues that do not necessarily specifically target LGBTQ+ students, such as multicultural centers, diversity-oriented student organizations, and LGBTQ+-specific centers. Multicultural centers (also known as multicultural engagement centers or MECs) have been proposed and studied as programs and locales that improve student well-being and sense of identity (Princes, 1994; Jones & Williams, 2006; McShay, 2017; Museus, Yi, & Saelua, 2017). Princes (1994) found that both black cultural centers and multicultural centers were necessary to support and provide resources for minority students on university campuses. McShay (2017) and Museus et al. (2017) describe how multicultural centers increase students’ sense of identity and belonging on campuses. Diversity-oriented student organizations have also had a presence on campuses, mainly through student chapters of professional organizations. Examples of these organizations include the Society of Women Engineers (SWE), National Society of Black Engineers (NSBE), Society of Hispanic Professional Engineers (SHPE), and Out in STEM (oSTEM). Diversity-oriented student organizations target specific marginalized communities such as women engineers, black engineers, Hispanic engineers, and LGBTQ+ engineers and provide mechanisms of social support and social integration for marginalized students, as they become hubs of community for people to connect and share information and resources (Guiffrida, 2003; Harper & Quaye, 2007; Lin, 2006; Park & Kim, 2013). These social support systems contribute to a sense of belonging in the campus culture and a more positive college experience for marginalized people (Montelongo, 2002). For LGBTQ+ students and students with multiple marginalized identities, student organizations may serve as a mode of political and organizational resistance (Revilla, 2009, 2010). LGBTQ+ inclusive spaces are often a mixture of multicultural centers, diversity-centered student organizations, and other specifically LGBTQ+-inclusive spaces that
universities, colleges, and students may spearhead – all with the intent of building a space and community of LGBTQ+ people to feel safer on campus and share common experiences with each other.

Other studies have highlighted how inclusive spaces can also create tensions within both the campus and LGBTQ+ community (Marine & Nicolazzo, 2014; Davis, 2018). For example, in their study of nineteen LGBTQ+-inclusive spaces, Marine and Nicolazzo (2014) noted that on-campus LGBTQ+ centers can create tensions between the LGBTQ+ and trans* community. Through center naming, programming, staffing, and activism efforts, Marine and Nicolazzo illustrate how trans* identities can often be erased under the broader umbrella of the LGBTQ+ moniker. Programming in inclusive spaces, they found, often only sought to educate people about trans* identities rather than providing resources to address the needs of trans* people (Marine & Nicolazzo, 2014). As a result, LGBTQ+-inclusive spaces that they explored did not fully provide trans* and gender-nonconforming people the resources and support they needed. This work opens the door to investigating inclusive spaces in higher education through a critical theoretical perspective that integrates queer theory and oppositional lenses.

As communities of practice, inclusive spaces function as locales for marginalized people to congregate, share knowledge and resources, and exist in a space separate from the proverbial outside world. Having inclusive spaces on campus pose significant benefits for students, as they can promote students’ sense of identity and serve as potential sites for activism and resistance. However, the goals and focuses of inclusive spaces are complicated by both structural elements that may erase certain populations and, more importantly, the personal and cultural knowledges that students bring to the space, which we turn to next.

**Cultural Scripts**

As spaces that students inhabit and build communities of practice in, inclusive spaces exist at the intersection of all the cultures and experiences that students bring to it, and new cultures unique to each inclusive space develop in the context of the space itself and the students and staff who inhabit it. Anthropologists have termed this construction of space and culture “cultural space” (see e.g. Rooke, 2007; St. Clair & Williams, 2008). According to Rooke (2007) in her exploration of lesbian cultural spaces and cities, cultural spaces can embody both heteronormative and homonormative values, and the routines and practices of people inhabiting such spaces exhibit broader cultural processes, for “it is in the space of the everyday and daily practices that we negotiate and celebrate [the space] on a human scale, simply going about our daily business” (p. 233).

Within these cultural spaces are embedded cultural scripts about LGBTQ+ culture and university culture. The notion of a social script has been widely used in sociology and gender and sexuality research to describe the unwritten patterns of human behavior and ways of acting that occur in a given situation or context (Goffman, 1959). Social scripts are intimately related to the spaces that they exist in and the people who exist in that space, and as such, social script theory has been used to explore race, gender, and sexuality in various sociological contexts (see e.g. Gagnon & Simon, 1973; Spector-Mersel, 2006; Molina, 2013). In sociology, gender studies, and sexuality studies, social scripts have been leveraged to describe ways in which interactions and social processes at the individual level exemplify and reproduce cultural ideas and values about marginalized groups at the societal level and vice versa.
Cultural scripts broaden the scope of social scripts to patterns of interaction within cultural spaces. For this paper, we define cultural scripts as the set of cultural norms, values, and practices that produce meaning, frame behavior, and structure interactions at an individual level within a confined or situational space or context. Within each cultural space, various cultural scripts can dominate people’s interactions with one another and set expectations for how people should interact with others in the same space. In the next paragraphs, we highlight some examples of cultural scripts in the engineering education space and connect cultural scripts to engineering students’ sense of belonging and identity.

Many scholars have begun to investigate how dominant cultural scripts in engineering education have marginalized underrepresented populations, leading to what scholars currently call a chilly climate (Flam, 1991; Collins, Bayer, & Hirschfeld, 1996; Walton, Logel, Peach, Spencer, & Zanna, 2015; Pascarella, Whitt, Edison, Nora, & Hagedorn, 1997). Among the many effects of the chilly climate for minority students are include lower retention rates, a weaker sense of engineering identity, a decrease in self-esteem, a decrease in sense of belonging, and a significant amount of identity work. The chilly climate has been observed to impact LGBTQ+ engineering students as well: a culture of heteronormativity in engineering and silence around LGBTQ+ issues pervades the engineering education space (Cech & Waidzunas, 2011; Hughes, 2017).

From the lens of cultural scripts, the engineering chilly climate can be present in student interactions between faculty, staff, other students, professionals, and institutions that they may encounter in their daily lives. For example, one element of engineering culture is the techno-social dualism, described by Faulkner (2007) and expounded upon later by Cech (2014). The techno-social dualism is the notion that engineers draw clear delineations between the nature of their technical work and the nature of their social interactions. As Faulkner notes, this perception of engineering discounts the fact that engineering is inherently both a technical and social endeavor – but nonetheless, the perception is prevalent among engineering professionals (Faulkner, 2007). When mapped onto a space such as a classroom or professor’s office hours or student group project meeting, the techno-social dualism may cause conversations and discourse to center around technical issues instead of social issues such as ethics, diversity/inclusion, and mental health as an engineering student. These forms of discourse lead to what Cech (2014) calls the culture of disengagement, where she finds that engineering students are less concerned with public welfare issues as they get socialized to the profession. This is not to say that the cultural script of primarily centering discourse around technical issues in engineering spaces dictates the kinds of conversations that people have in engineering spaces; instead the cultural script of technical interactional discourse speaks to the broader theme of the techno-social dualism in engineering.

Cultural scripts make a significant impact on engineering students’ engineering identity and sense of belonging in engineering. Tonso (2006) notes how engineering students’ identity practices are shaped by the cultural knowledges and scripts in engineering. She characterizes several types of engineering student at the engineering school she studied, delineating a hierarchy of identities that had associated with them specific behaviors and actions. For example, the “computer-nerds… ‘don’t have a social life; they don’t interact with people’”, whereas the “technogeeks are not considered social outcasts, but they are thought of as people who ‘know all the facts about anything’” (p. 285, emphasis original). Tonso notes that
“among engineering students, campus engineer identities that incorporated ‘nerd’ regulated within-group behaviors. Student engineers gave their colleagues not-so-subtle feedback on their behaviors by reference to less-than-desirable identity terms. Whenever a student made a bonehead mistake, colleagues said, ‘You nerd,’ implying his skill was suspect” (p. 285).

In Tonso’s work, cultural scripts play a significant role in the “regulation of within-group behaviors” that she found. Students in her work enacted and leveraged cultural scripts of intelligence in engineering to police the performance of student engineering identity. Tonso continues to characterize the cultural space of engineering as students’ “figured worlds,” where students choose a path they want to take given the cultural scripts that the school engineering culture provided and use the cultural scripts the perceive to understand and integrate themselves into the engineering cultural space around them.

For LGBTQ+ engineering students, cultural scripts in engineering may lead to experiences of marginalization and a lower sense of belonging. As Cech and Waidzunas (2011), Hughes (2017), and others have illustrated, the engineering cultural space has been marked by heteronormativity and silence around LGBTQ+ issues. Cech and Waidzunas (2011) note that “there is a clear sense that taking sexual identity issues out of the realm of discussion does not create a safe, welcoming environment. Instead, by making sexual equality an irrelevant topic of conversation, discussions of power, discrimination, and hostility are also considered irrelevant” (p. 11).

The cultural script of avoiding or skirting around topics of sexual identity in conversation is one element of broader cultural forces that alienate LGBTQ+ engineering students from their engineering classmates. Furthermore, the cultural scripts enacted by other engineers leads to a constant “environmental surveillance” where LGBTQ+ engineering students observe others for any signs of hostility (Hughes, 2017, p. 394). These scripts are tied to engineering culture’s depictions of hegemonic masculinity and homophobia: as Hughes states, “expressions of masculinity in the culture and climate of the engineering school informed students’ perceptions of the risks of being open about their sexual orientation with their peers…due to the ways their peers’ expressions of masculinity were homophobic or heterosexist” (2017, p. 396). Cultural scripts of heterosexism and masculinity in engineering led to significant discomfort for the gay men Hughes studied – while they felt a strong sense of belonging in the engineering community, the belonging was mediated by the experiences of silence and heterosexism in their engineering spaces.

The effects of cultural scripts on LGBTQ+ engineering students allows for the introduction of new modes of understanding identity and marginalization through the lens of queer theory and intersectionality. In the next section, we describe how the core tenets of queer theory and intersectionality can lend to a unique framework to understanding the experiences of LGBTQ+ (and other marginalized) engineering students.

*The Outsider Within, Intersectionality, and Queer Theory*

LGBTQ+ engineering students bring a unique perspective to inclusive spaces due to their experiences as both LGBTQ+ and engineering students. Existing at the edge of engineering culture, they have a position as an outsider within engineering, living in the in-between, liminal,
non-conforming, outside-of-the-boxes spaces that engineering tends to overlook. As a result, their experiences are colored by both their experiences of their LGBTQ+, engineering, and other (potentially marginalized) identities. Queer theory brings a unique set of perspectives, tools and constructs to critically analyze the experiences of LGBTQ+ engineering students, such as intersectionality and identity. Queer theory also opens the possibility for radical perspectives on queer community-building, which can be leveraged to reconceptualize inclusive spaces.

The outsider-within perspective, first coined by Collins (1986), describes how marginalized outsiders approach dominant cultural scripts in professional communities of practice. The outsider-within perspective situates a certain population as outsiders in a (physical, theoretical, or other form of) cultural space where a dominant group defines the primary mode of thinking. Collins builds the outsider-within perspective around black feminist work in relation to her contemporary modes of sociological thought, writing that “Black women’s experiences highlight the tension experienced by any group of less powerful outsiders encountering the paradigmatic thought of a more powerful insider community” (1986, p. S29). However, instead of critiquing the current system, Collins goes on to argue that the outsider-within perspective, when brought together with dominant modes of thinking, can create radical spaces of understanding that embrace the potentiality of the outsider experience. Collins states, with respect to black feminist thought and sociology, that

“[i]n contrast to in approaches that require submerging these [Black feminist] dimensions of self in the process of becoming an allegedly unbiased, objective social scientist, outsiders within bring these ways of knowing back into [sociology]. At its best, outsider within status seems to offer its occupants a powerful balance between the strengths of their sociological training and the offerings of their personal and cultural experiences” (1986, p. S29).

Collins alludes to the ability for outsiders within to transform the dominant modes of thinking inside the insider spaces and suggests that outsiders within are uniquely positioned to contribute to the creation of more inclusive (in her case, theoretical) spaces.

The outsider-within perspective can readily be applied to LGBTQ+ engineering students, as they often approach the dominant modes of engineering with a unique position to critique the traditional engineering establishment. This unique position is a result of the intersection of their multiple identities, often called intersectionality. Intersectionality, while often discussed in queer theory in the context of race, gender, sexuality, age, disability, and other attributes of a person, can be and implicitly have been also extended to include professional identities, largely through the perspective of multiple identity theory (Patrick & Borrego, 2016; Tate & Linn, 2005; Tonso, 2014). Both multiple identity theory and intersectionality acknowledge the multiplicity of identity and the dependence of identity on sociocultural contexts; however, intersectionality reorients identity toward the unique experiences that result as a product of both personal identities and professional identities. In other words, intersectionality allows the inclusion of professional identities into the construct of identity itself, acknowledging that professional life and work are crucial components of a person’s identity (Tate & Linn, 2005; Patrick & Borrego, 2016). This maybe not-so-radical notion of identity is expounded by Cohen (1997), a queer intersectionality theorist, as a new way to conceive institutional and political change: “The reconceptualization of not only of the content of identity categories, but the intersectional nature of the identities themselves, must become part of our political practice” (p. 481). Intersectionality
also opens the door to the inclusion of other and multiple marginalized identities within an analysis of one particular identity: LGBTQ+ engineering students have other identities such as race and ethnicity that color their own experiences of their LGBTQ+ identities in engineering, which must be acknowledged in both research and the implementation of policies and programs to assist them.

Both the outsider-within perspective and intersectionality are necessary to fully consider the position of LGBTQ+ engineering students in engineering and inclusive spaces. One illustrative example of how the outsider-within perspective and intersectionality interact to create a powerful technique for analyzing the unique experiences of people with multiple marginalized identities is given in Alimahomed’s (2010) work on queer women of color. Alimahomed notes how queer women of color have historically been excluded from both feminist movements and LGBTQ+ movements: feminist movements before the 1960s did not recognize the significance of race in women’s experiences, and LGBTQ+ movements were often whitewashed and male-dominated. As a result, queer women of color are outsiders within these groups due to their intersectional identities. Yet this position affords them a political intransigency that creates generative spaces for new mechanisms of resistance unique to queer women of color: the queer women of color in Alimahomed’s work eventually began producing a zine (self-published, self-distributed magazines) devoted to their experiences as queer women of color. From a theoretical approach, Alimahomed draws on Collins’ theory to analyze the experiences of queer women of color, concluding that the position of the outsider within can lead to differential oppositional consciousnesses (Sandoval, 2004 as cited in Alimahomed, 2010) that resist the dominant narratives of the exclusive inclusive spaces. Being excluded from both feminist and LGBTQ+ spaces enabled the creation of new forms of inclusive spaces that did include queer women of color for these women.

A key point Alimahomed notes in her discussion of queer women of color’s exclusion from LGBTQ+ movements is the notion of a gay “measurability”:

“The measurability of being gay is projected as a continuum in which one is more authentically gay if one is a highly visible subject and displays shared characteristics that are presumably an outgrowth of one’s gay identity. However, one is ‘less authentically gay or even a “self-denying gay” if he is closeted, invisible, or shows few auxiliary characteristics associated with gayness’ (Brekhaus, 2003, p. 12, as cited in Alimahomed, 2010). An underlying social logic privileges those people who are able to project gay as their master status as the authentic queer” (Alimahomed, 2010, p. 153).

Alimahomed draws on several ideas to describe the exclusion of queer women of color: maleness, homonormativity, and projection of gay identity. The LGBTQ+ movement has indeed been traditionally male-centered; however, not so clear is the rise of a “certain kind of gay” (termed homonormativity by queer scholars) that is predicated upon visibility. As Alimahomed cites from Brekhus, visibility becomes a cornerstone of the queer identity, allowing privilege to be assigned to those who are open about their identities. In other words, dominant cultural scripts of coming out, being proud, going to pride parades and events, and resisting conformity lived in the cultural spaces in which LGBTQ+ movements were housed, resulting in the exclusion of those who did not necessarily subscribe to the narrative of visibility. Homonormativity in LGBTQ+-inclusive spaces is a prime example of how cultural scripts in inclusive spaces can result in the exclusion of others.
Methods

Nine LGBTQ+-identifying undergraduate electrical engineering students attended one of four semi-structured focus groups during spring 2019 at a large public flagship university in the southeastern United States. Focus groups were chosen as the primary qualitative research method, as opposed to interviews. This choice was made because focus groups offer the ability for study participants to connect with other LGBTQ+ engineering students, thereby providing an opportunity for students to foster community within the LGBTQ+ engineering student population. Participants were recruited through an initial survey of general well-being administered to about 1500 students in the electrical engineering department of the host university, on which students were asked to identify as non-LGBTQ+ or LGBTQ+. The participants were not compensated for participating in this study. One of the authors [JY] facilitated the focus groups with the participants. At the beginning of the focus groups, the facilitator read a statement that prompted the participants to consider their multiple identities, including racial identity, gender identity, religious identity, etc.

The focus groups were transcribed and coded by one author [JY] in two iterations by applying a grounded theory methodology. First, inductive and deductive codes from the transcripts were generated through an open coding technique. Second, after the codes were refined, axial codes were generated, and the transcripts were re-coded. To ensure reliability and validity, the lead author created research memos as reflective writing tools throughout the process. After each iteration of coding and writing memos, all authors discussed the codes to ensure the reliability and validity of the coding scheme.

From the data, we selected two participants, Parker and Jordan, to be the foci of this paper. Parker and Jordan were chosen because they elicited their experiences at the intersection of several marginalized identities in greater detail than any other participant. In the following paragraphs, quotes indicate direct statements from the participants.

Positionality

As a gay cisgender Asian man and an undergraduate electrical engineering student in the same school as the study population, I [JY] leveraged my position in the department in various ways throughout the focus group facilitation and coding/analysis process. My position enabled me to understand specific references to courses, professors, events, school programming, student organizations, policies, and politics that the focus group participants mentioned in the focus groups. This insider knowledge also gave me personal insight into and allowed me to identify with the specific cultural scripts, cultures, languages, and behaviors within engineering that focus group participants mentioned or alluded to. As a result, during the focus groups, I was able to establish a rapport with the participants and ask about specific experiences they had and probe their responses in significantly more depth, and during the analysis, I drew on this knowledge to refine my analysis and conclusions.

Results

Parker, a fourth-year electrical engineering student, identified as a non-binary, straight, Malayali person who uses he/him pronouns. In his experiences, he highlighted how he felt significantly excluded in both engineering and non-engineering spaces, including spaces intended to embrace inclusion, due to cultural scripts that he felt he could not subscribe to.
Jordan, a third-year electrical engineering student, identified as a queer, pansexual, cisgender woman using she/her pronouns. In her experiences, she mentioned how she felt she needed to showcase a certain marginalized identity to exist in certain spaces intended for certain marginalized people. We present each student’s experiences separately in the following sections.

Parker

Parker was an extremely active member in both engineering-related and non-engineering-related on-campus activities. Splitting his time between engineering, leading several large student organizations, and many other activities, Parker had several firsthand accounts of the different cultures that inhabited the different spaces at the university. To Parker, the culture of engineering was extremely “competitive,” “cutthroat,” “judgy”, and “overwhelmingly hypermasculine”:

“A lot of people, mainly men, would oftentimes ask...challenging questions that they thought would show the professor their intelligence. And I feel like a lot of times in classes that I've taken that's kind of been, especially in the first few semesters where everybody's kind of trying to show how smart they are to other people and prove themselves as intelligent human beings, I guess. I felt a lot of, what you said, a lot of competition to succeed and it was kind of cutthroat.”

This hypermasculinity is amplified in spaces specifically for engineering students, something he observed when the electrical and computer engineering department was relocated into a central building. The central building was a new building commissioned by the university to house the electrical and computer engineering department. The department faculty and staff were relocated to various parts of the university while construction was completed, then moved back in when the building opened to the public for classes in Fall 2017. Parker notes that

“in some cases, hypermasculinity to me has made me uncomfortable being an ECE student here at, in like the building even…. I think the fact that we have a centralized building now, kind of changes the culture a little bit. It kind of provides a centralized location for people to disseminate ideas and thoughts and also, I guess bad, competitive stigmas. It makes it easier for those to concentrate. And so I think before we had this building, I thought I felt, oddly enough, more an ECE student and more like I belonged than after we got this building.”

Such a culture made Parker distinctly uncomfortable and led to his decreased sense of belonging, especially since he had come into the school with no prior engineering experience and felt that he could not prove himself or legitimize his existence in the engineering space. The pressures of needing to prove himself led to his imposter syndrome:

“For me, I did not know anything about coding before I came here really. I had to take high school classes in physics and circuits a little bit, but like compared to everybody else, I felt like I was an idiot for like the first three years of college. Right? And I still kind of feel like that like imposter syndrome is real.”

The competitive culture of engineering framed much of his negative experiences as an engineering student. Existing in the engineering space meant that he was often imbued with dominant cultural scripts related to being successful or portraying a successful image to be accepted by the community, such as asking questions to demonstrate knowledge rather than
understand content. These dominant cultural scripts often highlighted competitiveness, success, and hypermasculinity, which he did not – and in some ways, could not – subscribe to. As a result, he developed an imposter syndrome that he carried throughout his time at the engineering school.

For Parker, his experiences in the on-campus multicultural engagement center (MEC) stood in direct contrast to his experiences in engineering. Whereas the dominant cultural script in engineering spaces was to be overly competitive, cutthroat, and hypermasculine, to Parker, the MEC was “the complete opposite and everybody, almost everybody was LGBTQ+, almost everybody, and almost everybody was a person of color.” Describing the inclusive space of the MEC, Parker states that

“They kind of would form their own culture as you naturally would. It got to-It felt like I was not conforming enough to be there, but here I was too nonconforming to feel comfortable here. It's weird because in those spaces where everybody is out, everybody is proud of who they are and what new identities they have, you don't have to think about it too much, but I felt like I have thought about it a lot.”

The diversity that Parker saw in the MEC was so radically different from engineering that

“I felt like I wasn't nonconforming enough … because everybody else was so comfortable and so, I guess, they had so much of their own culture and I wasn't there enough to always do that with them because I was like kind of really busy with engineering classes like all the time.”

As both an LGBTQ+ and engineering student, Parker’s restrictions on his ability to engage in the culture of the MEC due to his engineering commitments created a barrier to being fully engaged in the MEC culture. However, being immersed in the culture was not necessarily something that he felt he could have done in the first place:

“…sometimes I feel like I'm in this gray area where it's like I'm not so different from I guess, like if you look at me walking down the street, I'm not going to look any different from any other person that you would consider normal in the sense of you're being straight and like non-binary or whatever.

They [the people in the MEC] were very comfortable to be themselves and they were very comfortable to make so many cultural references in pop culture, references that I just did not understand and did not identify with. And it made me feel like I, like I said, just wasn't good enough to be able to access those things or not out there enough.”

The cultural scripts surrounding deviance and non-conformity in the MEC became a significant barrier for Parker because he felt that he didn’t have the appropriate cultural knowledges to fully engage with the people who inhabited the MEC. As he states, many of the cultural references that people in the MEC would make would be things that he could not relate to and therefore did not identify with. From Parker’s account, the dominant cultural scripts of the MEC meant that Parker needed to subscribe to certain “niche cultural things” such as “Beyonce or makeup” to be able to feel like he belonged in the space, which felt alienating to him.

Parker’s accounts of his inhabited spaces led to his expression that he was at the center of an internal “tug-of-war” between the extremely heteronormative, meritocratic, stifling culture of
engineering and the extremely open, deviant, non-conforming culture of the MEC. He describes the tug-of-war as “not conforming enough to be [in engineering], but here I was too nonconforming to feel comfortable [in the MEC].” Each space had its own specific form of rituals and humor, and each culture carried certain expectations to which he felt pressure to conform to legitimize his existence in that space. As he states,

“if you say something outside of the norm, it's very easy for people to identify you as somebody that's not part of the group…. Because there's clearly a difference between making a reference to Beyonce or making a reference to makeup or whatever it is, and making a reference to memes or, something like Subtle Asian Traits on Facebook or something like that. Various, very, very niche cultural things.

And so it's always kind of this weird tug of war. Like I said, a weird in-between, between being not conforming enough and too nonconforming.”

Parker perceived that each culture was so concentrated and so antithetical to the other that he simply did not belong in either. Parker’s feelings of isolation in both spaces showcase how both the engineering building and the inclusive space of the MEC, in supporting marginalized identities, contained an environment predicated upon knowing certain cultural references and specific cultural knowledges to be truly included in the space – without those knowledges, Parker felt marginalized in spaces intended to be welcoming to him.

Jordan

Jordan described her overall experience in engineering as “overall net neutral,” where the engineering component of her experience (e.g. classes) was negative but the relationships and connections she made while in engineering was positive. She states that

“I think the engineering perspective has been kind of negative, just because classes are so stressful, and my first year was very rough. I had a lot of faculty that were not very nice, and it was a lot of weed-out courses that were very awful. But I think that really is what a lot of people get out of college is the positive experience of meeting people who are like-minded and accepting, especially with regards to sexuality and orientation and those identities.”

Jordan was heavily involved in on-campus student organizations, participating in various diversity-centered engineering student organizations such as Society of Women Engineers (SWE), Society of Hispanic Professional Engineers (SHPE), and Women in Electrical and Computer Engineering (WECE). These student organizations are also designed to be inclusive spaces for certain marginalized populations, providing spaces for marginalized peoples to build community around their identities. For Jordan, student organizations were one of her ways of embracing her identities, including her LGBTQ+ identity, and meeting others who have similar identities:

“I didn't really have the opportunity to be out and comfortable with it until I got here, more or less. So, I get really excited when I'm able to go to like oSTEM or any other sort of rainbow activities, right, because I never had that opportunity. My middle school and high school experience was very conservative, and it was not a good environment, not very conducive to being out and proud of it.”
However, as a queer Hispanic woman in STEM, she often still felt incomplete when she participated in these organizations, since

“it certainly feels like at certain times you have to prioritize an identity. Like, I primarily, I suppose, I'm a woman in engineering, and then after that, probably, Hispanic in engineering. Especially that ties in a lot to the groups that I go to, right. If I go to WECE regularly then I don't go to SHPE that much, and so that does that mean I prioritize being a woman or do I prioritize being Mexican? So, it's definitely something that I'm aware of, but, at the same time, those groups are made to support certain identities. And if I identify as all of them then if I go to a WECE thing it's not really, I feel like, it's not really the time to talk about my experience as a Latina or whatever. And I try to focus on at least those sort of identities at those certain groups, since I think that's really what they're looking for, right, is that sort of representation of that minority at that certain time.”

This description of Jordan’s internal identity conflict is particularly poignant because it contains a significant critique of the predominant student organization structure on the grounds of her intersectional identities and lived experiences. Jordan describes how, being at the intersection of multiple marginalized identities, she had to prioritize certain identities when she utilized the inclusive spaces given by the student organizations, to the point where she ranked them based on her perception of her own identity. If she chose to participate in one organization, then her decision may force her to not participate in another organization, and that choice, from her perspective, reflected an internal referendum on her own identities. Furthermore, while inhabiting these inclusive spaces, Jordan felt that she could not talk about her other identities for fear of detracting from the power of the space itself, noting for example that “it’s not really the time to talk about my experience as a Latina” at a women-centered organization. After all, “those groups are made to support certain identities,” but may overlook the uniquely intersectional experiences of those who have other marginalized identities in addition to the identity the group supports.

After discussing her experiences with diversity-oriented student organizations, Jordan noted the absence of an LGBTQ+-specific student organization in engineering. She states that

“I do wish there was some sort of community because it's hard to have that conversation and to try to consciously ... Consciously surrounding yourself with people who are supportive is not very hard, but it's very different to speak with an ally than it is to speak with somebody who shares your identity. And I know, it's ... I don't, to some extent, I don't want to be the person who is like, "Hey, that's offensive," right. But if ... But being able to share these experiences I think ... Part of the nice thing about college is being able to find people who you vibe with.

I've gone to a lot of WECE events and SHPE events, and I've made a lot of friends through those who have shared my experiences, and not really having that from the queer identity is such a loss.”

Jordan notes that diversity-oriented student organizations were her primary way of building a supportive network and community of people, regardless of whether they focused on one singular identity or not. Surrounding herself with people who shared similar identities with her – not just supported her – was crucial in her engineering experience because they alone had the unique perspective into the challenges that she faced. Attending diversity-oriented student
organizations was a necessity for her to build her support network because engineering was an impersonal field, one in which she never really had positive experiences in academically:

“I think it's hard to foster a sense of community in this field because I think engineering, at times, feels very impersonal. And, it's hard especially when you have classes that are so massive, and I see people in my class who apparently I was in [freshman class] with and never realized, right. So I think it's hard to feel ... To what degree do you want to artificially manufacture community, and to what degree should it just develop on its own.”

Jordan notes that engineering culture in and of itself did not come with a natural community for her, and the artificially manufactured communities of the diversity-oriented student orgs – with their flaws and imperfections – were still important venues in which she found the sense of belonging that she did not get from the engineering environment natively.

For Jordan, a queer Hispanic woman engineering student, student organizations that provide inclusive spaces for marginalized groups were her way of connecting and networking with other people who shared some of her identities and were the primary positive experiences of her engineering experience, as opposed to academics. However, the predominant cultural script in these student organizations was to focus on one identity without including other identities that contribute to the lived experiences of the participants. As a result, for Jordan, participating in diversity-focused engineering student organizations came at the cost of having to pick and choose which identities she wanted to forefront in those spaces. Due to her multiple identities, she was forced to prioritize certain identities whenever she could not participate fully in all the organizations pertaining to her identities. As a result, her prioritizing forced her to constantly question and evaluate her identities as it pertained to how she saw herself. While the student organizations she attended were spaces that were inclusive and she felt included in, what she missed was an inclusive space in which she could embrace all of her identities without needing to highlight one at the expense of another.

Parker and Jordan

In both Parker’s and Jordan’s experiences, the culture of inclusive spaces placed implicit cultural restrictions on their multiple identities. For Parker, the electrical engineering building concentrated the hypermasculine and competitive engineering culture to where he felt that he had to constantly conform to the standards of success defined by the culture, and the multicultural engagement center relied on cultural knowledges of non-conformity that he was not aware of or comfortable with, ultimately leading to his lack of sense of belonging in either space. For Jordan, to participate in diversity-centered student organizations, she had to prioritize certain identities of her multiple intersectional identities over others, creating an environment where her choices to participate in certain organizations became, in her eyes, a reflection of which identities she valued more. These experiences showcase how specific cultural scripts in inclusive spaces can pose a barrier for inclusive spaces to achieve their goals of providing community and safe spaces for everyone who utilize them, especially for people with multiple marginalized identities.

Discussion

The experiences of Parker and Jordan highlight several key notions about inclusive spaces and their cultures that provide starting points toward envisioning new forms of both more
inclusive engineering spaces and university spaces. Inclusive spaces are interesting locales for significant research on diversity and inclusion in engineering because they are physical spaces in which marginalized students in engineering come together to create a community of practice. However, one must recognize that inclusive spaces can value or contain certain dominant cultural scripts that can potentially treat engineering students with multiple marginalized identities as outsiders within the communities they inhabit. As a result, these engineering students tend to have a lower sense of belonging in both engineering spaces and inclusive spaces.

As both physical and organizational spaces where marginalized students inhabit, inclusive spaces can develop and foster unique communities of practice that intend to support marginalized communities (Lave & Wenger, 1991; Wenger, 1998, 2000). Within these spaces often arises a set of cultural scripts that are emblematic of the culture of the inclusive space – the cultural scripts within spaces defined norms by which people felt they were evaluated. In the spaces that Parker and Jordan inhabited, the cultural scripts involved portraying their knowledge or experiences of the niche cultural knowledges that the inclusive space looked for (Roberts, 2001). Beyoncé, makeup, and other elements of queer or “non-conforming” culture were key components of the MEC, and the people who inhabited the space reinforced the scripts of deviance and nonconformity by sharing elements of that culture in interactions and conversations with others. By joining in and sharing these cultural knowledges, the people in the MEC participated in a community of practice surrounding the legitimization of queer and non-conforming identities. In this community of practice predicated on embracing one’s non-conformity, Parker, as a straight-presenting and cis-presenting person, felt that he conformed too closely to the societal definitions of normalcy to subscribe to the cultural scripts of deviance inhabiting the MEC.

Similarly, common experiences surrounding a shared singular identity, such as being a woman or Hispanic in engineering, drive the development of student organizations, creating communities of practice in which members of the marginalized identity could exchange narratives, experiences, and resources with other engineering students sharing the same marginalized identity. These spaces create sites for minority students to talk to someone with a shared identity and establish a community in a culture that largely overlooks them (Pittman, 1994). Diversity-oriented student organizations, by singling out particular identities, craft specific cultural scripts in their spaces focusing on the experience of one single marginalized group instead of the whole. For Jordan and other students with multiple marginalized identities, these cultural scripts meant that talking about one identity at one time in one place – in contrast to all of one’s marginalized identities.

Students with multiple marginalized identities, like Parker and Jordan, use a variety of tactics to work within these inclusive spaces that may not necessarily be fully welcoming to them, such as compartmentalizing identities to certain spaces or aspects of their lives and prioritizing certain identities within inclusive spaces. Cech and Waidzunas (2011) describe compartmentalization as a form of identity work whereby LGBTQ+ engineering students will “maintain boundaries between their engineering work and social lives” (p. 17), changing how they act and behave based on the certain specific spaces, times, situations, and contexts that they inhabit. Parker in particular noted this distinction in which the stark disparities in the cultural scripts of the spaces he inhabited necessitated compartmentalization – in the engineering space, he felt that he had to cultivate an image of success and normality to be accepted by engineering culture and could not be completely open about his identities lest he be devalued as an engineer,
and in the inclusive space of the MEC, he felt that he had to highlight his deviance in lieu of his engineering background. These concentrations of cultures led to living a compartmentalized life as he transitioned between one space and the other. As Cech and Waidzunas (2011) note, compartmentalization takes a significant toll on LGBTQ+ students, causing them to take on significantly more emotional labor than their straight counterparts – some students find it a sacrifice for their identity. Parker feels the same way, wishing that "across the board there was just a feeling of acceptance in all spaces because it shouldn't be that you have to go to certain parts of the university to feel like you can be a certain kind of person…. But obviously, that's not the case because of our history and so many things that have happened in the past. But I do think that if we were ever able to get to a position of wider acceptance for LGBTQ+ people, and just overall identities that stray from the norm, … if that was acceptable, and appreciated, and loved in all environments and settings and contexts, I feel like that would solve a lot of problems about feeling excluded.”

While Cech and Waidzunas (2011) paint compartmentalization as a way for LGBTQ+ engineering students to both navigate the heteronormativity in engineering and maintain a (completely separate and, arguably, more comfortable) social life outside of engineering, in this case, compartmentalization became a technique to conform to the cultural scripts within each space. Trapped between a rock and a hard place, Parker compartmentalized his life to ensure that he could navigate both the engineering and non-inclusive inclusive space that was the MEC.

Living the compartmentalized life that Parker lived, however, is significantly more difficult when the inclusive space overlaps with the engineering space, as in the case of Jordan and her diversity-centered student organizations. Instead of compartmentalizing her identities between the different organizations, Jordan prioritized her identities to ensure that her attendance at student organizations reflected her identities. Jordan’s experiences have been mirrored in the work and findings of Alimahomed (2010). In her work, Alimahomed finds that queer women of color exhibit a unique political transiency that is a result of their marginality in spaces that intend to inclusive toward all people of one identity, for example queer spaces, spaces for women empowerment, and spaces for people of color. As queer women of color, they are invisible within intentionally inclusive spaces such as queer or feminist spaces, as dominant cultural scripts within some of them favor people with seemingly single marginalized identity e.g. a white gay man in a queer space, a white straight woman in a feminist space, and a straight man of color in a person-of-color space. This invisibility is both a form of marginality and a form of empowerment, Alimahomed argues, since the queer women of color in her work decided to create a new communal space for them to exist. While Jordan’s marginality is evidenced by her need to prioritize between identities in her selection of which student organizations to attend, her intransigency in the student organization space empowered her to construct support networks and leverage multiple communities of people to make her engineering experience less negative.

Reconceptualizing Inclusive Spaces

While the experiences of Parker and Jordan were explored because they were part of a broader study on the experiences of LGBTQ+ engineering students, their experiences highlighted here open the door to new modes of thinking about the relationships between engineering and non-engineering inclusive spaces and students with multiply marginalized identities as well as potential ways to radically transform inclusive spaces into spaces that are truly inclusive. In this
vein, queer theory offers the potential to radicalize the approach to understanding these students’ experiences via intersectionality and the outsider-within perspective.

Intersectionality envisions a novel approach to identities that encompasses all the identities a person may have and enact, including personal identities and professional engineering identities. While intersectionality may seem deconstructive, it has significant practical implications for both students and inclusive spaces. In the cases of Parker and Jordan, the intersections of their engineering and marginalized identities gave them unique and potentially negative experiences in inclusive spaces whose dominant cultural scripts did not include intersectional identities. Other students with multiple marginalized identities may experience other conflicts and complexities with their engineering and marginalized identities, and those conflicts may map onto the engineering and (non-)inclusive spaces they inhabit. Inclusive spaces must therefore take significant steps to investigate and deconstruct the current cultural scripts that exist in those spaces and “build a political analysis and political strategies around the most marginal in our society … highlighting the intersectionality of one’s race, class, gender, and sexuality” and professional identity, taking care to account for, if not center, engineering students with multiple marginalized identities (Cohen, 1997, p. 480).

Engineering students with multiple marginalized identities also have a unique outsider-within perspective as described by Collins (1986) that is based in part on their intersectional identities: they experience tensions between their own experiences of engineering and dominant cultural scripts of heteronormativity and silence in the field. In inclusive spaces, engineering students who do not understand or cannot fully relate to the dominant scripts, whether because they only encapsulate one part of their identity or other reasons, in those spaces are also outsiders within these spaces. As mentioned above, the outsider-within perspective yields new potential for crafting more inclusive spaces, for they have specific experiences to draw from in commenting on the spaces they inhabit, both engineering and non-engineering; inclusive spaces must utilize, or at the very least, listen to, their voices in designing, creating and maintaining spaces that suit their needs.

How can we reimagine the spaces that Parker and Jordan find themselves in to make them truly inclusive? We offer several suggestions through the lens of co-curricular support (Lee & Matusovich, 2016). First, we should give students primary roles in creating non-identity-specific inclusive spaces and tailoring them to the needs of a diverse student body. After all, inclusive spaces are intended to serve students, and students are ultimately the target population of the space. Students have a different dynamic between each other than with faculty or staff members who may support the creation of inclusive spaces institutionally. Within these spaces, both students and non-student university supporters of inclusive spaces should facilitate conversations surrounding the continued development of the inclusive space with respect to resources and outreach. These conversations should try to include people who come from a diverse set of backgrounds, majors, and perspectives, as everyone who uses the inclusive space likely uses it a little differently from everyone else. Second, we should foster the development of inclusive student organizations and/or programming that specifically focus on celebrating intersectional identities and thereby create (not necessarily physical) spaces in which intersectional identities can flourish. For example, the queer women of color in Alimahomed’s (2010) study created a zine (self-made, self-published magazine) surrounding their identities and experiences as a way of resisting the dominant cultural scripts of their respective identities. Creating programs and spaces for engineering students to embrace all of their identities, not just
their racial, ethnic, gender, sexual, and professional identities, enables new forms of diversity and inclusion in thought and practice that extend beyond a single physical inclusive space. By centering students from a wide diversity of backgrounds in the creation of inclusive spaces and including them in the creation of common inclusive spaces and their own liminal spaces, we can envision radical new ways of transforming physical, cultural, and academic inclusive spaces to embrace all forms of intersectional identities.

In developing new inclusive spaces, we must also consider the many dilemmas and conflicts that may arise as barriers to entry to current existing inclusive spaces (Secules et al., 2019). Secules et al. note several institutional and student barriers that make creating inclusive spaces difficult, including structure, time commitment, funding, and visibility. Structures that determine whether a student is eligible to use a certain space or participate in a certain program or activity, such as cohort model programs, may in effect reduce access to resources to only a certain group of chosen people. Students’ time commitment to cocurricular and extracurricular activities may be limited by their course workloads, especially in engineering settings where labs, homework sets, and other obligations. Funding for the redesign of inclusive spaces may be sparse or unavailable, and hidden costs associated with running various programs may become insurmountable. Visibility and perception issues may arise in how inclusive spaces are advertised and branded on campus, as campus cultural perceptions of the space may influence whether students are encouraged to use it. Whine these are merely some of the difficulties of constructing spaces that engineering students will use to their fullest potential, inclusive spaces, and their associated activities and programming, should strive to create a variety of activities and programs for students to engage in at all levels of commitments.

Conclusion

The experiences of Parker and Jordan illustrate both ways in which inclusive spaces are limited and potential ways for inclusive spaces to take a more intersectional approach to embracing marginalized communities. While not all engineering students with marginalized identities will utilize inclusive spaces, and each experience of inclusive spaces is based on myriads of factors, including personal convictions, we sought to highlight the experiences of engineering students who do use inclusive spaces for their intended uses. By embracing specific marginalized identities and elevating their cultural scripts to the forefront of the spaces, inclusive spaces may isolate those who may identify as part of a marginalized group but not subscribe to or be familiar with all of the group’s cultural scripts. Other students, like Parker and Jordan, may feel like they cannot belong in the inclusive space and therefore cannot fully embrace their identities in the space. Inclusive spaces therefore must create radical new spaces in which engineering students of multiple intersectional identities can feel comfortable, build community and networks, embrace their identities as wholes, and thrive in the world of engineering.

Acknowledgements

We would like to acknowledge the focus group participants their willingness to participate in the focus group. We would also like to acknowledge Maya Denton for her valuable discussions. Finally, we would like to thank the anonymous reviewers who provided valuable feedback in the development of the paper, in particular for their discussions of co-curricular support and practical applications of the work.

References


