

## **Comparing the Narratives of Two LGBTQ+ Undergraduate Engineering Students at a Hispanic Serving Institution**

### **J Garcia, Florida International University**

J Garcia is currently pursuing an electrical engineering degree at Florida International University, graduating in the Spring of 2023. They earned a bioengineering degree at Florida Gulf Coast University in the Spring of 2019. Their research works toward understanding the different experiences LGBTQ+ students in a Hispanic-Serving Institution in order to provide ways to support marginalized identities within the College of Engineering.

### **Malak Elaouinate, Florida International University**

Malak Elaouinate is a Florida International University student studying electrical engineering. Her research aims to investigate the many experiences of LGBTQ+ students at a Hispanic-Serving Institution in order to inform changes within CEC that contribute to students of marginalized identities feeling welcome, comfortable, and accurately represented.

### **Bailey Bond-Trittipo, Florida International University**

Bailey Bond-Trittipo is an engineering and computing education Ph.D. student in the School of Universal Computing, Construction, and Engineering Education (SUCCEED) at Florida International University. Her work centers on understanding how systems of oppression shape the culture of undergraduate engineering education and developing strategies to support engineering students in resisting oppression within institutions of higher education and society more broadly.

### **Dr. Stephen Secules, Florida International University**

Stephen is an Assistant Professor Engineering and Computing Education at Florida International University. He has a prior academic and professional background in engineering, having worked professionally as an acoustical engineer. He has taught a number of courses on engineering and education, including courses on engineering design, systems in society, and learning theories. Stephen's research interests include equity, culture, and the sociocultural dimensions of engineering education.

# Comparing the Narratives of Two LGBTQ+ Undergraduate Engineering Students at a Hispanic Serving Institution

## 1. Introduction

I am hyperaware of the actions that I'm doing... Am I talking too gay? I definitely present myself more in that machismo, not completely, but to the point where they're comfortable with it.

~Alberto

I think that might speak to my experiences as a Black woman and growing up and knowing that stuff like this is always going to happen to us. . . we're always taught to turn the other cheek, water down our back and to just keep moving forward.

~Christina

LGBTQ+ students continue to be underrepresented in undergraduate engineering programs despite decades of diversity, equity, and inclusion initiatives in science, technology, engineering, and mathematics (STEM) education [1]. Prior literature indicates that the underrepresentation of LGBTQ+ students in STEM persists due to the heteronormative culture of engineering [2]. Furthermore, Leyva et al. [3] theorized that queer students of color face oppression in undergraduate STEM programs due to the cis-hetero patriarchal culture of undergraduate STEM education. This dominant and oppressive culture lead LGBTQ+ students to feel pressure to change their behaviors or appearances to fit into engineering contexts and that these students struggle to find a support system within engineering [2], [4]-[5]. However, the experiences of LGBTQ+ engineering students at Hispanic-Serving Institutions (HSIs) are yet to be explored.

This insight, along with the lack of research focused on LGBTQ+ engineering students experiences at HSIs motivated our critical qualitative interview study, which focuses on the stories of two LGBTQ+ engineering students who attend a large HSI in the Southeastern United States. Our focal participants, Alberto and Christina, are both LGBTQ+ and both experience and react to marginalization with forms of self-regulation and self-censorship. For Alberto, the danger of being gay within a hypermasculine Latinx culture is the central throughline of his narrative, while for Christina, being a Black woman in a predominantly white Latinx culture is the more salient experience. This paper showcases their narratives and examines how their experiences are affected by the culture surrounding them. We are motivated to help students like Alberto and Christina, to represent challenges they face, and to provide insight into how HSIs and engineering programs can better support LGBTQ+ engineering students.

## 2. Literature Review

LGBTQ+ students are significantly more likely to experience marginalization in engineering programs compared to non-LGBTQ+ students [6]. Previous studies focused on LGBTQ+ students in STEM have found that this student group face discomfort in heteronormative STEM spaces and feel pressure to “pass” as straight as a way to stay safe and be respected in these settings [2], [7]. For example, LGBTQ+ students may physically present themselves in a certain way or change the way they speak to avoid outing themselves in engineering settings [2], [7].

Additionally, LGBTQ+ engineering students have been found to experience a lack of support and community [4]-[5], [7], which are crucial for college students' success.

Nevertheless, LGBTQ+ identities are not experienced in isolation and the LGBTQ+ community is far from a monolith; intersectionality emphasizes the ways that multiple systems of oppression coincide to create unique experiences [8]. Sexism [9]-[10] and anti-Blackness [11] heavily influence the culture of engineering education, which creates oppressive environments for women and Black students. These oppressive forces have also been found to negatively impact the experiences of Black college students [12] and women [13] at HSIs. These multiple modes of oppression that are present in undergraduate engineering programs further emphasize the importance of understanding LGBTQ+ engineering students' experiences through an intersectional lens.

LGBTQ+ students' intersecting marginalized identities impact how they make sense of their identities in engineering contexts [2]. For example, in their study of lesbian, gay, and bisexual engineering students at a predominantly white institution (PWI), Cech & Waidzunus [2] found that some participants who had minoritized racial/ethnic and/or gender identities placed more emphasis on these identities within their engineering school context. The researchers noted that the two Chicano/a-identifying participants in their study "described race as being an identity around which they could socialize with other Chicano engineers," but also "described strong sentiments against expression of gay identity from this racial/ethnic group that they attribute to the religiosity of the Chicano community" [2, p. 13]. Additionally, higher education research focused on LGBTQ+ Latinx college students more broadly indicates that queer Latinx students, "often experience discrimination within the Latinx community due to their sexual orientation and from the queer community due to their racial or ethnic identity" [14, p. 94]. Considering these findings and the lack of engineering education research focused on LGBTQ+ engineering students' experiences at HSIs, it is important to better understand the experiences of LGBTQ+ engineering students with marginalized identities in HSI and engineering contexts.

### **3. Purpose**

The purpose of this study is to better understand how LGBTQ+ engineering students experience the culture of engineering at an HSI and gather information about how they feel they could be better supported by their professors, peers, or the institution. As such, our research questions are as follows:

- What are the consistent and contrasting stories of two LGBTQ+ engineering students' experiences at an HSI?
- How do two LGBTQ+ engineering students attending an HSI feel they could be better supported?

### **4. Conceptual Framework**

For this study, we utilize draw on the Model of Multiple Dimensions of Identity (MMDI) framework [15] to understand how our participants perceive the salience of different dimensions of their identities as they discuss their experiences of marginalization in engineering. The MMDI illustrates that one's personal identity is composed of multiple layers of intersecting social identities (race, ethnicity, class, gender, sexual orientation, (dis)ability, religion) that are both externally defined by sociocultural conditions and the built environment one is situated within, as

well as internally experienced [15]. As such, the MMDI is intended to capture how one makes sense of their identity at a particular point in time, rather than suggesting that identity is experienced in a heterogenous, constant way across various contexts [15]. Furthermore, though each dimension of one's identity is always present, power and difference influence the ways in which one perceives the salience of, and connections between, each dimension at a given time [15]. For example, a white woman may not view race as a salient component of her identity [15].

Additionally, we apply intersectionality to make sense of our participants' perspectives and experiences. Intersectionality is a critical social theory that can be applied as an analytic tool to interrogate how interconnected power relations of social identities influence the social relations that shape our societies and everyday individual experiences [8]. Collins & Bilge [8] emphasize that power relations across social identities "are not discrete and mutually exclusive entities, but rather build on each other and work together. . . while often invisible, these intersecting power relations affect all aspects of the social world" (p. 1). While the MMDI framework highlights that one *perceives* the salience of their social identities differently across contexts, it is important to recognize that all of our identities inform our lived experiences.

## **5. Methodology**

The following section includes the program and institutional context our study is situated within, our respective researcher positionality statements, the approaches we utilized for our data collection and analysis, and demographic information for the participants whose narratives we share in this paper.

### ***5.1 Program and Institutional Context***

This research study was conducted as part of the Justice, Equity, Diversity, and Inclusion (JEDI) Ambassadors Program at Florida International University, which was launched in Fall 2021 as a collaborative student engagement effort between the Center for Diversity and Student Success (CD-SSEC) and School of Universal Computing, Construction, and Engineering Education (SUCCEED). JEDI employs FIU undergraduate engineering and computing students to design and carry out their own projects focused on equity-centered research, activism, and K-12 outreach within the College of Engineering and Computing (CEC) and the local South Florida community. The first two authors of this paper, Garcia and Elaouinate, joined the program in Fall 2021 as part of the first cohort of JEDI ambassadors. Secules serves as the faculty mentor for the program, and Bond-Trittipo is the primary mentor for the student research groups.

FIU is a large HSI in Miami, Florida. As of Spring 2022, the undergraduate enrollment for CEC was nearly 6,500 [16]. This student body is comprised of 66% Hispanic students, 11% Black or African American students, 9% White students, 4% Asian students, and 10% students whose race/ethnicity is categorized "Other" by the institution, which includes students who selected Native American, Pacific Islander, or two or more races, are non-residents, or chose not to report their race/ethnicity [16]. As for gender, institutional data indicates that 79% of CEC students are men and 21% are women [16]. We recognize this reporting is severely limited due to the binary gender categories and the lack of specificity for the racial/ethnic categories.

Engineering programs within CEC are housed in the Engineering Center (EC), which is approximately one mile from FIU main campus. Most required engineering classes are only offered on EC, and engineering-specific student support resources, such as tutoring and career

services, are also located on EC. Because of these factors, engineering students spend most of their time on EC. University-wide student organizations and support resources, such as the Pride Student Union, the Women's Center, and Counseling and Psychological Services, are located on FIU main campus, which may limit engineering students' ability to fully access and engage with these groups and services.

## ***5.2 Positionality***

J Garcia identifies as a Latinx, bisexual, non-binary undergraduate engineering student. They are originally from Guayaquil, Ecuador but migrated to the South Florida at the age of three. Garcia attended Florida Gulf Coast University, where they obtained a Bioengineering degree. Their interest in engineering education research began when they moved back to South Florida to attend FIU to work towards their Electrical Engineering degree. Around this time, they realized that the representation for LGBTQ+ engineers was lacking, and they wanted to know why. Being back in a school environment where they noticed a lack of representation for LGBTQ+ students, they became curious about the toxicity that comes with the Latinx culture and the lack of support for LGBTQ+ engineering students.

Malak Elaouinate is a fourth-year international student at FIU who identifies as a cisgender female. At the age of sixteen, she moved from Morocco to the United States to complete her high school education and later to pursue an electrical engineering undergraduate degree. As she began to integrate more fully into campus life and the engineering center, she realized that her home life, in which she was raised with a single, feminist mother who was the provider in the family, contrasted with the patriarchal nature of the atmosphere at the university. This caused her to experience cultural shock and felt pressured as a woman to suppress parts of herself in engineering spaces. Reflecting on this pattern prompted her desire to push for change to improve the experiences of underrepresented student groups in engineering. She identifies as an ally for LGBTQ+ people, and the lack of emphasis on LGBTQ+ students in the STEM research literature troubled her and motivated her to take part in this research.

Bailey Bond-Trittipo is a third-year engineering education Ph.D. student at FIU. She identifies as a neurodivergent, bisexual cisgender white woman. Her research focuses on employing critical theoretical frameworks and qualitative methodologies to understand how systems of oppression shape the culture of undergraduate engineering education and how engineering students resist oppression within institutions of higher education and society more broadly. These interests and her desire to support undergraduate engineering students in equitably transforming their local environment led Bond-Trittipo to help develop JEDI, the program this research is situated within. As part of her role as a graduate assistant for JEDI, Bond-Trittipo is the primary mentor for all student research projects and a portion of the activism projects.

Stephen Secules is an Assistant Professor at FIU. He identifies as a white gay man and is the organizing mentor for the JEDI Ambassador program that supports Garcia, Elaouinate and Bond-Trittipo in this study.

## ***5.3 Data Collection and Analysis***

The data presented in this paper was collected as part of a larger semi-structured interview study focused on the experiences of women and LGBTQ+ engineering students at FIU. Garcia and Elaouinate designed this study to better understand how engineering students who identify as

women and/or LGBTQ+ experience the culture of CEC and gather in-depth information about how these student groups feel they could be better supported in order to inform future JEDI advocacy projects. In early Spring 2022, CD-SSEC personnel sent out a recruitment email to the CEC undergraduate student body and posted a flyer about the study on CEC’s Instagram story. In total, 14 students who fit our criteria (CEC undergraduate student, identifies as a woman and/or LGBTQ+) filled out the form and indicated they were willing to be contacted to arrange an interview. Bond-Trittipo sent an email to these 14 students to schedule their interview, and ultimately, eight of the fourteen students responded to the interview request email and completed an interview. Garcia and Bond-Trittipo conducted Zoom interviews with the eight participants between mid-February and early-April 2022. Three of the eight participants identified as straight women, two identified as gay men, two identified as lesbian women, and one identified a pansexual non-binary individual.

Consistent with the goals of the project, our semi-structured interview protocol focused on participants’ background that led them to study engineering at FIU, their perceptions of how (un)welcoming their engineering peers and professors are toward women and LGBTQ+ students, the factors they feel shape the culture of CEC, and their ideas about how women and LGBTQ+ students could be better supported in CEC. A semi-structured interview protocol allowed us the flexibility to go more in-depth on the topics participants wanted to speak the most about while maintaining consistency across interviews [17].

Zoom audio recordings were saved then transcribed using a transcription software service, Otter.ai. Garcia and Elaouinate independently conducted open coding for each transcript, which consisted of reading through each transcript and highlighting standout points in the interviews. All four authors then came together to review the results of the open-coding process. During this review, the research team noticed that the five LGBTQ+-identifying participants shared experiences that diverged from those of the three participants who identified as straight women, which led us to narrow our analysis to these five participants. Then, upon further examination of the interview data, the research team realized that two of the five LGBTQ+ participants provided especially in-depth accounts of how their intersecting marginalized identities shaped their experiences as engineering students at FIU, so Garcia and Elaouinate decided to focus their analysis specifically on these two participants. At this point, the research team decided to utilize a narrative approach to present and analyze the data to preserve the rich details the participants shared about their experiences and present their stories in their own words. Using the guidance provided in Kellam et al. [18] on thematic analysis of narrative techniques, Garcia, Elaouinate, and Bond-Trittipo worked together to construct and analyze the narratives of the two participants based on the key stories that were identified in the open-coding process.

#### ***5.4 Participant Table***

The table below (Table 1) includes participants’ pseudonyms and their self-reported sexual orientation, gender, and race/ethnicity.

**Table 1: Participant Information**

<b>Participant Pseudonym</b>	<b>Gender</b>	<b>Sexual Orientation</b>	<b>Race/Ethnicity</b>
Alberto	Cisgender man	Gay	Latinx/Cuban
Christina	Cisgender woman	Lesbian	Black

## 6. Findings and Analysis

In the following subsections, we present the narratives of our two participants and our analysis of their respective narratives. We organize these narratives in parts, so that a comparison between the participants can be made on each sub-section.

### 6.1 Identity and Interaction

#### 6.1.1 Alberto's identity and interactions as a Latinx gay man

For as long as he can remember, Alberto was always interested in STEM. He mentioned that he was the kid that would go around the neighborhood and help with the computers and fix their problems even though it was simple tasks in his opinion (like turning off the Wi-Fi and turning it back on). He became interested in engineering through the STEM courses he took in high school, then the coursework and salary for the profession motivated him to pursue an engineering degree. Since enrolling at FIU, Alberto says he has experienced an environment of toxic masculinity:

Since STEM is such a male-dominated career, it does have a lot of toxic masculinity and I've noticed that throughout my years at FIU. I've had to, more or less, hide my identity sometimes because I'll literally be in study groups and people will outright be homophobic. It's been harder to make friends and find groups that relate to me. . . it's very male-dominated, it's just hard to find my clique. . . . My anxiety takes over, and I hide my identity to feel more comfortable in these spaces.

Based on his experiences, Alberto believes that toxic masculinity is an inherent part of STEM and the culture of the university. We can see that Alberto, a cisgender gay Latinx/Cuban man, feels out of place as an engineering student. Since he is a part of the dominant gender and ethnic groups, one would expect Alberto to “fit in”. However, as someone who identifies as gay, he feels out of place within the cis-hetero patriarchal culture he is situated within, which speaks to how one's intersecting social identities shape their lived experiences.

Alberto has not been able to be out on the engineering campus because of the toxic environment that he is surrounded with. He is not sure how the people around him would perceive him if he were to come out and be himself:

When I go to my classes, my professors don't know that I'm gay, the people in front of me don't know that I'm gay. . . . But considering the fact that a lot of these study groups that I've been in, a lot of these men, mostly men, around me have been kind of homophobic, I don't know. Maybe they would view me differently and not respect me as much. . . How is it that I'm in a study group with you, and five minutes into the study group you're already saying something homophobic? It's like is that your identity? Do you identify as a homophobic man? They're proud of that.

Here, we can see Alberto actively considering the root causes for not being out about his gay identity to his peers and professors. He is cautious, he believes that if he were out, his peers and professors would perceive him differently because of the homophobic remarks he has heard his peer make in the past. Alberto claims that people in the study groups he attends are constantly saying homophobic things, prompting him to ask, "Is that your identity?" Do you identify as a

homophobic man?” This emphasizes how we are surrounded by a male-dominated space, but we do not have to accept homophobia as a core aspect of masculinity; men can be asked to be better.

### *6.1.2 Christina’s identity and interactions as a Black lesbian*

Christina decided to pursue an engineering degree because she always excelled in science and mathematics throughout her K-12 education, and she wanted to follow in the footsteps of several of her family members who are engineers. When asked her perspective on how her social identities impact the way people view her as an engineer, Christina said:

I don't think the lesbian side of it has made people view me differently, but I think the woman side of it has for sure. . . . I [don't] go into a classroom [and] be like, “Hey, guys, I'm gay” when we sit down. But I dress how I feel comfortable. It's just like I exist, [my peers and professors] exist. And it just feels like nobody makes a deal or says anything about it. . . . I've never run into anybody who's like, “You should be with a man. What's wrong with you?” or anything like that, and I haven't run into anybody who's like, “Go gays!”

Here, Christina notes that she dresses how she feels comfortable and implies this may signal to some that she is a lesbian, but she does not feel negatively or positively impacted by this implication.

### *6.1.3 Comparison of Alberto’s and Christina’s identities and interactions*

Being gay/lesbian is an identity which can be “invisible” or not depending on the context [19]. Christina and Alberto have both considered the extent of their sexual orientation identity’s visibility, but in contrasting ways. For Alberto keeping his gay identity invisible is a conscious and active choice, one he may wrestle with, but that he has confirming evidence could be a necessary form of self-defense. Christina thinks many people perhaps perceive her as a lesbian based on how she dresses, but it does not get spoken about explicitly and she does not believe that being a lesbian impacts the way her peers and professors perceive or treat her. Rather, she feels that her gender impacts the way her peers and professors interact with her. Alberto, a Latinx/Cuban-identifying man, does not mention how being white Latinx or a man impacts his experiences, but this is somewhat expected as they are the dominant ethnic and gender groups in the university's engineering college. The interplay of Christina’s intersecting identities and Alberto’s calculation with whether to be out continues to reverberate in their experiences of their university’s marginalizing engineering culture.

## ***6.2 Marginalization by Peers and Professors***

### *6.2.1 Alberto’s experiences with peers’ homophobia*

Alberto talks about the difficulties of being open to people and making friends at FIU because of what he observes from his peers and surroundings. There was one instance where Alberto thought that he had made a new friend group only to then have to confront a group member about saying a homophobic slur:

I confronted her. I was like, “Listen that's not a good word, it's not a joke”. She basically said “Okay, if you're uncomfortable with it, I won't use it around you, but I'm going to keep using it.” And I was like, Okay. Cool. So, I dropped that.



Alberto was not out to friend who made this comment, so he stood up for himself in a way that kept his gay identity concealed. Her casual use of a slur and her lack of concern when she was corrected further confirmed to him the need to stay closeted. Within this same peer group, Alberto had trusted someone enough to come out to them, but that friend did not support him in this instance of experiencing homophobia:

I also had a friend of mine that I had come out to in that same group, and he knew that I was gay, and he was accepting to a certain degree. He was accepting but, in that moment, when I was trying to tell the girl who had said the f-word why it was wrong and why it made me really uncomfortable, he was kind of just sitting there. He wasn't actively engaging in the conversation and trying to support me. Complacency is also a form of violence. That makes me think if I'm in public with him, and someone screams the f-word at me or does a hate crime, would he be there to support me and would he actively help me in that situation?

Alberto feels isolated and alone due to his group member who he had come out to not supporting him when he addressed another group member who said a homophobic slur. In saying, "Complacency is also a form of violence," Alberto makes a powerful statement reframing of the group member's lack of action as, in this context, a form of violent action.

Alberto started college in 2020, when everything was virtual, and he did not communicate with people much. Now with the shift back in person, he is realizing the environment around him:

But now in person it's so clear to me, it's awful. It's awful and it really makes me feel lonely sometimes. I'll be in the library by myself instead of, well recently, because last week, that was the week when I confronted the girl. . . So I stopped hanging out with them and now I've just been by myself and eating lunch by myself and that's really, it gets lonely.

The recent events have exacerbated Alberto's sense of isolation because he feels he cannot rely on those who really know him to stand up for him. We sense that he is caught between connection with a risk of harm, or isolation and self-preservation.

Alberto goes on to discuss how there is "so much toxic masculinity" at his university's engineering campus and expanded in the following quote:

It's difficult because I would love nothing more than to show my friends pictures of my boyfriend, and just be open about myself. . . I shouldn't have to shelter myself, but they don't make it a welcoming environment. . . . I just think genuinely, it's also partially like the Miami culture. You know, FIU is in Miami, and Miami is just filled with homophobia. . . . I've even considered transferring to UCF, because, I don't know, maybe Orlando has like a better demographic or more inclusivity.

Alberto is in a relationship with a man and would love to show off his boyfriend and be open about himself, but he doesn't feel able to. Alberto looks to partially explain FIU's particular culture with by mentioning that Miami is "full of homophobia," and contrasting it that perhaps UCF and Orlando have "a better demographic." As the primary demographic difference between Miami and Orlando is a 73% Latinx/Hispanic population in Miami [20] versus 33% in Orlando [21], we presume Alberto was attributing a level of homophobia to Latinx cultures and/or the specific Latinx culture represented in Miami.

### 6.2.2 Christina's pattern of experiences with sexism and racism

When discussing her journey as an engineering student at FIU, Christina shared that she began her studies as an engineering major in a specific discipline, but she switched to a different discipline after taking the orientation class for her initial engineering major. During her interview, she attributed her major-switching to her struggle to understand the content of the course. However, she also mentioned that the professor for her orientation class created an unwelcoming environment for women, and this experience could have influenced her decision to switch. She described:

I was one of the three girls. And so we were kind of like, you know, girl power. So we formed our own group, because we had a lot of group work. So [there were] all these guys and then us in our little three group. . . and the teacher just hated us. He just hated us. Personally, I feel like it was because we were, you know, all the girls that group together, we didn't branch off, we were our own group. Literally doing assignments, an [all-guy] group would do the exact same thing as us. Exact same thing, he would tell them the exact same thing, they got an A versus we got a B. So you could definitely tell that there was the bias. And we all saw it. And we all knew it in the way that he talked to us treated us. . . . I mean, you know, at the end of the day, we're all here to be engineering students. He made that class horrible.

Here, Christina shares her dissatisfaction with her professor's treatment of her and the other women in the class compared to the men in the class. Despite being given the same instructions and accomplishing the same tasks as the men in the class, she feels that her group of all women received lower scores due to the professor's gender bias.

Unfortunately, when Christina took the orientation class for her current engineering major after switching disciplines, she had another negative experience, this time with her peers:

We didn't get to choose groups. . . . I was in a group with all guys, I was the only girl. And we had to build a bridge. I didn't do anything with the bridge. They didn't let me. Even though, I could definitely tell that our bridge was not structurally sound. We had gaps in the bridge, but my opinion didn't matter. And they just brushed it off. And I was just like, whatever. This is how it's going to be. . . . So, obviously, it's gonna fail, which our bridge did. I was completely right. It failed.

In the quote above, Christina describes a negative experience she had with intra-group marginalization among peers in a small peer group. She also had a negative experience in a subsequent course for her current major when she was the only woman in her project group, demonstrating a persistent pattern of gender bias in Christina's experiences:

And then [in another course], I was also in an all-boys group. And because, I mean, I didn't have to do a lot of the grunt dirty work, which, I'm okay with that. They're like, Oh, you're the only girl. You can be our leader. I was like, okay, whatever. We did a lab with a total station. So you have to-- It tells you how to level it. And the teacher showed us that you, you turn it a certain way so that it's completely straight in, everything matches up, and you twist the things exactly. And the guy was doing it backwards. And I told him, I was like, No, it's this way. This exactly the way that the he showed us. And he was like, No, it's this way. I was just like, well, whatever, just ignored it.

Christina's perspective is once again disregarded by her peers. Taken together these quotes demonstrate a pattern of Christina's marginalization in team dynamics; in one case, she experiences gender bias from her professor, in other cases, she is confronted with gender bias by her peers. Christina synthesizes these experiences in complex ways; she claims she doesn't let the experiences get to her although they linger in her mind, and yet she frames it as a story about her peers and instructor being the problem, not her.

### *6.2.3 Comparison of Alberto's and Christina's marginalizing experiences*

Both participants expressed discomfort with the environment on their engineering campus, which exudes an unwelcoming atmosphere for their identities because of the prominence of hetero-patriarchal norms. Alberto fears being outed or experiencing generalized homophobia, whereas Christina has come to expect unwanted sexist and/or racist interactions. These impressions have resulted from a pattern of negative interactions with their peers, with both participants mentioning instances of discomfort in smaller group settings, in Alberto's study groups and in Christina's within class team settings. By ignoring Christina's concerns and not allowing her to contribute to the hands-on portion of their project, the men in Christina's group treated her in ways that disregard her abilities as an engineering student. In contrast, Alberto, who falls into the dominant gender and ethnic groups within CEC, did not share any accounts of his peers questioning his intellectual abilities. This divergence is consistent with findings discussed in prior literature—Black women in undergraduate engineering programs have faced skepticism about their abilities and “fit” in engineering [22], whereas white men are typically seen as knowledgeable by default and do not have to prove themselves to be seen as engineers [23].

Furthermore, Christina specifically mentioned her professors creating an uneasy environment. Christina expressed that she felt she had been treated differently in her classes due to her gender, citing the example of her all-girl group receiving a B on an assignment while an all-boy group received an A. In contrast, Alberto shared that he has not had any negative experiences with his professors, which he assumes could be due to him passing as straight. Christina, on the other hand, is unable to mask her identity as a woman in the classroom.

## **6.3 Coping Mechanisms**

### *6.3.1 Alberto sheltering himself from homophobic masculinity*

Due to the heteronormative culture he experiences, Alberto is hyperaware of how he comes across:

I am hyperaware of the actions that I'm doing, like I don't know, am I talking too gay or like, you know what I mean. . . . I definitely present myself more in that machismo, not completely, but to the point where they're comfortable with it.

Alberto discusses further how he shelters himself within the engineering campus and says the following:

So it's not really portraying machismo, it's more of just sheltering myself, like [being] quiet, and just saying a few words and probably not expressing myself as I would otherwise if I was in a comfortable environment. . . . And I guess talking in a normal voice, not normal voice but one that is comfortable for them. . . . I guess I'm a little bit more expressive with my hands like otherwise in a safe environment. . . . The code

switching is like sheltering maybe, like my boyfriend told me that I tend to do this thing where my voice will get deeper, and I'll be talking differently in environments where I don't feel the safest. So even he realizes, it's that much of a code switch where he realized that I do code switch.

Alberto frequently uses the word "shelter" to describe his demeanor on the engineering campus. He is hyperaware of his actions to the point where he is constantly concealing his true self from his peers and portraying himself in a way that makes those around him feel at ease, thus conforming to the machismo entrenched in the dominant culture of the university. This demonstrates that he is unsure of how he wants to present himself in a way that is both safe and liberating.

### *6.3.2 Christina's mean mug and keep moving forward*

When asked if she approached either of her professors to tell them about her negative experiences, she responded that she did not, and she shared that she feels that her decision to not address the issues was influenced by her identity as a Black woman:

I never approached [my professors]. I think that might speak to my experiences as a Black woman and growing up and knowing that stuff like this is always going to happen to us, like other stuff. And we're, you know, we're always taught to turn the other cheek, water down our back and to just keep moving forward. So I just took it with a grain of salt. Let it go and kept moving forward.

Although Christina does not express it, one wonders if she is comparing her approach to peers from different identity groups (e.g., white or Latinx women, white men) who she sees as speaking up about issues more frequently.

Christina described that, in general, she tends to keep to herself in her engineering settings:

I think [I] definitely go into classes with a mean mug, kind of like the persona of like, I don't want to associate with you. I don't talk to you leave me alone kind of. But I feel like that that's just how I am in Miami too as a whole too, it could be like a mix of everything. But I feel like I have to wear that mean mug. And to make people not want to talk to me. Because when they talk to me, it can lead to unwanted experiences. Like even at the store, I wear my headphones, and I try to always wear something that says FIU on it so that they know that I don't live here like this. I'm not from around here. Because, you know, the second that [I say] I'm sorry, I only speak English. Eye roll. You know, it's very like that. And, you know, going into a store, and the security guard is watching you like a hawk.

Christina characterizes her attitude at the university as reserved, having a "mean mug" to avoid any interaction. Although Christina does not explicitly mention anti-Blackness, it is implied by her experiences; she appears to be aware of her surroundings and attempts to manage the expectation.

### *6.3.3 Comparison of Alberto's and Christina's coping mechanisms*

Both Christina and Alberto speak with clear cognizance of their coping strategies. Both students' strategies speak to an aspect of silence as a survival mechanism. Alberto's silence is around his identity as gay, and a careful calculation for when and to whom to reveal it. Christina's silence is

about minimizing her interaction with people of all kinds: not bringing up issues with her professors and adopting a mean mug to avoid interactions in the university and Miami at large. Although both Christina and Alberto attribute this to their silence to their particular identities or upbringing as a Black woman and as a gay man respectively, we can see silence also as a shared and parallel coping strategy for people from disparate or overlapping marginalized groups (LGBTQ+, Black women). There is a sense from each student that their strategy for silence is unique and that others around them are not hiding, yet we also see some parallels across these participants. Although we do not know if Alberto and Christina know each other, it also raises the question whether students may not be accurately perceiving the extent to which each other are speaking up or hiding / silencing themselves. Potentially, connecting with and being aware of other LGBTQ+ and marginalized students who have silenced themselves would be a help to both Christina and Alberto.

#### ***6.4 Suggestions for Improving LGBTQ+ Support***

##### *6.4.1 Alberto's desire for greater LGBTQ+ representation and organization*

Alberto does not know anyone who is out within the engineering campus. He says knowing people like him who are willing to fight for him and support him would be nice to have at the engineering campus:

Just knowing that I have people like me, and not even people like me, but people in the LGBTQ+ community or accepting people who are willing to fight for me and who are willing to be there to support me. I would love that, but I have none of that right now. None of it, like it doesn't exist for me.

Alberto felt he couldn't get the support he needed, so the interviewer mentioned Out in STEM (oSTEM), an organization that supports LGBTQ+ people in the STEM community. He had no idea such a club existed at the university.

When asked for ideas on how to better support the LGBTQ+ community at FIU, Alberto could quickly come up with many ideas, as if he had been thinking about it for a long time:

One that came to me immediately is anonymously reporting [things] like homophobia and hate speech and hatred. I don't know if that already exists, but maybe a hotline...Just more things about inclusivity, even [having] posters up can make the environment feel a little bit more safe. Posters promoting oSTEM or just inclusivity just anything give us anything. . . . I've never had a professor be [like] this is a safe space for LGBTQ+, if you want to talk to me [you can], which I feel should be part of every professor's [class], even on their syllabus "Oh, this is a safe space, if you ever have any concerns, just email me."

Alberto emphasized the importance of a safe environment and mentions the student organization oSTEM, after being introduced to it just moments prior to his answer. Unfortunately, oSTEM went dormant shortly after the interview, therefore there was no organization on the engineering campus to provide a space for LGBTQ+ students. Upon completing this interview study, the authors of this paper realized that the lack of identity-based student organizations played a major role in LGBTQ+ students feeling unsupported and decided to pursue getting oSTEM reinstated as a student organization at FIU.

##### *6.4.2 Christina's desire for better representation for Black and LGBTQ+ students*

Christina discussed the engineering college's lack of support and representation for the Black and LGBTQ+ communities, which are both important parts of her identity:

I think there's so many societies and stuff that are like, Venezuelan and Hispanic, and, so it's all very, I mean, listening to the groups, I was like, "Okay, where's the one for like Black women or Black people?" Doesn't exist. Got it. . . [If I could change the College of Engineering], there would be a Society for like Black Engineers, something to-- where I could be with people like me, I mean, there's a lot of groups for people, certain groups of ethnicities. . . There's nothing for me, I think representation is very important. We look on a TV and some Black little girls watching Simone Biles at the Olympics, like that could be me, but there's nothing as a Black individual. For me at EC really, that's kind of what it feels like. And I think that would definitely be something that I would change. I mean, there might not be a lot of us, but anything is better than nothing. Because I feel like there was something that was a part of it, but then it kind of just dismantled, and it was gone. And maybe like a group for LGBT, but honestly, I don't know if there's a lot of us there either. Because, you know, not everybody can just look at and be like, Oh, they're gay, bi, lesbian so...

She proposed developing a Black engineering organization as well as an LGBTQ+ organization at the engineering center to provide a more inclusive environment for these identities. Similarly, Christina is unaware of the National Society for Black Engineers (NSBE), which has had an FIU chapter, but which was also dormant at the time of the interview study. Additionally, Christina shares that more representation will benefit future generations and inspire those who have similar identities to pursue engineering education while embracing their authentic self and feeling welcomed in such a male-dominated environment.

#### *6.4.3. Comparison of Christina's and Alberto's suggestions for change*

The lack of representation has contributed to Alberto and Christina feeling unsupported and unaccounted for as minorities at a "majority minority" universities. Both discussed the need for spaces that support their identities, as well as the need for change in order to showcase more diversity at their engineering center. Christina notices a lack of representation for Black students, whereas Alberto notices a lack of representation for LGBTQ+ students. Both students emphasized the need for student organizations specific to these marginalized identities.

## **7. Discussion**

### ***7.1 Comparison with the Literature on Marginalization in STEM***

Alberto's and Christina's perspective resonated with a number of findings in the literature: smaller group settings are where they notice the most homophobic or sexist comments (as in [2], [7]) and a lack of support and representation within engineering programs at their universities (similar to [4]-[5], [7]). To feel safe, Alberto feels pressure to pass as straight and cover cultural markers in certain spaces (similar to [2]). Alberto deepening his voice and remaining quiet in certain areas is a form of LGBTQ+ micro-defense described by Campbell-Montalvo et al. [7]. Also, Alberto shares his experience with a past friend group member saying a slur which demonstrates the harmful impact of hearing these jokes and slurs (similar to findings in [7]). Christina, on the other hand, believes that there is no support for Black students, but she perceives obvious support for the Latinx community, consistent with Pirtle et al. [12] findings

which explains that the lack of representation and resources within the university affect the support for Black students within an HSI.

While we found a good deal of similarity between findings at PWIs and our study conducted at an HSI, we see particular nuances come to the fore through the nature of comparing two students with contrasting identities and their narrative experiences in a particular university culture and place. Although many prior studies note the importance of intersectionality and identity salience, our study provides more insight into how and why those dynamics emerge. A larger study on LGBTQ+ students may have backgrounded Christina as participant or utilized only quotes related to her identity as a lesbian, though she does not find her lesbian identity significantly marginalized. Although telling stories about the same geographical and cultural place, Alberto finds his university and city particularly homophobic, while Christina finds it particularly anti-Black. Identity and culture play powerful roles in shaping our perspectives and narratives can provide powerful insight into the shaping and interpretation of those perspectives.

### ***7.2 Implications for Student Support***

The understanding gained through these student narratives provide insight into implications for student support. The lack of support and resources for Black and LGBTQ+ students at this HSI university could be supported by counterspaces such as NSBE and oSTEM, which are important sites of community-building and professional development for Black and LGBTQ+ students, respectively [2], [22]. Such counterspaces help marginalized students to lessen the overlap between their identity and being an engineer, allowing them to be more vocal and secure in their identity.

In light of the intersectionality present in these narratives and in all student experiences, Secules et al. [24] spoke to similar challenges of supporting multiply marginalized and ‘small n’ [25] populations within student support. Although Christina identifies as a woman and could hypothetically find community within the local student chapter of the Society for Women Engineers (SWE) organization, the normative identities of SWE students and the intersection of sexual orientation and race makes SWE less likely as a space where Christina will find community as a Black woman. Students who are at the intersection of multiple systems of oppression are ultimately a smaller population to support student organizing and community building. LGBTQ+ engineers are a relatively small population and can be even smaller in a less welcoming landscape due to individuals being afraid to be “out.” Thus, by the logic of conventional diversity support, students who are the most marginalized are the least able to access student organizations that represent their identities and needs. Secules et al. [24] suggested creatively drawing on political intersectionality to think about how student organizations could reconceive their structure to support multiply marginalized and small n populations.

The students also mentioned other people, resources, and actions that could help create a welcoming environment for LGBTQ+ people. Although much of the marginalization in the narratives is inflicted by student peers, Alberto noted that instructors can be more open and intentional about providing a safe atmosphere [5], [7], incorporating a safe statement into class syllabuses, for example. Alberto also suggested an anonymous reporting system for hate speech could improve the environment at the engineering campus, make it a safe space for LGBTQ+ individuals, and demonstrate the institution's support for the community. Alberto suggested

posters could make the physical campus more welcoming, this strategy for increasing visibility and representation resonates H. E. Rodríguez-Simmonds's experience attending a "Rainbow Callout" event at his university that featured LGBTQ+ organizations on campus [26]. This new visibility and representation motivated Rodríguez-Simmonds to be more expressive about his identity to his surroundings and be his authentic self in his daily life [26].

### ***7.3 Limitations and Future Work***

We are aware of the work's limitations. First, our in-depth narrative analysis approach limited the number of participants we could discuss. We are only looking at two people's perspectives on an HSI: a Cuban gay man and a Black lesbian woman. As such, we are missing the viewpoint of other marginalized identities and do not intend for Alberto's and Christina's experience to be essentialized as representing all LGBTQ+ people, or all gay Latinx men or Black lesbians, respectively. Future research should continue to highlight these and other marginalized groups at HSIs and reflect those experiences into institutional implications that can have local and broader improvements.

## **8. Conclusion**

In this paper, we have presented the narrative experiences of two LGBTQ+ students at an HSI. To address the pain of these students and reconsider university support requires an attention to their intersectional experiences. HSI contexts are often considered "majority minority" and might be considered completely inclusive, free from the marginalization of many predominantly white universities. HSIs are contexts that support students traditionally marginalized at other universities, but they still create dominant groups and normative practices. Faculty and staff are not always to blame, some of the worst marginalization seems to happen in peer-to-peer interactions in study groups and project groups. Still, faculty, staff, and universities have a responsibility to create a safer and more inclusive campus experience. Student organizations, in particular, can offer a thriving sense of community for Latinx students but may not be a structure that is any easier for supporting Black and LGBTQ+ students. As we endeavor to support students like Alberto and Christina, we call for more honesty about the contexts we operate in, and more creativity and solidarity to upend marginalization and create the support structures that will help the most marginalized among us succeed.

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