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THE WATER WE WERE SWIMMING IN: TRANSGENDER AND GENDER  
NONCONFORMING STUDENTS' LIVED EXPERIENCES IN ENGINEERING

By

Natalie Saroff Oliner  
B.A, Indiana University, 2012  
M.A., University of Michigan, 2013

A Dissertation  
Submitted to the Faculty of the  
College of Education and Human Development  
in Partial Fulfillment of the Requirements  
for the Degree

Doctor of Philosophy  
in Counseling and Personnel Services

Department of Counseling and Human Development  
University of Louisville  
Louisville, Kentucky

May 2022

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A Dissertation Approved on

April 12, 2022

by the following Dissertation Committee:

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Dissertation Chair  
Susan Longerbeam

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Amy Hirschy

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Mary Brydon-Miller

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Chase Catalano

## DEDICATION

This dissertation is dedicated to the transgender and gender nonconforming students who actively disrupt oppressive systems, build community, and enrich the engineering field by living their truth.

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## ABSTRACT

### THE WATER WE WERE SWIMMING IN: TRANSGENDER AND GENDER NONCONFORMING STUDENTS' LIVED EXPERIENCES IN ENGINEERING

Natalie Oliner

April 12, 2022

Few studies address the lived experiences of transgender and gender nonconforming (TGNC) students in engineering. Grounded in critical trans politics (Spade, 2015), this dissertation contributes to the literature on TGNC students in engineering by examining their experiences negotiating their identities while navigating interrelated systems of oppression in a field dominated by White, heterosexual, cisgender men. Using a critical constructivism framework, I conducted a narrative inquiry to explore the lived experiences of five TGNC students in engineering programs.

Participants experienced TGNC oppression at their universities, built LGBTQ+ and TGNC communities, and described more welcoming climates in non-engineering contexts compared to engineering. Their perceptions of the engineering climate included: mental health struggles tied to a rigorous and unforgiving curriculum, underrepresentation of their identities, oppressive gender dynamics, and impersonal depoliticization (Cech, 2013) in their departments. When negotiating their identities in engineering curricular contexts, participants discussed erasure of their TGNC identities, mental burdens, isolation, and ways they found (a lack of) support in their program. Participants expressed varying degrees of comfort and support in co-curricular contexts.

In relation to engineering industry, or community contexts, participants shared their anxieties in anticipation of negotiating their identities in a potentially unwelcoming or oppressive company as well as actions they took to assess their work environment during their internships. Participants also highlighted strengths they used in negotiating their identities and persisting through their engineering program including self-preservation, compassion, and building a supportive community of people with whom they could decompress and validate one another.

The continued administrative violence (Spade, 2015) of TGNC individuals at interpersonal, departmental, and institutional levels impedes TGNC liberation, though administrators, educators, and professionals can undo oppressive systems by centering TGNC students in engineering.

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## CHAPTER 1: INTRODUCTION

College students who pursue majors and careers in science, technology, engineering, and mathematics (STEM) are consistently in high demand in the United States (U.S.). Gender and racial disparities, however, persist within STEM degree programs and professions. While women currently make up more than half of the United States population and the overall workforce, they are underrepresented in STEM employment, comprising only 29% of the STEM workforce in 2017 (National Science Board [NSB], 2020). The low representation of women is especially prevalent in technical fields that are traditionally dominated by White men, such as computer science, mathematics, and engineering, compared to more stereotypically nurturing, service-oriented sciences including psychology, biology, and social sciences, which tend to have higher rates of women participation (NSB, 2019; Sax et al., 2016; Stout et al., 2016). Of the women who accounted for 29% of science and engineering employment in 2017, about half worked in life sciences, psychology, and social science careers—a higher representation compared to physical sciences (29%), computer science and mathematics (27%), and engineering (16%; NSB, 2020). Black, Hispanic, and American Indian or Alaska Native individuals are also underrepresented in science and engineering majors and professions, accounting for 11% of physical science, 12% of engineering, and 13% of computer science and mathematics occupations.

The predominant representation of White, heterosexual, cisgender men in STEM has led to an environment where underrepresented identities such as people of color,

queer, transgender, gender nonconforming, and cisgender women often struggle to feel a sense of belonging in the field (Cech & Waidzun, 2011; Cech et al., 2017; LaCosse et al., 2016; Linley et al., 2018). Colleges and professional organizations continue to increase visibility of underrepresented populations in STEM majors through education and outreach initiatives. However, the persistence rates of underrepresented identities are still lower compared to their peers who are White, heterosexual, cisgender men (Hughes, 2018). With fewer underrepresented identities entering and persisting in STEM fields, colleges lose opportunities for “increased learning for all, as students learn to manage cross-difference interactions and improve interpersonal relationships” (Renn & Reason, 2013, p. 4) through meaningful engagement with diversity. A greater diversity of graduates would diversify the STEM workforce in identities, thoughts, and experiences, which would enhance the perspectives and skills utilized in problem solving, building strong teams, and contributing innovative ideas to the U.S. and global economy (Williams, 2013).

When assessing representation by demographics in STEM, sex (male or female) and race tend to be the only indicators used by researchers, institutions, and organizations, thereby omitting other identities such as sexual orientation, gender identity, and gender expressions. Researchers extensively examined the experiences of cisgender women in STEM, but the empirical data on the experiences of transgender and gender nonconforming (TGNC) individuals is minimal. Despite a recent increase in scholarship surrounding lesbian, gay, bisexual, transgender, and queer (LGBTQ+) students in engineering, researchers continue to blend the unique experiences of TGNC students and their gender identity and expression with those of lesbian, gay, and bisexual

students. Conflating sexual orientation with gender identity and expression is inappropriate, inaccurate, and can influence or perpetuate TGNC oppression (McDermott & Hatemi, 2011).

Existing literature highlights the challenges underrepresented students endure when navigating a field dominated by White, cisgender men. However, there is a noticeable gap in the scholarship when addressing the unique experiences of underrepresented gender identities and expressions within STEM, as well as the multiple, intersecting identities of students when accounting for race, gender, sexual orientation, and other identities. Intentional consideration of the unique experiences of people with underrepresented gender and other marginalized identities is especially relevant when examining the specific STEM field of engineering. The enrollment and retention rates of cisgender women and people of color are consistently lower compared to cisgender men and White students. In 2017, women accounted for about 49% of the U.S. population (United States Census Bureau [U.S. Census], 2017), but earned only 21.5% of engineering degrees (NSB, 2019). Additionally, out of the almost 118,000 awarded bachelor's degrees in engineering in 2017, Black students earned only 4.2%, and Hispanic or Latinx individuals earned only 11.9% (NSB, 2019), despite Black citizens accounting for 12.7% of the U.S. population in 2017 and Hispanic or Latinx individuals making up 17.6% of the population (U.S. Census, 2017). When examining awarded science and engineering degrees together, American Indian or Alaska Native people earned 0.7% in 2017 (NSB, 2019), while they accounted for 0.8% of the total U.S. population in the same year (U.S. Census, 2017). These statistics illustrate how White

men continue to dominate engineering and other STEM fields while women and marginalized racial populations remain underrepresented.

While data on LGBTQ+ students is limited, existing studies, which tend to focus on sexual orientation, indicate a similar discrepancy between LGBQ+ students and heterosexual students. For example, Hughes (2018), using a sample of 4,162 STEM students from the Higher Education Research Institute's longitudinal survey data, found that LGBQ+ students were about 7% less likely to persist in their STEM major compared to heterosexual students. However, since existing literature focuses on cisgender women or TGNC identities inappropriately grouped with LGBQ+ sexual orientation identities, more data is necessary to understand the experiences of TGNC students in engineering.

### **Purpose Statement and Research Questions**

The purpose of this study was to examine and understand the lived experiences of TGNC students in engineering programs as they negotiated their identities in a heteronormative field dominated by White cisgender men. A part of this investigation was to examine the interrelated social and institutional systems of oppression that influenced TGNC students' perceptions of their identity and experiences. Specifically, I strived to center and amplify TGNC students' personal narratives to understand how they negotiated their salient identities in engineering curricular, co-curricular, and community contexts. By gaining insight into TGNC students' salient identities, lived experiences, and strategies when navigating their experiences in engineering programs, engineering educators and student affairs professionals can take action to disrupt oppressive systems. This research also provides educators and student affairs professionals a better understanding of TGNC student experiences and needs in engineering in order to

integrate TGNC identities into practice and policy, and offer appropriate support. Additionally, shared knowledge of TGNC students' lived experiences may provide current and future students with helpful coping mechanisms and strategies to persist in engineering. Therefore, this study sought to answer the following research questions:

- What are the lived experiences of TGNC students in engineering programs?
- In what ways do TGNC students negotiate their identities when their gender identity becomes salient in curricular, co-curricular, and community contexts?
- In what ways do systems of oppression influence TGNC student experiences in engineering programs?
- What skills and strategies do TGNC students use to empower themselves to persist in their engineering programs?

### **Positionality**

Growing up as a White, queer, Jewish woman in the U.S. South, I quickly learned the social and cultural norms about identities that were and were not welcome in certain spaces. Having experienced discrimination first-hand, I continued to observe the ways able-bodied, upper- and middle-class, White, Christian, heterosexual, cisgender men held power and privilege over anyone who identified differently. In addition to influencing my worldview, these experiences also led me to study sociology and religious studies so I could better understand what beliefs and systems caused people to discriminate against certain communities.



After completing my undergraduate education, I decided to direct my passions of helping others and pursuing social justice by working with college students. During my master's degree, I focused on learning scholarship about various marginalized identities in the context of higher education. However, my specific academic and professional experiences focused on students with disabilities, women in STEM, and LGBTQ+ students.

Once I earned my master's degree, I began my professional role as an academic counselor for engineering students. Quickly after starting my new job, I noticed opportunities for students with underrepresented identities to connect with one another through formal organizations. The student organizations included the Society of Women Engineers, National Society of Black Engineers, Society for Hispanic Professional Engineers, and American Society of Engineers of Indian Origin. While administrators, educators, staff, and students actively recognized the contributions of women in engineering, the recognition occurred through a cisgender and heterosexual lens, failing to acknowledge the identities and experiences of TGNC students or students with underrepresented sexual orientations. As a pansexual cisgender woman, I was curious about LGBTQ+ student experiences and possible systemic barriers that hindered their opportunity to succeed and live authentically while pursuing a degree in engineering. I also wondered if LGBTQ+ students wanted or needed a formal support system such as a student organization. After several interest and planning meetings, students presented a clear interest and demand for an LGBTQ+ specific organization for engineering students. The organization quickly formed, and I served as the staff advisor for the organization. Over the years, I had formal conversations with LGBTQ+ engineering students through

one-on-one interviews, focus groups, and leadership meetings, as well as informal discussions when working or socializing at co-curricular events.

Through these exchanges, it was evident that cisgender women and TGNC students encountered overt discrimination and harassment involving their gender identity and expression more directly than their sexual orientation. Since there is ample literature on the experiences of cisgender women in engineering, it is imperative that researchers provide the space and opportunity for TGNC students to share their stories and experiences. While I sought to amplify and share these narratives, I acknowledge that I am a White, cisgender researcher writing about TGNC identities and experiences—ones I will never fully understand nor experience firsthand (Nicolazzo, 2017b). I inevitably benefit from this study by having data for my dissertation, but my primary goal was to center TGNC voices and narratives to highlight their unique experiences, strengths, and the ways I and other cisgender practitioners, scholars, educators, and administrators can advocate for TGNC student rights, inclusion, and needs, while striving to dismantle systemic oppression (e.g., TGNC oppression) in engineering programs and higher education institutions.

### **Conceptual and Theoretical Frameworks**

Gender is a social construction in any given sociocultural context, creating norms that give power to dominant ideologies and essentialist perspectives of gender. In the U.S., the dominant discourse privileges the binary gender categories of cisgender men and women. These ideologies lead to oppressive systems that benefit cisgender people while harming TGNC individuals whose identities, by definition, defy binary conceptions of gender and can be fluid over time and place. In the following sections, I provide an

overview of the conceptual and theoretical frameworks I use in my study to understand the complex identities of TGNC people and situate the systems of oppression that influence their experiences. These frameworks include Spade's (2015) critical trans politics, Hurtado et al's (2012) multi-contextual model for diverse learning, and Jones and Abes' (2013) intersectional model of multiple dimensions of identity.

### **Critical Trans Politics**

I use critical trans politics (CTP) as the primary theoretical framework throughout this study. Developed by Spade (2015), CTP is a theoretical perspective that examines and critiques TGNC oppression as it exists in culture and society. CTP challenges normative systems that perpetuate TGNC oppression and uphold other prejudices such as racism, classism, ableism, and sexism (Spade, 2015). Additionally, CTP empowers TGNC individuals, while also acknowledging how intersectionality influences individual and community experiences with oppression based on their intersecting identities (Crenshaw, 1991; Spade, 2015). CTP also highlights the ways that sociocultural, institutional, and interpersonal mechanisms use gender as a rigid categorization that privileges cisgender people while oppressing the TGNC community. Systems such as prisons, policing, welfare, and immigration enforcement all perpetuate oppressive structures through policies and practices that disempower, control, and fail to consider TGNC people. Such policies and practices also amplify the disempowerment and discrimination against other marginalized identity groups including people of color, individuals of low socioeconomic status, persons with a disability, and cisgender women.

CTP encourages intentional and meaningful social change through the resistance of individuals and communities of various and intersecting identities towards oppressive

systems (Spade, 2015). Having a common goal of dismantling oppressive systems encourages coalition building between TGNC people and individuals in other marginalized (and privileged) communities to capture and address the authentic needs and experiences of oppressed communities. Spade's (2015) idea of trickle up social justice—political organizing with primary leadership and direction from marginalized identity groups who can share direct experiences and needs—centers marginalized communities who are disproportionately harmed by administrative violence—structural inequality embedded in social structures that are upheld through legal policies and practices. TGNC and other marginalized communities can share their narratives and advocate for their genuine needs instead of those with power ignoring or assuming the needs of marginalized communities based on their own benefit or privileged experiences. Buy-in and collaboration from various marginalized groups can yield a multitude of ways to address problems as there is no one way to address all administrative violence nor a goal of reaching a final point. Instead, the reflection, assessment, and overall process of resisting and creating effective social change through the undoing of oppressive systems is a main objective of CTP. By emphasizing the importance of intersectional collaboration and community resistance, CTP also centers and elevates TGNC voices and narratives. Centering TGNC voices and identities can also be viewed as a strategy for creating counternarratives in which TGNC individuals can share their lived experiences and subsequent expertise in specific environments such as classrooms (Kean, 2020).

### **Multi-Contextual Model for Diverse Learning Environments**

To understand the identities and experiences of TGNC students, I use Hurtado et al.'s (2012) multi-contextual model for diverse learning environments (DLE) as a

framework to situate the contexts that influence TGNC student experiences in higher education and engineering programs. The DLE model highlights curricular and co-curricular learning environments that take place within socio-historical, policy, institutional, and community contexts. An institution's climate for diversity also takes historical, organizational, compositional, psychological, and behavioral influences into account within the model. Additionally, I use the DLE model with a CTP lens to frame how various oppressive systems, contexts, and characteristics impact TGNC student experiences in their engineering program.

The DLE model also centers student identity within the institutional context, indicating the curricular and co-curricular processes that influence TGNC student experiences. The curricular processes include teaching methods, instructor identity, and course content while the co-curricular processes include professional practice, staff identity, and programming (Hurtado et al., 2012). When considering engineering environments, the gender identities of faculty and staff can impact students' experiences in the program (e.g., whether there is gender diversity and TGNC representation) as well as the incorporation, or lack thereof, in course content, pedagogy, practice, and programming.

### **Intersectional Model of Multiple Dimensions of Identity**

Since TGNC students have multiple, intersecting identities and must navigate various systems of oppression, I use Jones and Abes' (2013) intersectional model of multiple dimensions of identity (I-MMDI) as the second identity-based conceptual framework for my study. The I-MMDI resembles an atom within a larger atom, with an individual's core (authentic self) at the center of the smaller atom. The small atom also

has a filter of meaning-making surrounding it. The rings around the smaller atom indicate individual micro analysis with dots that meet at the intersections of various rings. These dots represent an individual's intersecting identities. Similar to the multiple layered contexts in Hurtado et al.'s (2012) model, the larger atom encompasses the smaller atom, representing the macro analysis, which consists of the intersecting oppressive systems that influence a student's perception of their identity and experiences (Jones & Abes, 2013). As expressed in CTP, it is not only important to consider an individual's intersecting identities, but also the intersecting oppressive systems that affect everyone, regardless of identity (Spade, 2015).

### **Summary**

In summary, engineering is one of several STEM fields that is dominated by White cisgender men. While there is extensive research on women and underrepresented racial identities in engineering, there is little data on LGBTQ+ student experiences in engineering, especially TGNC students. The minimal existing scholarship, however, indicates that TGNC students encounter many barriers in higher education and engineering, some that overlap with barriers documented in prior research, others that are unique to TGNC student experiences. I use CTP as the driving conceptual framework for my dissertation to better understand TGNC student identities and experiences in engineering majors as well as the oppressive systems they navigate. CTP emphasizes the need to center TGNC voices and experiences in collaboration with other intersecting and marginalized identities to strategize, challenge, and undo oppressive systems that harm TGNC people and other marginalized communities. I also apply the DLE model to understand the contexts in which students interact with faculty, staff, peers, and

community members—contexts that can house supportive or oppressive policies and practices. Lastly, the I-MMDI highlights the interconnected web of intersecting identities and their relationship to systems of oppression.

In Chapter 2, I review extant research and theory on CTP as well as the DLE model, and I-MMDI. Additionally, I review the literature on TGNC identities and experiences as well as social and institutional systems of oppression that influence TGNC lived experiences in society, higher education, and engineering programs. Through the literature review, I highlight the lack of data on TGNC identities and experiences in engineering curricular, co-curricular, and community contexts.

## CHAPTER 2: LITERATURE REVIEW

Research on TGNC students continues to grow but is limited when addressing the specific intersection of TGNC identities within engineering and other STEM majors. Before reviewing existing literature, I provide key terms I will use throughout the study as well as my rationale for choosing certain terms and acronyms. Then, I discuss CTP, the central theoretical framework that guides this dissertation, as well as the various critical and postmodern theories that influenced its development. Next, I review the DLE model, which serves as a conceptual framework for understanding the multiple contexts in which students negotiate and experience their identity. Additionally, I review the I-MMIDI, which illustrates how intersecting identities relate to oneself as well as systems of oppression. With these frameworks in mind, I then analyze literature on TGNC identities and oppression within society and higher education institutions. I also review research that captures oppression present in engineering and other STEM fields. Specifically, I discuss key concepts that emerge in literature on women and students with underrepresented racial identities, as well as the minimal scholarship on TGNC students—usually situated in the LGBTQ+ population—in engineering and other STEM majors. At the end of each section on TGNC oppression, I provide a summary that directly applies the CTP theoretical framework. The summary incorporates CTP to critique systems and structures that oppress TGNC people, and recenter TGNC identities and experiences in society, higher education, and engineering or other STEM contexts



respectively. Lastly, I highlight the relevance and importance of my research and conclude by reemphasizing my purpose statement and research questions.

### **Terminology**

Researchers often group TGNC identities into acronyms and communities that focus primarily on sexual orientation such as LGBTQ+ (lesbian, gay, bisexual, transgender, queer, etc.). Furthermore, the diversity of gender identities falls under the “T” for transgender as an umbrella term. Despite the inclusion of a T in the acronym, LGBTQ+ organizations and communities have historically excluded and discriminated against transgender, genderqueer, agender, nonbinary, and gender nonconforming individuals (Manire & Nicolazzo, 2014; Stone, 2009; Stryker, 2017). Additionally, conflating sexual orientation and gender identity is problematic as TGNC experiences, needs, and identities differ from those based on sexual orientations. Similarly, the conflation of sexual orientation and gender identity often fails to recognize that transgender individuals can also identify as lesbian, gay, bisexual, queer, asexual, pansexual, and other non-heterosexual identities.

There are varying perspectives on the appropriate way to name a non-cisgender population in research. Some scholars use trans\* as an umbrella term to represent the vast array of non-cisgender identities (Nicolazzo, 2017c). Recent scholars have used the TGNC acronym to represent transgender and gender nonconforming individuals (Grice, 2020; Jaekel & Nicolazzo, 2020; Lefevor et al., 2019; Meacham, 2020; Platt, 2020). While TGNC leaves out specific language of other gender identities, I choose the TGNC acronym due to the growing number of individuals who publicly identify as gender nonconforming (James et al., 2016) as well as the increase in use of the term TGNC in

recent scholarship. Using TGNC also avoids using one umbrella term or a lengthy acronym that is difficult to communicate and inevitably also excludes identities.

When interviewing and writing about participants in this study, I used the identity label they used, but for purposes of discussing gender identities such as transgender, gender nonconforming, genderqueer, and nonbinary throughout the literature review and study, I use the TGNC acronym. To promote a common understanding of gender terminology used within this study, I provide the following definitions of gender identities and related terms:

- **Agender:** Agender is a gender identity that indicates an individual does not identify with any gender (Nicolazzo, 2017c).
- **Biological/assigned sex:** This refers to the medical categorization of an individual based on physical characteristics, hormones, or genes (Catalano & Griffin, 2016). Similar to gender, sex tends to be presented as a binary—male or female—in the U.S. However, about 1.7% of people are born intersex—having both male and female sex characteristics—when considering chromosomal, genetic, and physical differences (Fausto-Sterling, 2000). Intersex individuals are often unknowingly forced into medical procedures as infants and sometimes throughout their childhood such as hormone therapy and surgeries to align their sex with male or female characteristics due to sociocultural norms rather than medical necessity (Chase, 2012; Kessler, 1998).
- **Cisgender/cis:** Cisgender refers to an individual whose gender identity aligns with their biological/assigned sex. For example, a person who is assigned female at birth and identifies as a woman, and a person who identifies as a man and was

assigned male at birth are both considered cisgender. However, cisgender individuals' gender expression or gender roles may diverge from sociocultural norms affiliated with their biological/assigned sex or gender identity (Catalano & Griffin, 2016). For example, a cisgender woman might have short hair, wear suits instead of dresses, and work as a welder—characteristics, clothing, and a profession that would likely be categorized as masculine in U.S. culture and society. Using the term cisgender is also a way to challenge the assumed default of gender to cisgender, which otherwise burdens TGNC individuals with having to disclose their gender identity (Stryker, 2017).

- **Gender assignment:** When medical professionals declare that a baby is male or female, they essentially are also categorizing the infant into a gender category—boy if male or girl if female (Messerschmidt, 2009). However, it is important not to conflate sex and gender as sex refers to biological/assigned sex, while gender often denotes socially constructed notions and expectations of how an individual should look, behave, and work, as well as what their interests and activities should include (Catalano & Griffin, 2016).
- **Gender expression:** Gender expression refers to the ways an individual conveys their gender identity including “behavioral, aesthetic, and psychological characteristics” (Catalano & Griffin, 2016, p. 185). Ways of conveying gender identity can include clothing, physical characteristics, hair style, mannerisms, and other attributes that may or may not align with the gender norms in a given society or culture.

- **Gender identity:** Gender identity is an individual’s self-ascribed identity or “fit (or lack of fit)” (Stryker, 2017, p. 21) with a gender, which may or may not align with their biological/assigned sex. Gender identities include, but are not limited to transgender, cisgender, woman, man, genderqueer, gender fluid, gender nonconforming, nonbinary, agender, and bigender.
- **Gender role:** Gender role is the historical, sociocultural expectations placed on an individual based on their gender identity. For example, in the United States in the first half of the twentieth century (and earlier), men were expected to work outside of home while women were expected to raise the children and tend to the house. Considering intersectional experiences, Women of Color continue to be expected to tend to White children and homes. Additionally, working-class women of all races are often required to work long hours outside the home, hindering their ability to tend to their own children and homes. Like sex and gender identity, gender roles are socially constructed, assuming men should inherently be masculine, and women should inherently be feminine in their presentation and behavior (Catalano & Griffin, 2016).
- **Gender nonconforming, genderqueer, and nonbinary:** These gender identities refer to individuals “who do not conform to the binary notions of the alignment of sex, gender, gender identity, gender role, gender expression, or gender presentation” (Stryker, 2017, p. 24). These terms can have distinctions from one another depending on how the individual defines themselves but can include people who adopt a neutral or umbrella approach to transgress the gender binary and affiliated expectations (gender nonconforming), “intentionally queer, or

destabilize, their gender identity, expression, or embodiment” (genderqueer) (Nicolazzo, 2017c, p. 168), or formally reject the gender binary (nonbinary) (Stryker, 2017).

- **Passing:** Passing is the degree to which an individual is able “to be socially (mis)read as having a particular gender identity” (Nicolazzo, 2017c, p. 168). For example, a person who has facial hair, wears masculine clothing, and has a deeper voice will likely pass as a man in U.S. society. While some individuals may value the notion of passing, others may intentionally aim to not pass and experience stress when considering potential violence and oppression due to not passing.
- **TGNC Oppression:** Trans\* oppression (or TGNC oppression as used in this study) is the “[system] of privilege afforded to...people whose gender identity and/or gender expression conform to cultural and societal expectations for women/girls and men/boys” (Catalano & Griffin, 2016, p. 183). TGNC oppression can occur within systems and institutions as well as interpersonal relationships and interactions.
- **Transgender/trans:** The term transgender can have a few different meanings. Some people use the term “to encompass any and all kinds of variation from gender norms and expectations” (Stryker, 2017, p. 37), while others may use it when wanting to specifically indicate a gender identity within the binary that is different than their biological/assigned sex. Trans\* may also be used as an umbrella term to identify individuals “who transgress the socially constructed discourse of how we identify, express, and embody our genders” (Nicolazzo, 2017c). The use of the asterisk represents the inclusion of the aforementioned

definitions of transgender—those that identify with a gender identity within the binary, and those that challenge the binary, such as gender nonconforming, genderqueer, and nonbinary (Tompkins, 2014). However, while used to highlight the breadth and depth within the transgender community, the term trans\* has become problematic for misuse and, like all terms, should only be used if the individual uses it when stating their identity (Nicolazzo, 2017c).

As scholarship moves away from using trans or trans\* as an umbrella term, I use the TGNC acronym to include individuals who do not identify with their biological/assigned sex, including those who identify within the gender binary and those who challenge or transgress it. I use terms other than TGNC in the literature review only when mirroring the language used by the scholar(s) when referencing a particular study. However, it is important to acknowledge that this study is bounded by place and time while identities are complex and ever-evolving (Jourian, 2015; Stryker, 2017).

### **Conceptual and Theoretical Frameworks**

To center the identities and lived experiences of TGNC students, I apply CTP as the foundational theoretical perspective throughout this study. Additionally, I use Hurtado et al.'s (2012) DLE model and Jones and Abes' (2013) I-MMDI to frame the interrelated contexts and systems of oppression in which TGNC students negotiate and experience their identity in engineering. In the following subsections, I discuss the evolution and core tenets of CTP. Then I review Hurtado et al.'s DLE model to frame the various contexts in which TGNC students have their experiences as well as the systems through which TGNC oppression occur. Additionally, I examine the components of the I-

MMDI that illustrate ways identities and contexts interact with one another, creating unique experiences for TGNC engineering students.

### **Critical Trans Politics**

Postmodern theoretical perspectives disrupt essentialized notions of identity while acknowledging the socially constructed nature of identities and the need to challenge dominant social norms that influence identity politics. Postmodern feminism, for instance, contests the gender binary in society as well as the assumed intrinsic status of gender and its relation to sex (Tong & Botts, 2017). Individuals continuously construct their identities, acknowledging the fluidity of identity as opposed to fixed binary categories of gender and sex. Additionally, unlike earlier feminist perspectives, postmodern feminism strives to be more inclusive of transwomen within the gender category of women (Tong & Botts, 2017).

Queer theory similarly challenges commonly held perceptions by emphasizing the social construction of gender and sexuality. Queer theorists thus seek to highlight the marginalized and deviant identities in comparison with social norms and systems that normalize and privilege one group over others including heteronormativity and cisnormativity (Abes & Kasch, 2012; Salamon, 2009). Butler's (1990) work, cited in feminist and queer theory, stressed the fluidity of identity and the ways identities and sociocultural contexts influence one another, which causes individuals' self-concept and social perceptions of gender and sexuality to change over time.

Critical theories add an additional layer to the fluid and complex nature of identity by examining the systems of oppression that marginalize and disadvantage identities that are not normalized or privileged in a culture or society in a particular historical context.

Through the acknowledgement of the social construction of norms that systems of oppression enforce, critical theorists also emphasize concepts of liberation since individuals, in theory, have the freedom to live authentically while resisting oppressive norms and systems (Kincheloe & McLaren, 2000).

CTP takes on many attributes of these postmodern theories, mirroring notions of challenging and actively resisting socially constructed gender norms. However, CTP specifically centers the identities, experiences, and needs of the TGNC community, examining the ways systems of oppression affect trans people (Kean, 2020; Spade, 2015). Spade (2015) wrote,

The most marginalized trans people experience more extreme vulnerability, in part because more aspects of their lives are directly controlled by legal and administrative systems of domination – prisons, welfare programs, foster care, drug treatment centers, homeless shelters, job training centers – that employ rigid gender binaries. (p. xiv)

Due to the vulnerability of marginalized populations, Spade argued that CTP demands access to resources and legal protections that are afforded to those with privileged gender identities, while also calling for an undoing of current systems that oppress TGNC people as well as communities of other marginalized identities. Therefore, CTP has roots in Crenshaw's (1991) concept of intersectionality through its acknowledgement of parallel discrimination beyond just trans identities (Spade, 2015) as well as how people with multiple marginalized identities experience layers of oppression in harsher ways than through a singular identity axis.

However, mere “legal recognition and inclusion” (Spade, 2015, p. 1) are insufficient. Instead, CTP calls for TGNC and other oppressed communities to join forces, resist, and transform social norms and politics. Spade (2020) refers to this



intentional joining of forces to challenge current systems as mutual aid, which is the “collective collaboration to meet each other’s needs, usually from an awareness that the systems we have in place are not going to meet them” (p. 7). Oppressive systems often create or enhance social problems and inequalities (Spade, 2020), and by way of administrative violence, prevent TGNC people from accessing necessary protections and services, further marginalizing and endangering the TGNC community (Spade, 2015). TGNC individuals are also then forced to navigate systems that do not recognize or value their existence. Thus, legal actions, policy changes, and institutional reforms often oppress the TGNC community instead of solving or addressing the imperative needs of the community. For example, policy makers may push for prison reforms instead of addressing issues that TGNC people face involving employment, housing, and policing, all of which can directly relate to TGNC incarceration. Cisgender—and sometimes TGNC—individuals with privileged platforms advocate for inclusive policies and reforms but fail to consider the needs of the diverse transgender communities (e.g., trans women of color and disabled trans people). Additionally, transgender inclusion in the military receives ample media attention, yet the military industrial complex remains within a fixed gender system, which is antithetical to broader justice movements. Meanwhile, healthcare, housing, employment, and other day-to-day social concerns remain distant from media scrutiny (Spade, 2015). Additionally, many legal reforms “maintain—and often bolster—systems of maldistribution and control in the name of equality, individuality, and diversity” (Spade, 2015, p. 71). Therefore, CTP promotes the notion of dismantling oppressive systems instead of enacting reforms (Spade, 2015). For example, instead of passing prison or welfare reforms, the entire system should be

undone because neither seek to remedy the root causes of violence, addiction, and poverty. Dismantling oppressive systems can highlight the evident power and control within these systems that oppress the TGNC community and promote TGNC liberation.

While Spade's (2015) concept of CTP focused on various legal and social applications of trans experiences, CTP can be applied to other institutions and aspects of society. Kean (2020), for instance, discussed how a critical trans framework can be used in K-12 education to better support TGNC and other students. The first principle in the framework highlights the individual, institutional, and sociocultural layers of how gender functions in various contexts. Genderism is the focus of the second principle, which necessitates educators examining the ways genderism interacts with racism, sexism, ableism, classism, and other systems of oppression. Lastly, the third principle reinforces the critical importance of centering trans narratives, knowledge, and lived experiences in curricular and co-curricular contexts (Kean, 2020).

Most historical, sociocultural, and institutional contexts in the U.S., including education, foster oppression of TGNC people as well as other intersecting and marginalized populations based on race, ethnicity, sexual orientation, ability, socioeconomic status, etc., (Bilodeau, 2009; Catalano & Griffin, 2016; Nicolazzo, 2017a). Acknowledging and challenging these oppressive systems assists in understanding the role of power in TGNC experiences while centering the lived experiences of TGNC individuals at the core of CTP (Spade, 2015). Empowering the TGNC community and utilizing their narratives is of utmost importance as they challenge socially constructed, essentialized notions of gender, construct their own

identity, and thereby possess the experiential knowledge of negotiating TGNC identities within systems of oppression while seeking liberation (Kean, 2020).

Spade (2015) intentionally used the term “subjection” (p. 6) to understand the meaning individuals give to their identity and experiences, both intrapersonal and interpersonal, within oppressive systems. Using the term “oppression” runs the risk of simplifying a complex power system (Spade, 2015). In other words, it is not a mere experience of one group holding power and controlling another group; there are many individuals, communities, and systems at play when examining power and control relationships. My use of the term “oppression,” however, is not meant to simplify the concept. Instead, it references Adams’ (2018) framework of oppression existing on interpersonal, institutional, and systemic levels. When considering these different levels, centering the voices of TGNC people and other marginalized communities to highlight their experiences with oppression is vital.

Lastly, CTP also emphasizes the importance of ongoing reflection and assessment of multiple communities to consider the various ways to address social change (Spade, 2015), including mutual aid efforts (Spade, 2020). Together, TGNC and other oppressed communities can develop ways to resist and challenge assumed truths, norms, and experiences. Through intentional collaboration, CTP underlines the significance of processes and multiple ways of approaching an issue instead of the notion of arriving to an end point. For example, TGNC individuals can collaborate with the Disability community to strategize ways to address unique and intersecting concerns regarding employment discrimination and incarceration. In addition to having multiple perspectives present, the collaboration between the TGNC and Disability community also provides a

space for ongoing reflection and openness to address inevitable changes that will occur to current policies and systems that affect their community. Using CTP informs Hurtado et al.'s (2012) DLE model as well as the I-MMDI (Jones & Abes, 2013) through its core tenets: (a) examining and challenging TGNC oppression embedded in society, (b) valuing an intersectionality approach to addressing political issues that oppress TGNC individuals as well as other marginalized communities, (c) centering TGNC voices and narratives when examining community needs and experiences, (d) promoting resistance and social change through the integration of many identities and narratives, and (e) emphasizing the process of ongoing reflection and the importance of developing multiple ways to address problems.

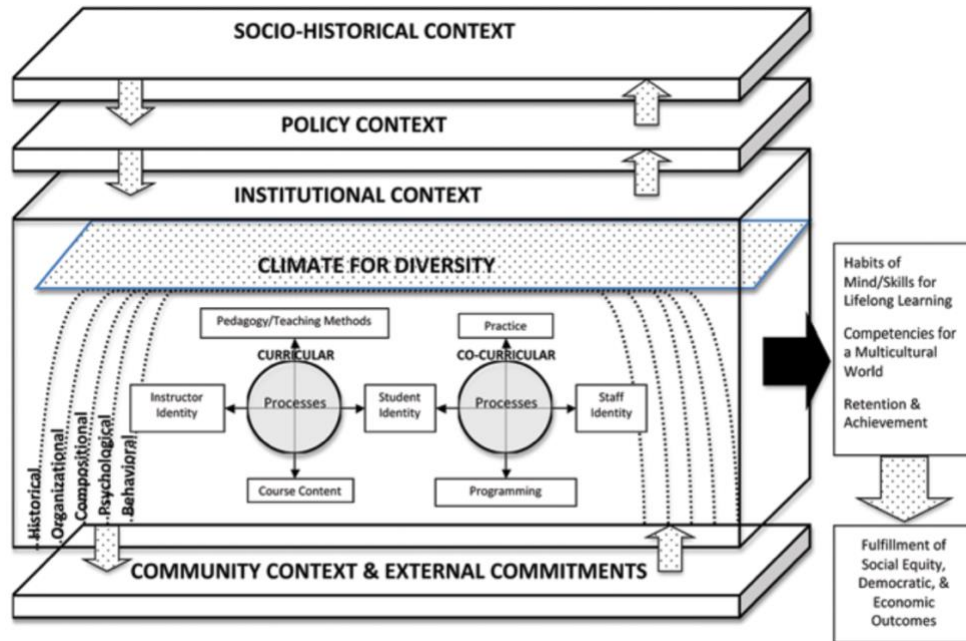
### **Multi-Contextual Model for Diverse Learning Environments**

To frame the various contexts in which TGNC students negotiate and experience their identities, I use the DLE model. Hurtado et al. (2012) developed the DLE model to account for the different circumstances and factors that affect the ways individuals, groups, and institutions experience diversity. The DLE model serves as a tool to assess the different types of learning environments for students and the ways diverse students experience their identity through an institution's mission and practice of diversity, while also taking external factors into consideration. As Hurtado et al. stated, "the DLE model provides...an opportunity to understand the various contexts in which diverse students learn, and how these varying contexts are linked to students' multiple social identities in the campus climate for diversity" (p. 76). These contexts to which Hurtado et al. referred include curricular and co-curricular experiences involving students, faculty, and staff

within the institution, community, and broader societal (socio-historical and policy) contexts (see Figure 1).

**Figure 1**

*Multi-Contextual Model for Diverse Learning Environments*



*Note.* From “A Model for Diverse Learning Environments: The Scholarship on Creating and Assessing Conditions for Student Success,” by S. Hurtado, C. L. Alvarez, C. Guillermo-Wann, M. Cuellar, and L. Arellano, in J. C. Smart and M. B. Paulsen (Eds.), *Higher Education: Handbook of Theory and Research* (p. 48), 2012, Springer ([https://doi.org/10.1007/978-94-007-2950-6\\_2](https://doi.org/10.1007/978-94-007-2950-6_2)). Copyright 2012 by Springer Nature. Reprinted with permission.

The core of the DLE model is made up of the “climate for diversity,” which encompasses curricular and co-curricular contexts. The curricular and co-curricular

portion of the model applies to my research as these contexts directly affect student identities and experiences as they navigate curricular processes including interactions with faculty identities, curriculum, course materials, and pedagogy, and co-curricular processes such as staff identities, programs, and practices (Hurtado et al., 2012). Student interactions and opportunities for diverse learning in these contexts are also influenced by factors that Hurtado et al. (2012) referred to as historical, organizational, compositional, psychological, and behavioral dimensions. These dimensions and learning environments are situated within the model's institutional context; therefore, each dimension is directly related to the past, present, and future characteristics, practices, and events within the institution. The historical dimension, for example, illustrates events that have taken place since the institution's establishment that have an impact on the way faculty, staff, and students interact and learn. The way institutions handle certain events (e.g., protests or incidents of harassment and discrimination), create—or fail to create—inclusive policies or practices for TGNC students, and how they develop and sustain initiatives to become more diverse and inclusive, for example, all affect the campus climate.

Beyond an institution's history, it is also important to consider the organization of the institution and the composition of the faculty, staff, and student body on campus. The way a university is organized might create or maintain barriers to a diverse and inclusive climate through certain practices such as hiring committees not including diverse representatives or not interviewing diverse candidates (Hurtado et al., 2012). Similarly, the composition of the institution can create a warm or chilly climate based on who is employed by the college or university to bring diverse perspectives to teaching and research, and serve as mentors or role models to TGNC and other marginalized students

on campus. Being able to interact with faculty and staff of similar identities and backgrounds, in turn, provides students with the opportunity to identify with people in their intended major or career. The navigation of personal identity in relation to faculty, staff, and peers, and the subsequent perception of a sense of belonging in one's intended educational path is what Hurtado et al. (2012) term the psychological dimension, while the student's actions such as changing majors due to a lack of mentoring or sense of belonging in a certain department would be categorized within the behavioral dimension.

While these institutional, interpersonal, and intrapersonal dimensions have a strong effect on student perceptions and experiences, a social institution such as higher education is inevitably linked to other external contexts including socio-historical, policy, and community contexts (Hurtado et al., 2012). The socio-historical context in the DLE model refers to social and historical movements and perspectives in a given society. When considering TGNC identities, socio-historical contexts can include the many years of systemic oppression towards anyone who challenges binary notions of gender identity and expression. Oppression can include violence, harassment, and discrimination by way of law, policy, and access to social services (Spade, 2015; Stryker, 2017). Past, present, and ongoing events can set a general tone for a society's attitude toward specific identity groups such as the civil rights movement, women's suffrage, marriage equality, and trans rights. Even if a society progresses on how it treats and includes people of diverse identities, history cannot be erased, so members of marginalized groups who have been discriminated against will likely not forget past socio-historical injustices. Similarly, the policies (policy context) that a nation's legal system creates reflect public attitudes towards different identity groups at a given point in history and can also influence the

institutional climate and the ways those individuals navigate their educational experiences and environments (Hurtado et al., 2012).

Just as higher education institutions interact with the larger society and its policies, they also engage with local communities. While specific communities might reflect the attitudes of the larger social climate, they also might diverge. For example, one town might be rather homogenous and not have a diverse workforce when it comes to gender identities. The demand for diverse employees may be high, but the climate for TGNC individuals might be hostile. These communal conditions can affect the experiences of students and other community members when navigating their identity and determining a sense of belonging.

All portions of the DLE model influence student experiences and how they negotiate their identity in various contexts. CTP provides a lens to understand TGNC oppression in the different contexts as well as TGNC student experiences. Identity models add an additional layer in examining how TGNC students experience their identities, which is situated in the central portion of the DLE model in relation to curricular and co-curricular contexts within the campus climate.

### **Intersectional Model of Multiple Dimensions of Identity**

Jones and Abes' (2013) I-MMDI provides a framework for understanding and situating the narratives of TGNC students negotiating their identity and experiences in their engineering program. The original model of multiple dimensions of identity (MMDI; Jones & McEwen, 2000) was based on Jones' (1997) study, which examined women students' understanding of their identity, considering identity salience within the context of social identities (race, gender, sexual orientation, culture, class, and religion)



and influential contexts (socio-cultural, family, decisions and goals, and present experiences). The core is at the center of the model and represents an individual's personal perception of their identity including their behaviors, skills, and traits. Unlike the core personal identity, the social identities are socially constructed, rotating and floating around the core self, sometimes intersecting with other identities (Jones & McEwen, 2000). The closer the social identities are to the core identity within the model, the more salient that identity is to the individual. The various contexts can influence identity salience and the way individuals perceive and construct their identity (Jones, 1997).

Since the initial conception of the MMDI, scholars developed numerous advanced iterations of the model. While the original model effectively created a manageable way of understanding the complex nature and interactions of a student's multiple identities, it did not address student identity development over time (Jones & Abes, 2013). To address this limitation, Abes, et al., (2007) developed the reconceptualized model of multiple dimensions of identity (RMMDI) by incorporating Baxter Magolda's (2001) scholarship on self-authorship to create a meaning-making filter. The filter serves as a penetrable, layered barrier between contextual influences and identity construction, illustrating how contextual influences affect self-perception. The meaning-making process can then be broken down into cognitive, intrapersonal, and interpersonal realms highlighting the ways students make sense of how they know something (cognitive), who they are (intrapersonal), and how to relate with others (interpersonal). If a student is further along in their development, the less likely the contextual influences are to pass through the meaning-making filter, while those who are not as advanced in their development are

likely more influenced by peer and family beliefs, social stereotypes and norms, and other contexts (Abes et al., 2007).

The RMMDI adds an important element of development and meaning-making when considering contextual influences on students' understanding and construction of their multiple identities, though it fails to examine the influence of identities on context as well as the role of systemic oppression and inequality on meaning-making and identities (Jones & Abes, 2013). In order to address the systemic oppression absent in the MMDI and RMMDI, critical and poststructural models emerged including the critical race theory model (CRT-MMDI), queered model (Q-MMDI), and intersectional model (I-MMDI; Jones & Abes, 2013). Given my study's focus on students' gender identity as well as the influences of systemic oppression within various contexts on students' perceptions of their identities and experiences, I use the I-MMDI to account for students' intersecting identities in relation to TGNC oppression, racism, ableism, and any other applicable form of systemic oppression, which aligns well with CTP. While the Q-MMDI has tenets such as fluidity and resistance to oppressive systems that seem to closely relate to CTP, the primary system of oppression in focus within the model is heteronormativity (Jones & Abes, 2013). While heteronormativity may have an influence on TGNC identity construction and experience, I choose to focus on the I-MMDI to avoid further conflation of sexual orientation concerns with gender identity and expression.

Though the other forms of the MMDI include characteristics of intersectionality as multiple identities can interact with one another and be influenced by particular contexts, the I-MMDI is built on an intersectional framework, acknowledging both intersecting identities as well as the context and influence of intersecting systems of

power (Jones & Abes, 2013). Using Crenshaw's (1991) concept of intersectionality in her legal work in which she examined the intersection of gender and race, especially the oppression against women of color within the context of racism and sexism, Dill and Zambrana (2009) adopted a critical approach and created an intersectionality framework. Similar to CTP, Dill and Zambrana's framework included centering the lived experiences of marginalized populations, acknowledging the complexity of identities across and within groups, recognizing the roles and influences of intersecting systems of power and oppression, and calling for social and institutional change through intentional action within professional practice and research.

Dill and Zambrana's (2009) tenets translate to the I-MMDI as core, identity salience, context, and multiple identities, with the inclusion of a filter as well. The core refers to an individual's authentic, ever-evolving self, which serves as the center of the model and is also connected to all other aspects of the model. As Jones and Abes (2013) wrote,

This perspective places at the core the lived experiences of people of color and their personal narratives or counterstories and raises the level of analysis of the core to a structural one rather than one only focused on individual identities. (p. 158)

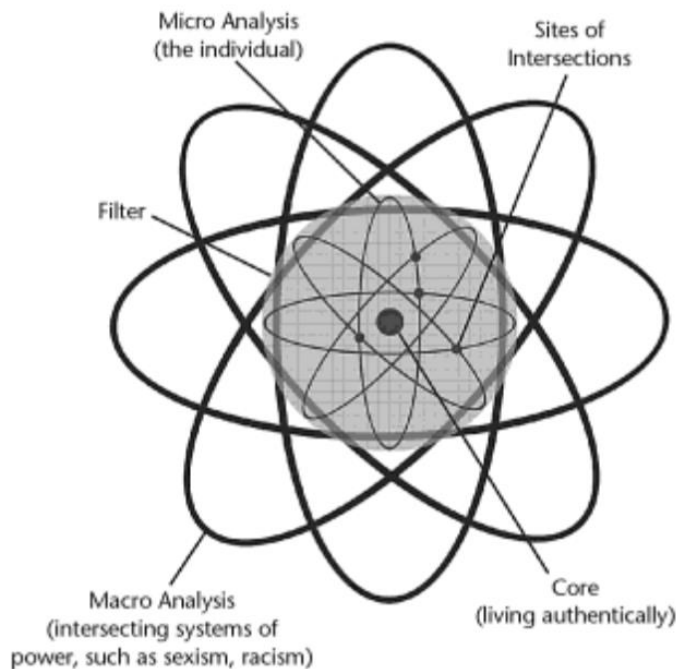
While the intersectionality framework focuses on experiences of people of color, I believe, in the case of my study, the same notion of lived experiences and narratives can be highlighted for TGNC identities—or whichever identities a student identifies as their core—both individually and as a community.

The core resides at the center of interconnected circles—the micro level individual—which includes multiple intersecting identities (see Figure 2). While an individual may cite certain identities as their salient identity and may be closer in

proximity to their authentic core, the I-MMDI also highlights the influence of contextual systems of oppression on identity salience. In other words, it is impossible to have an authentic core identity and salient identity without reciprocal influence from an individual's sociocultural context (Dill & Zambrana, 2009; Jones & Abes, 2013).

**Figure 2**

*Intersectional Model of Multiple Dimensions of Identity*



*Note.* From *Identity Development of College Students: Advancing Frameworks for Multiple Dimensions of Identity* (p. 161), by S. R. Jones and E. S. Abes, 2013, Jossey-Bass. Copyright 2013 by John Wiley & Sons, Inc. Reprinted with permission.

The meaning-making filter covers the micro level and core. While the meaning-making aspect of the filter relates more to the original MMDI than the tenets of

intersectionality, it can represent the interconnectedness of all I-MMDI components. In other words, the core, microlevel individual, intersecting identities, and macro systems of oppression cannot be separated from one another. All aspects influence the ways students negotiate and make meaning of their identity considering specific contexts and oppression(s). Therefore, individuals with varying intersecting identities will have different experiences and understandings of their identity depending on the context and systems of oppression at work (Jones & Abes, 2013).

Lastly, larger interconnected circles—the macro level—encompass all the previous elements of the model, representing the contextual intersecting systems of oppression. Intersecting systems of oppression can influence the ways an individual authentically constructs and negotiates their identity as well as how others perceive their identity. Both contexts and identities influence one another, remaining interrelated in all lived experiences (Dill & Zambrana, 2009; Jones & Abes, 2013).

While an intersectional approach runs the risk of minimizing or overlooking certain intersecting experiences depending on the context and influences, it also remains open and flexible enough for students' narratives to guide the model based on their lived experiences, emphasizing their salient and intersecting identities. When used together, the DLE model and I-MMDI align nicely with CTP. Hurtado et al.'s (2012) contexts mirror critical theorists' centering of individual identities with attention to oppressive systems within various contexts such as the historically conservative environment that is dominated by White, heterosexual, cisgender men in engineering programs (Cech & Waidzunas, 2011). Lastly, the I-MMDI (Jones & Abes, 2013) provides a conceptual framework for how TGNC students negotiate their identities within engineering and other

oppressive contexts within the DLE model (Hurtado et al., 2012). Using CTP (Spade, 2015) with these three models provides an interpretive understanding of the unique and complex experiences of TGNC student identities and experiences in and outside of engineering programs.

### **TGNC Identities**

The TGNC community consists of diverse, multifaceted identities that can be fluid and change over time. One of the ways that Stryker (2017) described transgender, used in an umbrella way, is “the movement across a socially imposed boundary away from an unchosen starting place, rather than any particular destination or mode of transition” (p. 1). While TGNC individuals identify in varied ways, Stryker’s (2017) definition denotes a common unifying feature in challenging essentialized notions of binary gender.

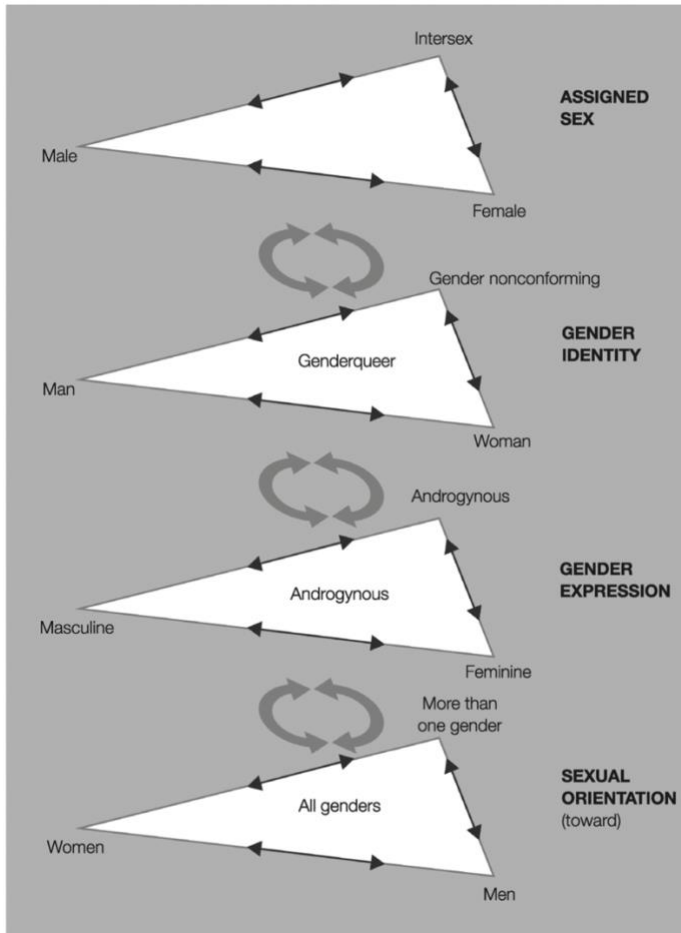
Despite the complexity of TGNC identities, scholars have attempted to capture the ongoing nature of gender identity development (Beemyn & Rankin, 2011; Bilodeau, 2005; Bussey, 2011; D’Augelli, 1994). D’Augelli’s (1994) lifespan model for LGB development paved the way for considering queer identity development as complex and fluid over time, which was a departure from the linear and binary models commonly developed when considering sexual orientation (Cass, 1979; Levine & Evans, 1991) and cisgender identity (Lev, 2004). In an attempt to specifically capture transgender identity development, Bilodeau (2005) adapted D’Augelli’s model to reflect the different stages in which an individual develops a transgender identity, however Bilodeau problematically integrates a gender identity development model with a model designed for sexual orientations. Devor (2004) also developed a “transsexual”/transgender identity

model, however, the model was also based on a sexual orientation model. In addition to the concern about meshing gender identity development models with sexual orientation development, existing models also fail to dedicate particular attention to gender nonconforming and nonbinary identity development.

Jourian's (2015) dynamic model of gender and sexuality provides a critical way to understand the fluid, complex, and non-linear ways students can define or experience their gender identity and expression over time. Based on Lev's (2004) two initial models of sex, gender identity, gender role, and sexuality—one suggesting a binary system and the other incorporating the notion of a continuum—Jourian (2015) critically reconceptualized these binary perspectives by introducing four different triangular planes. Each plane illustrates how individuals can fluidly change identities over time and not necessarily identify as one of the three identities located at the point of each triangle (see Figure 3). The first plane indicates an individual's assigned sex at birth, including male, female, or intersex. The second triangle, gender identity, illustrates man, woman, and gender nonconforming labels, with genderqueer indicated in the center of the plane. Gender expression includes masculine, feminine, androgynous, and another androgynous label in the center of the third plane representing a potential combination of multiple expressions. Lastly, the fourth plane represents a person's sexual orientation towards another, which consists of men, women, and more than one gender, with all genders located in the center of the triangle. All planes incorporate a continuum along each edge of the triangle, allowing individuals to identify in between various categories (Jourian, 2015). Additionally, Jourian included circular arrows between each plane suggesting that all identities are fluid and can change.

**Figure 3**

*Dynamic Model of Gender and Sexuality*



*Note.* From “Queering Constructs: Proposing a Dynamic Gender and Sexuality Model,” by T. J. Jourian, 2015, *The Educational Forum*, 79(4), p. 465 (<https://doi.org/10.1080/00131725.2015.1068900>). Copyright 2015 by Taylor & Francis.

Not only does the dynamic model transgress gender binaries, it emphasizes the fluidity, complexity, and evolving nature of sex, gender identity, gender expression, and sexual orientation. The influence of contexts also plays a role in the model in terms of time and place (Jourian, 2015). For instance, the way a TGNC student expresses their



gender around their family or at work may be different than how they express their identity around their friends. Or a high school TGNC student might define their sexual orientation as being attracted to women but learn that they are attracted to all genders once they meet new people and learn about different identities in college. Jourian (2015), when considering examples of students, articulated the individual's ability to indicate the relation of each plane to one another. For instance, one TGNC student may feel as though their gender identity and gender expression are closely related while their sexual orientation and assigned sex are separate and distanced from their gender identity and expression.

Overall, the dynamic gender and sexuality model provides a more expansive and inclusive way for people of all gender identities, expressions, assigned sexes, and sexual orientations to identify at any given time. While all can benefit, Jourian's (2015) model especially empowers TGNC and other marginalized people who are frequently stigmatized and oppressed within the binary gender system. By challenging socially constructed binary gender norms and centering the experiences of TGNC and other marginalized people, Jourian integrated a critical postmodern perspective. This critical reconceptualization also challenges oppressive systems and institutions, such as higher education, to assess policies and practice that do not effectively and appropriately allow students and other members of the community to accurately identify themselves and thereby live authentically in various contexts.

The language used to identify oneself can also vary depending on one's age or generation. Older individuals might use terms that younger generations view as outdated such as transsexual or cross-dresser, while others may use terms including transgender,

transman, or transwoman (Beemyn & Rankin, 2011; Stryker, 2017). The 2015 *U.S. Transgender Survey* (USTS), however, indicated that younger individuals are more likely to identify as nonbinary compared to older generations, highlighting younger generations' preference for no labels or ones that transgress binaries and traditional notions of gender (James et al., 2016). Regardless of the specific terminology used for an identity, there can be within-group differences in the TGNC community based on the meaning individuals ascribe to their identities and experiences (Cavanaugh & Luke, 2021).

It is also important to acknowledge TGNC individuals' other identities that intersect with gender as well as how they influence the ways TGNC individuals make sense of and negotiate their identities (Hetzel & Mann, 2021; Nicolazzo, 2016a, 2017c; Rankin & Beemyn, 2012; Spade, 2015). For example, a multiracial, queer, and nonbinary person who has a disability will encounter different challenges when applying for a job in the U.S. compared to a White, bisexual, able-bodied, transgender man. When examining TGNC experiences with oppression in society and higher education institutions, intersectionality plays a key role in marginalization, discrimination, and overall lived experience.

### **TGNC Oppression in U.S. Society**

Those with marginalized identities in a given society will likely encounter oppression based on established norms. When considering the lives of TGNC students at colleges and universities, it is critical to examine the ways these individuals encounter oppression outside the walls of their institution as oppression can occur prior to, during, and after college. For instance, as technology advances and social media and online

learning become prominent, individuals can encounter cyber harassment in addition to in-person oppression in society (Beemyn & Rankin, 2011; James et al., 2016; Nicolazzo, 2017c). The ways those who hold power perceive an individual's gender identity can lead to policies, practices, and interpersonal interactions that oppress TGNC individuals in being able to acquire and maintain employment, receive access to inclusive and affordable healthcare and housing, avoid outright harassment and violence, and cope with subsequent mental health challenges (Spade, 2015; Stryker, 2017). These experiences with oppression can affect TGNC students' self-concept and the ways they negotiate their identities (Beemyn & Rankin, 2011; Bilodeau, 2009; James et al., 2016; Nicolazzo, 2017c).

### **Perceptions of TGNC Individuals**

The established gender norms in the U.S. are built on a binary system of cisgender men and women. For example, the gender roles involving work in the White middle-class nuclear family evolved over time; cisgender men historically served as the breadwinners of the family while cisgender women took care of the home and children. In the twenty-first century, the White middle-class gender roles have shifted to where cisgender women can be the breadwinners and cisgender men can stay home and watch the children, not to mention the increasing normalization of families with same gender or TGNC partners. Oppression can also disrupt normative gender roles. Slavery, for instance, required various forms of manual labor from Black men and women, with no legal protections for their family, work, or well-being. Additionally, two partnered cisgender women or men had to navigate different gender roles while also navigating limited legal rights in their partnership and family. Despite the changes in gender roles, policy and law have only

recently acknowledged the diversification of the genders that make up a family structure (Spade, 2015; Stryker, 2017). However, while acceptance of lesbian, gay, bisexual, pansexual, asexual, and other non-heterosexual orientations has improved, TGNC individuals continue to face discrimination in various forms.

Since U.S. society has an established cisgender norm, people try to fit individuals into the dichotomous mold and label of man or woman. Therefore, when individuals who uphold prejudiced perspectives of gender perceive someone as not fitting neatly into binary gender boxes or traditional gender roles (Hackimer et al., 2021), they can use their power to discriminate against that person whether it is verbally or physically harassing them, denying them employment, or preventing them from receiving appropriate healthcare and housing. One concept that impacts the way an individual perceives a TGNC person is passing—or being perceived by others as in alignment with the gender binary (Catalano, 2015b; Nicolazzo, 2016a). For example, if someone is unable to easily perceive a person as a man or woman based on an androgynous appearance or gender expression, they are not passing as a man or a woman. However, if a transgender individual appears to have the presentation and physical features of a cisgender man in U.S. society, then others will likely perceive them to be a man, therefore that individual passes as a man. When considering the dynamic model of gender and sexuality (Jourian, 2015), anyone who expresses their gender as androgynous or in between socially normative categories (i.e., masculine and feminine that “appropriately” correlate to how others perceive them based on their assigned sex) may not pass as a man or woman. Thus, the binary norm causes gender nonconforming and nonbinary individuals to face

more discrimination compared to individuals who pass as one of the two binary genders (Miller & Grollman, 2015; Nicolazzo, 2016a, 2017c).

Johnson (2016) introduced the concept of transnormativity, which reinforces an oppressive social pressure to conform to the gender binary. In other words, the dominant social narrative of transnormativity privileges TGNC individuals who identify as a man or woman and medically transition according to the gender binary (Johnson, 2016). Transnormativity creates additional barriers alongside cisnormativity as TGNC individuals navigate their identity development and experiences considering one narrative, cisnormativity, which suggests their TGNC identity is deviant, and another narrative, transnormativity, that acknowledges transgender identities within the gender binary (Bradford & Syed, 2019). Cisnormativity and transnormativity can present challenges for individuals who are developing their identity in environments that fail to recognize or value TGNC identities (Cavanaugh & Luke, 2021). While transnormativity challenges cisnormativity by acknowledging transgender identities, it still delegitimizes and erases TNGC identities that resist and transgress the gender binary, privileging individuals who identify within the binary and pass as one of the binary genders in society (Fiani & Han, 2019).

Experiences with passing can also disproportionately affect gender nonconforming individuals of color (Nicolazzo, 2016a). Referencing the I-MMDI, multiple systems of oppression—racism and TGNC oppression—encompass students' core and their multiple, intersecting identities (Jones & Abes, 2013). The intersecting systems of oppression place an unjust burden on TGNC students of color and further strengthen social inequality. As cisgender individuals are socialized to adhere to binary

gender norms and beliefs that dichotomous gender is fixed and inherent in humans, they can consciously or unknowingly contribute to social marginalization and oppression of TGNC people (Darling, 2020). Additionally, social and cultural gender expectations, community and visibility, and experiences with multiple identities can influence the ways a TGNC person navigates their identity in various contexts (Coburn, 2021).

## **Employment**

The workforce is one of many realms that house TGNC oppression based on the ways cisgender individuals perceive an employee's gender identity. TGNC individuals may struggle to obtain or maintain employment based on the prejudice and perceptions of employers or they may experience poor working conditions based on the company culture and interpersonal interactions, and therefore find it difficult to continue working at the company (Cech & Waidzunas, 2021; James et al., 2016; Minei et al., 2020; Sawyer et al., 2016; Yoder & Mattheis, 2016).

Until 2020, there was a lack of legal protection in the U.S. for TGNC people. Individuals who did not identify, pass, or express themselves as cisgender men or women were subject to employer discrimination or harassment in the workplace (Bender-Baird, 2011; Sawyer et al., 2016). Title VII of the Civil Rights Act of 1964 formerly designated protections based on identities including race, sex, and religion (Civil Rights Act of 1964), however scholars and lawyers debated whether sexual orientation and gender identity should be included in the definition of sex (Curtis, 2016; Kimmel, 2016; Kirkland, 2006). The *Bostock v. Clayton County, Georgia* (2020) Supreme Court case clarified the definition of sex, ruling that employers cannot discriminate—fire or refuse to hire—based on sexual orientation and gender identity, including transgender individuals.

Until the 2020 ruling, however, the very protections the Civil Rights Act purported to provide for TGNC individuals in the workplace often yielded harm, in part, due to the disagreement of the term “sex” (Bender-Baird, 2011).

Despite increased legal protections for TGNC people, companies can still subtly and overtly oppress TGNC employees. Some TGNC individuals may not be out to their co-workers, which can lead to stress in navigating their identity and concern about harassment or lack of acceptance by co-workers (Bender-Baird, 2011). Since U.S. society reinforces a binary gender system, the workforce also reflects the binary gender norm, which leads to gender misidentification and gender role enforcement for TGNC people (Sawyer et al., 2016). Clothing and dress codes, for example, are one way an office may reflect social gender norms in addition to bathroom use expectations and identity document requirements (Bender-Baird, 2011). When oppressive gender policies are in place and there is a perceived safety risk within the company, TGNC employees can struggle to disclose and express their authentic selves without formal retribution based on company policies or harassment from colleagues (Williamson, 2020). The presence of oppressive policies and an unwelcoming environment can also cause TGNC employees to avoid unsafe spaces at work and alter their gender expression, which conflicts with their authentic core self within the I-MMIDI (Jones & Abes, 2013), and adds additional burden and stress to a population that already experiences substantial oppression (McCarthy et al., 2020).

TGNC individuals may also experience discrimination if they transition while working. For instance, if a TGNC person’s physical features change while employed at a company due to starting hormones or altering their presentation, colleagues may harass

them if they perceive a change in their gender identity or expression (Sawyer et al., 2016). Additionally, TGNC individuals who transition from a woman to a man may receive more respect and privilege as a man in the workforce compared to the perpetuated marginalization of women they previously experienced (Schilt, 2006). In Schilt's (2006) study of 29 TGNC employees, other characteristics such as height and race also influenced how colleagues treated them, reinforcing the relationships between intersecting systems of oppression and identities illustrated within the I-MMDI (Jones & Abes, 2013). TGNC individuals who transitioned while at work also struggled to challenge the gender binary out of concern of maintaining employment and relationships in addition to colleagues enforcing binary notions of gender expression and performance (Schilt & Connell, 2007).

Whether or not an individual is open about their identity at work, TGNC employees assess their coworkers' likelihood of being an ally by considering their coworkers' identities, the field they are working in, and evidence based on observing conduct or interacting with others (Minei et al., 2020). While employees of all genders likely assess others to find comradery at their work, the search for an ally is yet another unfair burden placed on TGNC individuals as they are not only seeking friendship or allyship, but also a safe environment while at work.

If a TGNC person is unable to obtain formal employment, they may struggle with finances. The USTS indicated that one-third of the respondents ( $N=27,715$ ) were at the poverty level, which is double that of the general U.S. poverty rate (James et al., 2016). Other TGNC individuals can receive legal income from multiple sources including employment, pensions, social security benefits, and unemployment, while others may



turn to alternative methods of income that are categorized as illegal in the U.S. (James et al., 2016; Spade, 2015). While some individuals may willingly choose to enter these alternatives due to personal interest, others may be forced to earn income through these methods due to an inability to secure or maintain formal legal employment. Alternative employment can include sex work and dealing drugs, which also leads to increased incarceration of TGNC individuals—a critical issue facing the TGNC community. Transgender women, for example, are disproportionately policed and also endure discriminatory gender regulations in public services, such as treatment and residential programs, which impacts the incarceration and poverty rates of transgender women (Yarbrough, 2021). Those who are incarcerated or were formerly incarcerated will then face additional barriers when trying to earn a livable wage and gain formal legal employment with a criminal record (Spade, 2015). Additionally, without formal legal employment, TGNC individuals may be unable to achieve long-term financial savings plans by way of a retirement account with employer contributions or be unable to obtain affordable health insurance.

### **Healthcare**

TGNC people may encounter barriers in obtaining affordable healthcare. Those who do not have health insurance through their employer and cannot afford it are left with costly healthcare. Additionally, TGNC individuals who need to use hormones or have gender affirming surgery can acquire substantial medical bills, making the TGNC population particularly vulnerable to financial struggles. The USTS indicated that 55% of TGNC individuals who requested insurance coverage for medical transition were denied,

as were one-fourth of TGNC individuals who requested coverage for hormones (James et al., 2016).

Beyond the difficulty of accessing healthcare, medical professionals can also be discriminatory and lack knowledge and training in how to support TGNC patients. Therefore, TGNC individuals may receive inappropriate treatment or be denied care altogether (James et al., 2016). Seelman et al. (2020) found that other identities and experiences such as race, ethnicity, disability, being out, education, mental wellbeing, and suicidality can be associated with perceiving one's healthcare professional to lack knowledge about trans medical care. Additionally, people with intersecting marginalized identities, such as Alaskan Native/American Indian trans men, were most likely to experience mistreatment in healthcare. Trans individuals who had a disability, low socioeconomic status, poor mental health, and those who were out about their trans identity, or had a queer, pansexual, or bisexual sexual orientation were also more likely to experience discrimination in healthcare compared to individuals without multiple marginalized identities (Seelman et al., 2020). Per the I-MMDI, people experience the intersection of their identities at the micro analysis (individual) level but are also susceptible to the macro analysis influence of intersecting systems of oppression such as ableism, classism, and racism (Jones & Abes, 2013). Thus, people with one of these marginalized identities may encounter discrimination in healthcare, but the intersecting experiences when taking multiple identities into consideration can influence the way those with multiple marginalized identities are perceived and treated by healthcare professionals.

## **Housing**

In addition to access and financial issues surrounding employment and healthcare, TGNC individuals can struggle to obtain housing due to cost and discrimination. The USTS reported about one-fourth of respondents encountering housing discrimination while about 30% reported being homeless in the past, and 12% disclosed they were homeless in the last year due to their gender identity (James et al., 2016). TGNC individuals may also be ostracized from their family. Therefore, those who depend on parents, family members, or other guardians, especially at a younger age, are at risk of losing housing and struggling financially if their family rejects them (James et al., 2016; Platt et al., 2020).

## **Violence, Harassment, and Discrimination**

In any of the aforementioned contexts in higher education and society, TGNC individuals are at high risk for violence, harassment, and discrimination. The results of the USTS indicated that almost half of the participants experienced violence, harassment, or discrimination in the past year due to their gender identity (James et al., 2016). The dominant social narrative regarding gender identity influences interpersonal relationships and discrimination in specific contexts (Vaccaro & Koob, 2019), such as those represented in Hurtado et al.'s (2012) DLE model. Intersectionality also plays a key role in leading to varying experiences as an individual with intersecting marginalized identities can experience multiple systems of oppression simultaneously, such as racism and TGNC oppression, as evidenced in the I-MMDI (Darling, 2020; Vaccaro & Koob, 2019).

Many TGNC people experience discrimination and harassment with educational institutions. The USTS indicated that 77% of the respondents experienced discrimination in education, 17% of whom transferred out of a school due to the harassment. Of the 46% respondents who attended college and were out to faculty, students, or staff, about half reported harassment (James et al., 2016). While these are general reports on harassment that are not specifically occurring at colleges and universities—perhaps the reported harassment was outside of the institution but occurred while they were a student—it is important to consider these general data when reviewing the experiences of TGNC students, especially those with multiple marginalized identities.

Specific contexts, such as education institutions, can have a hostile environment towards TGNC individuals due to oppressive structures, policies, and practices within the institution itself or other influential contexts present in the DLE model (Hurtado et al., 2012). Additionally, within society and higher education student organizations, TGNC students can experience in-group discrimination. For example, LGBTQ+ student groups may be inclusive of various sexual orientations but discriminatory towards TGNC students as well as students of color as LGBTQ+ centers and organizations tend to be predominantly White spaces (Manire & Nicolazzo, 2014). These unique contexts and consequences of TGNC individuals' responses to harassment or discrimination such as being misgendered can lead to further oppression, stress, and other mental health concerns (Gunn, 2020).

### **Mental Health**

Experiencing violence, harassment, and discrimination can lead to many mental health concerns for TGNC individuals including being hypervigilant of any threats to

their safety or well-being, which can create or add to existing anxiety or other mental health conditions (Rostosky et al., 2021). The cisnormative rhetoric and norms that are ingrained in U.S. society can also influence mental health and affect gender dysphoria as TGNC individuals internalize oppressive systems and essentialist notions of binary gender (Lindley & Galupo, 2020). Until the release of the *Diagnostic and Statistical Manual of Mental Disorders* fifth edition (*DSM-V*) in 2013, mental health professionals pathologized TGNC identities based on the inclusion of gender identity disorder—now gender dysphoria—in the *DSM-III* and *DSM-IV* (Zucker et al., 2013). The pathologizing of TGNC people served as a form of gatekeeping among institutions by way of the medical community, reinforcing binary gender norms and subsequent institutional oppression of TGNC individuals (Davy & Toze, 2018). Medical stigmatization made it difficult for TGNC people to receive appropriate services and care as institutions viewed TGNC identities as deviant, resulting in further marginalization and discrimination (Stryker, 2017). The *DSM* no longer recognizes gender identity disorder as a mental health diagnosis (i.e., disorder), yet gatekeeping remains an issue in allowing TGNC individuals to access social and medical services, and health professionals often fail to provide appropriate support for TGNC individuals leading to disparities in health care (Gomez et al., 2021; Seelman et al., 2020), especially for TGNC individuals of color (Seelman et al., 2021). For example, narratives abound about TGNC people who seek medical attention and instead find themselves dismissed or interrogated about their gender (Seelman et al., 2017b).

Additionally, TGNC individuals with other intersecting identities, especially those that are marginalized in the U.S., have unique experiences with mental health and can be

at higher risk for certain diagnoses. Layland et al. (2020), when examining the association between discrimination and suicide attempts in adults between the ages of 18 and 25 ( $N=2591$ ), found that sexual minority participants were more likely to have attempted suicide when compared to heterosexual participants regardless of race and ethnicity. However, within the sexual minority group Black and Hispanic individuals had higher odds of suicide attempts compared to White individuals. Another study examining sexual minorities highlighted the association between concealing one's sexual orientation with internalizing mental health issues as well as substance abuse concerns (Pachankis et al., 2020). While these studies focused on sexual orientation identities instead of gender, they showed how TGNC individuals who are sexual minorities or have other marginalized identities may be at greater risk of concerning mental health outcomes. Race and class are also vital identities when considering TGNC people and their experiences with mental health and the different systems of oppression at play (Shelton & Lester, 2020).

In addition to internalizing oppressive messages about TGNC identities from various institutions and individuals within society, lack of protective state and federal policies can also influence one's mental health. The absence of formal protection conveys social perspectives towards TGNC people, yet, as CTP highlights, the presence of protective policies would not eradicate all discrimination, violence, and harassment towards the TGNC community (Spade, 2015). However, lack of protection can influence TGNC mental health as victimization and discrimination can be strong predictors of suicidal ideation (Rabasco & Andover, 2020). Additionally, awareness of anti-TGNC legislation can be associated with stress, lack of sense of belonging, and hopelessness

regarding discrimination (Tebbe et al., 2021). Those who work with TGNC people in a counseling capacity or in a close interpersonal role should normalize and validate their unique needs and mental health concerns (Shelton & Lester, 2020). Incorporating an intersectional approach also allows professionals to address and better understand the various oppressive systems that affect TGNC individuals of multiple marginalized identities who are seeking appropriate and inclusive support (Astramovich & Scott, 2020; Shelton & Lester, 2020).

While TGNC individuals can experience the same discrimination and lack of knowledge by psychologists and psychiatrists as they do in other medical healthcare contexts, therapy can also be a helpful tool for TGNC individuals to receive support and coping strategies. Nonbinary individuals in Hall's (2020) study ( $N=21$ ) reported using various resources including therapy, their communities, and distractions to build resilience and address their experiences with anxiety and depression. With the incorporation of mental health concerns within psychology, medicine, and social work curricula, mental health providers can serve as a supportive and helpful resource for TGNC people, providing a safer environment compared to healthcare professionals who knowingly or unknowingly discriminate against TGNC patients.

### **Summary of TGNC Oppression in Society Through a CTP Lens**

CTP provides a framework for understanding the manifestation of TGNC oppression in society. TGNC oppression occurs in many ways including violence, harassment, and discrimination in employment, healthcare, and housing, all of which influence TGNC individuals' mental health. While TGNC people can succeed and thrive in all of these areas, systemic barriers and oppression often prevent them from accessing

opportunities (e.g., employment) and necessary services (e.g., healthcare). For example, TGNC individuals who identify as genderqueer and have an androgynous gender expression within Jourian's (2015) dynamic model may encounter barriers when navigating documents that do not reflect their gender identity or harassment when accessing binary gender restrooms or interacting with colleagues (Bender-Baird, 2011). Oppressive policies and practices can prevent TGNC workers from being able to be their authentic selves at work (Williamson, 2020), and lead to some TGNC individuals choosing or needing to pursue opportunities to earn an income through criminalized work (Spade, 2015). Using I-MMDI terminology, TGNC individuals are unable to present their core authentic identity due to the intersecting systems of oppression related to work and other aspects of their lives. Practices and attitudes within these systems that create barriers to legal employment lead some TGNC people to engage in criminalized work (e.g., sex work), which may intertwine them with the prison system (Spade, 2015).

Additionally, as represented in the I-MMDI, individuals with multiple or intersecting marginalized identities have different experiences from those with privileged identities and may be at a higher risk of oppression. For example, TGNC individuals with a disability, low socioeconomic status, or a marginalized sexual orientation are more likely to experience discrimination in healthcare (Seelman et al., 2020). Therefore, it is important to include the voices and experiences of various identity groups to understand the ways systemic oppression affects TGNC and other communities to disrupt systems of oppression and demand TGNC liberation and social change in a way that benefits multiple marginalized communities.



In addition to understanding the experiences of various communities, centering TGNC and other marginalized voices provides a way for communities to collaborate and address necessary social change. The problems are systemic and affect marginalized communities differently, therefore fixing one aspect of an issue that affects one community, will likely fail to address the entire problem for various marginalized communities. Having the needs, identities, and experiences of TGNC and other identities in the forefront can foster a collaborative effort to address systemic oppression. This form of resistance can occur through intersectional collaboration to determine multiple ways to enact ongoing social change by way of dismantling systems of oppression broadly and within specific institutions such as higher education.

### **TGNC Oppression in Higher Education**

Since TGNC students interact with U.S. society prior to and during college, they are likely affected by the various systems of oppression outside of higher education. However, TGNC students also encounter institutional barriers while attending college. Such barriers include TGNC oppression and the binary gender system within higher education spaces, policies, and practices. For example, TGNC students must negotiate their gender and other identities within the broad campus climate as well as specific curricular and co-curricular contexts. In this section, I review the literature on TGNC oppression by way of binary practices within higher education and the experiences TGNC students have when negotiating their identity in curricular and co-curricular contexts. Then, I discuss the violence, harassment, and discrimination that can happen to TGNC students while in college as well as their experiences with mental health. Next, I highlight how these various forms of oppression within higher education relate to student

success and retention as well as the ways TGNC students find support and empower themselves by building resilience and community. Lastly, I discuss TGNC oppression in higher education through a CTP lens to highlight oppressive systems and structures that influence TGNC student experiences.

### **Binary Gender Policies and Practices**

Higher education institutions historically have had physical infrastructures, policies, and practices that are entrenched in TGNC oppression, privileging those who identify as one of the binary genders while oppressing TGNC people (Bilodeau, 2009). The structure, functioning, and interactions within an institution are centered on societal gender norms that mediate the lives of those within the college or university (Nicolazzo, 2016b, 2017c). The oppression that occurs in these spaces can make students of various gender identities feel pressure to conform to established gender norms, further marginalizing and oppressing TGNC students. Furthermore, TGNC students can encounter multiple intersecting systems of oppression, including the overlap of sexism, transphobia, as well as racism, ableism, and others depending on their identities (Box, 2020).

When considering the physical spaces on campuses, residence halls and restrooms tend to be common areas that are designated based on binary gender options (Bilodeau, 2009; Grice, 2020; Nicolazzo 2017c). Gender neutral, gender inclusive, and trans-friendly restrooms and housing options have slowly emerged on some campuses, but they are far from the norm. While TGNC students reported gratitude for having gender-inclusive housing options, issues persist with TGNC students being able to access and fully benefit when cisgender constituents control policies and practices, and discriminate

against TGNC individuals in residential spaces (Wagner et al., 2018). When TGNC students do not have access to spaces in which they feel comfortable, they likely will not feel a sense of belonging, and are at greater risk of experiencing violence and harassment from others who uphold essentialist binary gender notions (Bilodeau, 2009; Miller & Grollman, 2015; Nicolazzo, 2017c). In addition to physical harm, violence, harassment, and oppression can also impact TGNC students' mental wellbeing (Seelman, 2016).

College applications and other forms on campus also tend to be embedded in TGNC oppression as students are given the option to select only male or female as their sex or gender—which is also problematic due to the inaccurate conflation of biological sex and gender, both of which are also not dichotomous (Bilodeau, 2009, Nicolazzo, 2017c). Failing to allow TGNC students to provide their appropriate gender identity on these forms, such as those included in Jourian's (2015) dynamic model, excludes them from being able to indicate their authentic identity, thereby also hindering TGNC students' sense of belonging at the institution (Lieberth, 2020). Applying the I-MMDI, genderism and TGNC oppression influence students' experiences negotiating their identity within higher education contexts that require students to select a binary gender, which can conflict with their core, authentic self (Jones & Abes, 2013).

Fortunately, institutions are increasingly providing systems and processes that allow students to change their names so that professionals on campus will use students' correct names. Lieberth (2020) conducted a narrative study examining the experiences of transgender college students who used a preferred name policy at their institution. The findings indicated that the name change policy influenced student persistence and the ways they negotiated their identity as well as their sense of belonging and validation.

However, the name change policy had flaws as students cited ways the system, training, and awareness could be improved (Lieberth, 2020). Additionally, name change policies can also be unclear and confusing for TGNC students, which can create further stress when negotiating their identity on campus (Catalano, 2015a).

### **TGNC Perceptions of Campus Climate**

Due to the oppression ingrained on college and university campuses, TGNC students have historically held negative perceptions of campus climates (Rankin et al., 2010). Differences in institutional characteristics, student generations, and individual experiences in curricular and co-curricular contexts can influence TGNC student perceptions of the climate (Garvey et al., 2017). TGNC students' degree of outness to people on campus can also impact their perceptions of campus climate as recent studies showed students who are out—specifically as TGNC, bisexual, pansexual, and sexually fluid identities—had more positive perceptions of their campus climate (Garvey et al., 2018a, 2019b). Gender conforming students tended to have more positive views of the curricular climate compared to gender nonconforming students, with degree of outness and other institutional factors such as the presence of LGBTQ+ inclusive curricula, use of resources, and support also having significant influences on students' perception of the campus climate (Garvey & Rankin, 2015). In their quantitative study of 380 nonbinary college students, Budge et al. (2019) found a direct relationship between students' sense of belonging, perception of campus climate, and minority stress experiences. Nonbinary students with low sense of belonging and negative perceptions of the campus indicated more experiences with enduring minority stress compared to those who held positive perceptions of the climate and had a greater sense of belonging. Additionally, Garvey et

al. (2018b) showed that students who have higher comfort with their campus climate tend to hold positive perceptions regarding their college or university's active dedication to and engagement with the campus climate, and also rated their academic success highly.

Intersectionality can also play a key role in TGNC student experiences and campus climate perspectives as they may struggle to negotiate multiple marginalized identities (Nicolazzo, 2016a, 2016b). TGNC students of color, for example, must navigate racism and TGNC oppression on campus, which can influence the ways they negotiate their identities on campus including the degree to which they are comfortable being out (Garvey et al., 2019a). Jourian and McCloud (2020) found that Black trans masculine students balanced trying to resist harmful social notions of Black masculinity while also transgressing Black masculinity by suggesting new ways of presenting that gender. Thus, not only were these students navigating racism and TGNC oppression—the macro analysis within the I-MMDI—but they also took on the responsibility of challenging norms and perceptions of their gender identity and establishing new ways to perform and be a Black trans masculine individual—the micro analysis within the I-MMDI. Other students with intersecting identities, such as TGNC students with disabilities, may encounter extra barriers when navigating institutional timeframes, policies, and accommodations that can place blame on students rather than ableist institutional structures (Miller, 2020). The macro level systems of oppression (e.g., ableism and TGNC oppression) present in the I-MMDI (Jones & Abes, 2013) are thus present in various contexts external to and within a college or university climate, influencing TGNC student experiences and perceptions.

Jaekel and Nicolazzo's (2020) examined TGNC educators' perceptions of TGNC identities on their campuses reported experiences of both hypervisibility and invisibility in curricular contexts as well as the broader campus. In other words, individuals who were out as TGNC willingly or unwillingly took on the emotional labor of answering questions or doing gender identity related diversity work such as mentoring students or faculty members. However, TGNC individuals felt they were invisible due to various personnel on campus overlooking or not acknowledging their identities and needs (Jaekel & Nicolazzo, 2020). The presence and representation of TGNC faculty, staff, and students is critical in establishing inclusive learning experiences for TGNC students, which can also influence TGNC students' perception of their campus climate (Garvey et al., 2017; Simpfenderfer et al., 2020). The DLE model illustrates the important and influential interaction of faculty and staff identities with students' identities in curricular and co-curricular contexts (Hurtado et al., 2012).

### **Curricular Contexts**

Within the broad campus climate, TGNC students can encounter more specific barriers within the classroom and within their major as illustrated in the DLE model's curricular and co-curricular contexts (Hurtado et al., 2012). The environment and acceptance of TGNC students in certain disciplines can vary when considering the sociocultural forces that influence perceptions of identity and historical gender norms that may still be present within a major (Linley & Nguyen, 2015). For example, social norms in the U.S. historically mandated that professional dress should be masculine suits for men and feminine dresses or skirts for women when presenting or interviewing. However, the established dress code may conflict with a student's gender identity and

expression, causing internal distress or external conflicts with instructor or employer expectations (Bilimoria & Stewart, 2009; Cech, 2013; Cech & Waidzunas, 2011; Nicolazzo, 2017c). In other words, students whose gender identity or expression do not match normative, binary expectations of gender—as seen in the dynamic gender and sexuality model—can experience tension with their authentic self due to the systems of oppression influencing policies and practices that impact TGNC students—seen in the DLE model and I-MMDI. The lack of inclusion of diverse gender identities can produce additional stress as students negotiate their identity and assess their safety in curricular contexts (Nicolazzo, 2017c).

Regardless of major, a TGNC student may be transparent about their identity with instructors and peers or may unwillingly be outed by someone in class who uses their incorrect name or pronoun, both of which can lead to further harassment and discrimination (Beemyn & Rankin, 2011; Nicolazzo, 2017c). Given the uncertainty in curricular contexts, especially ones that seem less open to diverse gender identities, TGNC students may assess their instructors' actions and interactions to gauge the degree of safety, support, and inclusiveness in the classroom (Linley et al., 2016). Faculty relations can also be key as gender norms and perceptions of the curricular climate can prevent TGNC students from receiving mentorship from faculty or other educators in a discipline due to lack of representation in those that share an identity or fear that available mentors will not accept their identity (Dugan et al., 2012). Activities such as mentorship or collaborative undergraduate research can play a significant role in students' development within their major, which also necessitates supportive and inclusive instructor-student interactions to be successful (Kilgo et al., 2019).

When considering intersecting marginalized identities, relationships between students and instructors can be vital, as shown in the curricular context within the DLE model (Hurtado et al., 2012). In Faulkner et al.'s (2020) study, marginalized students viewed instructors who were supportive, communicated well and in a timely manner, and centered student experiences and perspectives as inclusive and accepting. Having supportive instructors can be especially important for TGNC students who feel invisible in the classroom or department and experience marginalization related to their race and other identities (Duran & Nicolazzo, 2017). For example, curricular high-impact programs such as research, first-year seminars, capstones, internships, and other curricular and co-curricular programs are often shaped by cisgender perspectives and White ideology that fail to integrate TGNC students of color (Stewart & Nicolazzo, 2018).

In addition to the interpersonal relationships and interactions in the classroom, the curriculum itself can influence TGNC student experiences in their discipline, which is also indicated in the DLE model (Hurtado et al., 2012). The curricular context can serve as a microsystem in which TGNC students must carefully negotiate their identity in addition to responsibilities and stressors already present in being a college student (Linley & Nguyen, 2015). For example, a high achieving TGNC student who did not have to study in high school might have to navigate the stress of (re)learning how to study, commuting to campus, and managing a 30-hour job to help pay for college in addition to taking 15 credit hours of coursework. However, this student might also struggle to find support on campus after experiencing faculty, staff, and peers misgendering them or verbally harassing them due to their gender expression. Therefore, the student has the



added pressure of determining to whom they can safely disclose their identity and experiences in curricular contexts.

### **Co-curricular Contexts**

While TGNC students may struggle to find a welcoming environment in curricular contexts, they may find a supportive environment within co-curricular activities. However, many TGNC students still encounter oppression and barriers in these contexts as well. Campus LGBTQ+ center staff, despite including the T for transgender in the acronym often fail to acknowledge and incorporate the specific needs and perspectives of TGNC students (Manire & Nicolazzo, 2014). The exclusion of TGNC individuals reflects socio-historical perceptions and actions in which lesbians and gays have deliberately discriminated against transgender individuals and excluded them from organizations and resources (Stone, 2009; Stryker, 2017). The effects of past and present discriminatory policies and practices impact students' experiences and perceptions of an institution's climate for diversity due to the socio-historical context as well as the historical, psychological, and behavioral aspects within the institution (Hurtado et al., 2012).

Additionally, LGBTQ+ centers tend to be White spaces that can be discriminatory and exclusive of students based on their race in addition to their gender (Manire & Nicolazzo, 2014; Nicolazzo, 2016a). Due to the lack of diversity within LGBTQ+ centers, students may struggle to find their fit in student organizations and the campus community as parts of their identity are accepted in different spaces, but their entire authentic self—or the core within the I-MMIDI—with their intersecting identities may not be fully accepted in all co-curricular spaces (Catalano, 2015b; Dugan et al., 2012;

Nicolazzo, 2017c; Stone, 2009; Rankin & Beemyn, 2012). For example, a Black TGNC bisexual student may feel included in an LGBTQ+ student organization based on their sexual orientation but excluded due to their gender identity and race. However, the student may feel welcomed in a Black student organization due to their race while feeling marginalized due to their sexual orientation and gender identity. Depending on the context TGNC students are in (i.e., the DLE contexts) and the multiple identities that intersect and are salient—illustrated in the I-MMDI—in a given context, students will negotiate their identity and experience the environment differently.

When lacking a sense of belonging or experiencing discrimination in curricular and co-curricular contexts on campus, TGNC students are less likely to engage in campus activities—student organizations, mentorship programs, community service—and less willing or able to take on leadership roles (Dugan et al., 2012). Dugan et al. (2012) provided a rationale suggesting that trans students are, perhaps, less likely to want to be involved and take leadership roles to better a campus or society that discriminates against them through exclusionary laws, policies, and practices. The researchers also posited that male to female (MtF) students in their sample lost their perceived male privilege and thereby held fewer leadership positions in co-curricular activities and were less likely to have a mentor compared to cisgender students or individuals who others perceived to be men. Men often dominate leadership roles, therefore students who identify or present as women (e.g., MtF students) must navigate social gender norms that purport men as more capable leaders compared to women. The data and results from Dugan et al.'s (2012) study is limited in several ways including the small sample size, outdated and narrow transgender identity categories, as well as further inappropriate comparison of

experiences based on gender identity compared to sexual orientation without consideration of intersecting experiences between gender identity and sexual orientation. In other words, a TGNC individuals can be heterosexual or LGBTQ+. Regardless, Dugan et al.'s (2012) findings illustrate ways the campus climate towards TGNC students can affect their sense of belonging, engagement, and experience with discrimination.

### **Influence of Violence, Harassment, and Discrimination on Mental Health**

Just as TGNC individuals can experience violence, harassment, and discrimination in general society, they can also encounter these oppressions on campus. A national report on campus climates and LGBT students ( $N=5,149$ ) indicated that the majority of trans respondents experienced harassment on campus, 55% of which occurred in the classroom (Rankin et al., 2010). Additionally, while college students have high rates of mental health concerns, TGNC individuals have a heightened risk due to negotiating their identity on campus and society as well as encountering violence, discrimination, and harassment (James et al., 2016). TGNC oppression in society and higher education stigmatizes TGNC identities, which can lead to students experiencing psychological trauma and challenges including low self-esteem, anxiety, depression, and suicidality (Effrig et al., 2011; Huebner et al., 2004; Lefevor et al., 2019; Miller & Grollman, 2015; Platt, 2020; Rabasco & Andover, 2021; Seelman et al., 2017a; Woodford et al., 2018a, 2018b). Additionally, students can feel isolated, excluded, and fearful they will endure various forms of discrimination or violence (Rankin et al., 2010). These psychological implications are detrimental and can lead to harmful behaviors such as increased alcohol or drug use to cope when experiencing discrimination and stress (Ehlinger et al., 2021). Discriminatory environments and subsequent psychological harm

can also lead to student attrition, thereby affecting the number of TGNC individuals in their specific field. Students who have multiple marginalized identities are likely to experience higher rates of mental health concerns, illustrating additional challenges that can emerge when navigating intersecting marginalized identities due to multiple intersecting systems of oppression evidenced in the I-MMIDI (Efrigg et al., 2011; James et al., 2016; Lefevor et al., 2019).

TGNC students who experience harassment may decide to leave higher education. However, those that experience harassment or violence and remain at their college or university are more likely to experience a negative impact on their mental health and academics compared to cisgender students (Carmody et al., 2020). Due to TGNC oppression within society and higher education, for instance, TGNC students can experience stress from a pressure to conform to binary norms (Box, 2020; Duran & Nicolazzo, 2017). TGNC oppression reinforces a constructed notion of normalcy which can cause TGNC students to question whether they should conform to binary gender (Nicolazzo, 2016a), thereby questioning their identity—within the dynamic model of gender and sexuality—and core self (in the I-MMIDI). Students with multiple marginalized identities may also experience stress due to concern they are not trans enough (Catalano, 2015b), Black enough, disabled enough, or whichever identities feel salient in any given context based on social norms (Nicolazzo, 2016a).

In addition to social and institutional pressure, TGNC students can also experience stress due to pressure within the trans community. Some students may be concerned about transnormativity (Johnson, 2016) or being trans enough (Catalano, 2015b) in and outside of the TGNC community while TGNC individuals who identify as

a man or a woman may stress about whether they can or should pass as that gender versus wanting to be out as their authentic TGNC self (Catalano, 2015b; Nicolazzo, 2016a, 2017c). When negotiating and making sense of their own identities, TGNC students can also experience emotional burnout or exhaustion from being the token TGNC individual in certain contexts—such as curricular and co-curricular contexts in the DLE model—thereby being put in the position of educating others about their identity and experiences (Duran & Nicolazzo, 2017; Nicolazzo, 2017c). TGNC faculty in Jaekel and Nicolazzo's (2020) study also reflected experiences of tokenization and burnout, reporting they had added labor by way of emotional work due to requests that they mentor TGNC students and faculty.

Studies show, compared to cisgender students, TGNC students can have higher levels of stress when living on campus (Meacham, 2020) and account for the highest ratings of distress within college counseling centers (Platt, 2020). Those with intersecting marginalized identities can have varying experiences as well. One sample of 41,691 TGNC individuals of color, for example, had greater stress symptom severity when compared to cisgender and White TGNC participants (Lefevor et al., 2019).

TGNC students are also more likely than cisgender students to experience stress due to concerns about finances related to employment, healthcare, housing, cost of college, and other matters that disproportionately affect the TGNC community (Stolzenberg & Hughes, 2017). Additionally, students may experience high levels of stress as they are more likely to have strained relationships with family members compared to non-TGNC students (Platt et al., 2020). When TGNC individuals encounter discrimination such as microaggressions and victimization, some students may experience

high levels of stress and anxiety, (Effrig et al., 2011) and depression (Woodford et al., 2018a).

Experiencing TGNC discrimination or victimization (e.g., employer, healthcare, family, or housing discrimination) can lead to an increased risk in suicidal thoughts and behaviors (Cramer et al., 2021). TGNC students who also experience anxiety and depression may also be at risk for suicidal ideation (Miller & Grollman, 2015). In a study examining the association between suicidal ideation and being denied access to housing and restrooms on campus, one-third of the 2,325 TGNC person sample indicated they experienced suicidal ideation (Seelman, 2016). Denial of access to these spaces was shown to have a significant relationship to suicidality, while another study also indicated that victimization and discrimination experiences were strong predictors of the severity of individuals' suicidal ideation (Rabasco & Andover, 2021). When taking intersecting marginalized identities into account, Seelman (2016), using data on 2,316 TGNC individuals from the National Transgender Discrimination Survey, found that TGNC people of color were 1.25 times more likely to attempt suicide compared to White TGNC people. Additionally, individuals with a physical or mental disability and individuals with low income were more at-risk of attempting suicide compared to people without a disability or individuals with higher incomes (Seelman, 2016). These higher rates reflect the intersecting forms of oppression displayed in the I-MMDI.

While TGNC students are at-risk of experiencing mental health issues tied to oppression in society and higher education, Woodford et al. (2018a), using structural equation modeling on a sample of 268 LGBTQ+ students, found that the inclusion of nondiscrimination policies that include gender identity, LGBTQ+ curricula, and student

organizations at an institution had a significant negative indirect effect on distress ( $p < .001$ ). In other words, the inclusive policies, curricula, and student organizations were associated with lower levels of distress by way of lower levels of discrimination. Additionally, peer and adult acceptance of LGBTQ+ and TGNC identities have also been shown to be associated with lower rates of suicide attempt, with family and heterosexual peers' acceptance being the most significant (Cramer et al., 2021; Green et al., 2021). Specifically, parental support has been shown to help promote resilience and improved health outcomes among TGNC individuals (Andrzejewski et al., 2021).

While TGNC students report higher levels of depression compared to cisgender peers—47.2% compared to 9.5%, respectively, from a national sample, they also sometimes use counseling centers and other mental health resources more than cisgender students (Stolzenberg & Hughes, 2017). Offering and promoting counseling and support for TGNC students by professionals who are educated on TGNC identities is critical for their personal well-being as well as, ideally, positively influencing their sense of belonging on campus (Cavanaugh & Luke, 2021). However, offering professional support through counseling does not obviate the social and institutional responsibility of disrupting and dismantling existing oppression.

### **Retention**

When enduring discrimination and oppression, some TGNC students may leave their higher education institution. In their exploratory study of 14 trans students who did not persist at their institution, Goldberg et al. (2019) found students left their college due to various reasons including stress related to their gender identity when navigating interpersonal interactions and institutional services, unwelcoming and discriminatory

curricular and co-curricular climates, and difficulty with finances and family support. The USTS indicated that about 16% of the 27,715 TGNC respondents who attended college or a vocational school and were out on campus left higher education due to severe harassment (James et al., 2016). In addition to discrimination, students' society, institutions, identity development, relationships, and finances can all influence TGNC student retention (Garvey & Dolan, 2021). When TGNC students encounter challenges while negotiating or making meaning of their identity—especially at institutions or within disciplines that tend to incorporate dichotomous and unwelcoming policies or behaviors towards people with underrepresented gender identities—they can struggle to feel a sense of belonging, develop coping strategies, and persist in their chosen major (Cech et al., 2017; Grossman & Porche, 2014; Hughes, 2018; Lieberth, 2020).

Higher education and student affairs professionals can promote TGNC persistence through big picture inclusive opportunities for student integration and engagement on campus including support services, positive policies and climate, and training for faculty, staff, and students (Robinson, 2019; Woodford et al., 2018a); however, the interpersonal support is especially crucial for students to feel a sense of belonging and thereby persist (Apriceno et al., 2020). TGNC students may be likely to seek support from professional therapists through campus counseling centers (Platt, 2020), and they might also have positive experiences and receive support from faculty, staff, and peers (Pryor, 2015). However, college and university LGBTQ+ centers, the very units that are supposed to be safe and supportive spaces for TGNC and sexual minority students, have historically excluded or marginalized TGNC people (Manire & Nicolazzo, 2014). Similarly, just as TGNC students may receive support from some individuals, many encounter faculty and



staff that are “minimally inclusive” (Catalano, 2015a, p. 422) of their identity in curricular and co-curricular contexts (Pryor, 2015), which can influence sense of belonging and ability or desire to persist.

### **Kinship and Resiliency**

Systemic oppression and interpersonal discrimination towards TGNC individuals, especially those with multiple marginalized identities, leads TGNC students to search for various types of community building and coping mechanisms (Nicolazzo, 2016b, 2017c). TGNC students can find TGNC resources and community by engaging with other TGNC individuals through social networks (Goldberg & Kivalanka, 2018; Nicolazzo et al., 2017; Stolzenberg & Hughes, 2017) and other virtual spaces where they can be their authentic selves or present an idea of themselves through video games or online platforms (Beemyn & Rankin, 2011; Haverkamp et al., 2019; Nicolazzo, 2017c). Being able to discuss common experiences with other TGNC individuals, whether virtually or via in-person communities on or off campus, can provide support when exploring their identity or encountering discrimination as well as a space to present and be validated and accepted as their core authentic self (Goldberg & Kivalanka, 2018; Hetzel & Mann, 2021; Nicolazzo et al., 2017).

Nicolazzo (2017c) defines trans\* kinship networks as:

close groups of peers [who] recognize and honor trans\* people’s gender identities, expressions, and embodiments; provide a refuge from the cultural realities of gender binary discourse and compulsory heterogenderism; and act as a potential site from which trans\* people can resist or push back against systemic trans\* oppression... (p. 168)

Finding support through trans\* kinship can influence TGNC students’ resilience and agency in negotiating their identity and fostering their success in college and society

(Nicolazzo, 2016b; Nicolazzo et al., 2017). Despite facing oppression that pressures TGNC individuals to conform to binary notions of gender, TGNC students can be empowered by resisting societal expectations (Duran & Nicolazzo, 2017) and gender norms (Nicolazzo, 2016b), such as identifying or presenting as an identity within Jourian's (2015) dynamic model that challenges binary gender. Experiencing resiliency in the face of oppression and adversity can promote grit to persist as TGNC students navigate social and academic challenges (Robinson, 2019) as well as agency in tending to their own needs (Stolzenberg & Hughes, 2017).

### **Summary of TGNC Oppression in Higher Education Through a CTP Lens**

Similar to the manifestations of oppression in society, CTP also provides a way to frame TGNC oppression that occurs within higher education. TGNC oppression within higher education includes binary practices in housing, name change options, forms, and restrooms. Additionally, TGNC individuals navigate harassment, violence, and discrimination when engaging with faculty, staff, and students in various (DLE) contexts at their college or university. Oppression can also occur within specific departments based on gender norms and roles, such as expected dress codes during presentations (Nicolazzo, 2017c). Spaces that are designated as LGBTQ+, such as LGBTQ+ centers, may also be exclusive of TGNC identities, thereby failing to address the needs of TGNC students (Manire & Nicolazzo, 2014). This TGNC oppression can influence students' sense of belonging, engagement with others on campus, mental health, and persistence in their major or at their institution (Cech et al., 2017; Hughes, 2018). Again, concerns of TGNC student sense of belonging, engagement, well-being, and persistence are issues of systemic oppression that needs to change and not a reflection of TGNC people's innate

ability to thrive in their major or school. If students are unable to find formal support at their college or university, they may turn to outside communities to find liberation and develop resilience through TGNC kinship and other support systems (Nicolazzo, 2016b).

There is no monolithic TGNC student experience as each student's multiple identities and the salience of those identities impact their experiences. Some students may be more at-risk for discrimination, violence, harassment, and subsequent adverse effects on sense of belonging and mental health, especially those who have multiple marginalized identities and thereby experience intersecting systems of oppression (as seen in the I-MMDI). For example, LGBTQ+ campus spaces are often coded as White (Duran & Jones, 2020), so a TGNC student of color involved in an LGBTQ+ student organization may experience marginalization and struggle to feel a sense of belonging. Or, in an LGBTQ+ or non-LGBTQ+ space, a Black TGNC student may encounter oppression involving their race and gender identity, and therefore must negotiate their identity differently in various contexts (Jourian & McCloud, 2020).

Centering TGNC and all marginalized voices can foster change that liberates TGNC people and incorporates their needs. Again, substantive change requires assessing and undoing existing systems, not implementing minimal reforms that fail to truly address underlying problems. For example, gender inclusive on-campus housing may create opportunities for students of various identities to live together, however the mere inclusion of gender inclusive housing does not address the oppression that emerges in housing through oppressive interactions, policies, and practices (Wagner et al., 2018). Including multiple marginalized communities when resisting and advocating for change can address TGNC needs while also ensuring other marginalized identities are accounted

for in the process. Just like addressing TGNC oppression in society, multiple marginalized communities can collaborate to resist and determine various ways to address necessary social change by way of dismantling oppressive systems within higher education institutions broadly and within particular majors and departments.

### **Oppression in Engineering and STEM**

TGNC oppression present in society and higher education institutions causes barriers for TGNC and other students. However, specific disciplines that are dominated by White cisgender men, such as engineering, are historically conservative and perpetuate binary perspectives of gender that can be particularly unwelcoming to sexual minority and TGNC students (Cech & Waidzunas, 2011). Given the lack of research on TGNC identities in engineering and other STEM fields, I focus the majority of this section on women and underrepresented racial identities in STEM, and LGBTQ+ students in STEM, also highlighting the few studies that specifically address TGNC experiences in engineering and STEM when applicable. At the conclusion of this section, I provide a summary that directly applies CTP to the discussion of TGNC oppression in engineering and STEM fields.

### **Women and Underrepresented Racial Identities in Engineering and STEM**

Research on women and underrepresented racial identities in conservative STEM fields, such as engineering, reflect some of the marginalized experiences of LGBTQ+ individuals (Cech & Waidzunas, 2011). While harassment and discrimination take on different forms depending on students' intersecting identities, there seems to be a common unwelcoming environment for underrepresented populations in conservative technical fields. Some studies indicate improvement in the perception of barriers to

STEM fields by women and underrepresented racial identity groups (Grossman & Porche, 2014). However, students continue to experience gender bias and unwelcoming environments in STEM (LaCosse et al., 2016; Robnett, 2016). Grossman and Porche (2014), for example, found that gender and racial or ethnic minorities perceived lower levels of support in STEM, with the majority of the high school students in their sample ( $N=53$ ) experiencing microaggressions, especially related to gender, in the forms of systemic barriers as well as insults involving expectations and stereotypes of women. However, the respondents also indicated high levels of coping mechanisms (e.g., challenging stereotypes and seeking support) and confidence in pursuing STEM as well as believing times are changing and barriers are diminishing compared to the historic environment for women in STEM. While the climate for women and other underrepresented students may be improving, systemic barriers and discrimination still occur, creating hostile environments and challenges for students when negotiating their identities. Additionally, having more than one marginalized identity in engineering, such as a woman of color, can create a double bind (Cross et al., 2021) in which students must negotiate their multiple marginalized identities within oppressive environments that present competing demands between their environment and identities.

STEM majors operate within a college or university that inevitably has roots in TGNC oppression when considering the influential socio-historical, policy, and institutional contexts within the DLE model (Hurtado et al., 2012). While there is a lack of research specifically examining differences in gender and intersecting identities by subdisciplines within the broader STEM category (Perez-Felkner, 2019), binary gender norms infiltrate STEM majors, especially those with lower enrollment of women. The

lack of representation of women, subsequent stereotypes directed towards women who pursue STEM, and marginalization in the classroom can impact students' perceptions of their major and college or university (Leyva et al., 2020). One study, for example, had a total of 51 U.S. men and women of various races rate pictures based on the likelihood of the people in the photos working in a STEM field (Banchefsky et al., 2016). Banchefsky et al. (2016) found that participants perceived women who exhibited feminine characteristics to be less likely to enter a STEM field, illustrating the praising and privileging of men. Shropshire (2021) also found that participants, in multiple studies, linked facial femininity in photos with having a career in humanities, and masculine facial features to STEM fields. Participants were also more likely to associate Asian individuals with STEM careers compared to Black and White individuals, however feminine facial features were least likely to be associated with STEM careers regardless of race (Shropshire, 2021).

Women students can develop strategies based on gender norms as a way of managing their identities and succeeding in curricular and co-curricular STEM contexts. Strategies can include adopting the role of a “nurturing caregiver” or an “amicable nice girl” (Silver, 2020, p. 233) when interacting with their peers, which adds additional emotional labor to an already strenuous curriculum. Seron et al. (2018) observed that engineering education further reproduced gender norms, specifically hegemonic masculinity, privileging those with skills and independence. Due to these values within engineering, women viewed their marginalization as incidents unique to them rather than a matter of systemic oppression (Seron et al., 2018). This sentiment of marginalization being unique to them might lead women to believe that their marginalization is their own

fault rather than a systemic issue that affects women and people with other marginalized identities.

There are many studies specific to the experiences of cisgender women in engineering ranging from engineering education and workforce (Brainard & Carlin, 1998; Faulkner, 2009; McIlwee & Robinson, 1992), developing an engineering identity (Meyers et al., 2012) or an identity as an underrepresented population within engineering (Foor et al., 2007; Settles, 2004; Tonso, 2007), to psychological implications such as perceived competence, ability, and stereotype threat (Grossman & Porche, 2014; LaCosee et al., 2016; Robnett, 2016; Steele, 2010). Similar studies about underrepresented racial identities in engineering majors also contribute to the literature, illustrating that Black, Latinx, Native American, Asian American, and multiracial students are at high risk for experiencing discrimination, bias, stereotype threat, and other barriers to entering, persisting, and graduating in engineering (Grossman & Porche, 2014; McGee & Martin, 2011). These barriers occur over an individual's lifespan as individuals accumulate internalized negative messages regarding their identity from society, peers, and family, microaggressions, and discrimination, which can lead to stereotype threat and imposter phenomenon (Nadal et al., 2021). Considering the I-MMDI, these students' experiences can differ based on their racial identities and systemic oppression they encounter in STEM contexts. Those who identify as women (or are perceived to be women) encounter intersecting systems of oppression—genderism and racism—that influence their experiences as students with intersecting marginalized identities in STEM.

Challenges and experiences in curricular and co-curricular contexts directly affect the ways students negotiate their identities. Robnett (2016), for example, hypothesized

and demonstrated that of 108 high school girls, (a) the girls' peers who were boys exhibited more gender bias than girl peers, (b) gender bias was more pervasive in rigorous math majors, and (c) those who experienced more gender bias had lower "STEM self-concept,"—confidence in pursuing STEM or the ability to identify and belong as a STEM student or professional (p. 67). In other words, the more discrimination women in STEM majors experienced, the less likely they were to feel a sense of belonging and ability to succeed in those fields. This link between discrimination and sense of belonging is closely related with stereotype threat where individuals internalize common social perceptions of their identity group, which creates anxiety or concern about their behavior, performance, or presentation confirming a stereotype about their identity group (Steele, 2010). Women and underrepresented racial identities face stereotypes about their level of intelligence and ability to succeed in STEM fields due to the historical dominance of White cisgender men in STEM (Grossman & Porche, 2014; LaCosee et al., 2016; Robnett, 2016).

Other researchers examined the intricacies of meaning-making and attributions when it comes to gender and intellectual ability. LaCosee et al.'s (2016), for example, framed the specific microaggressions towards women in STEM in terms of internal and external causes. For instance, if a man in high school performed well on an exam, he generally attributed his success to his intellect (internal), while a woman performing well on an exam credited her success to chance or luck (external). However, if the situation involved a setback, the man explained his performance based on external circumstances such as the test being too difficult or him not feeling well (external), while the woman attributed her performance to her supposedly poor aptitude (internal; LaCosee et al.,



2016). The study also showed that a negative environment had a significant influence on women's desire to study or build a career in a STEM field – a factor that can also affect the retention, graduation, and overall success of LGBTQ+ and other underrepresented students in higher education (Beemyn & Rankin, 2011; Bilodeau, 2009; Hughes, 2018; LaCosse et al., 2016; Nicolazzo, 2017c). Being able to develop an engineering identity, for example, is also linked to having a sense of belonging and persisting in the major (Meyer et al., 2012). However, some women in STEM may struggle synthesizing their identity as a woman and a STEM student. Settles (2004) found that those who had difficulty harmonizing these two identities tended to have lower levels of performance and well-being outcomes, which also likely influences sense of belonging and persistence.

Women with additional marginalized identities negotiate their identities differently than cisgender women with no other marginalized identities and may not experience a sense of belonging in a field that favors and rewards White cisgender men (Foor et al., 2007). In addition to negotiating their identity as a woman, engineer, and a person of color, for example, women of color may develop additional identities including academic, social, and intellectual identities to assist with their persistence (Tate & Linn, 2005). When having to negotiate complex intersections of their identities in STEM contexts, women of color may create or seek physical or conceptual counterspaces, such as student organizations or mentorship relationships, whether they are formally part of the department or informally established by a group of students (Ong et al., 2018). In these counterspaces, women of color can be their authentic selves and support one another without the concern or pressure of racism or genderism. Therefore, students

experience their intersecting identities and intersecting systems of oppression within the I-MMDI model differently depending on the DLE context they are in. If a student struggles to present or resonate with their core self, they may seek or develop counterspaces where they can live authentically and find support to persist in STEM.

### **LGBTQ+ in Engineering and STEM**

While the existing literature on LGBTQ+ students in STEM is limited, similar concepts of negotiating one's identity in historically conservative fields, such as those in scholarship on women and underrepresented racial identities in STEM, are evident. Common themes of LGBTQ+ identity navigation in STEM can include bias and discrimination, stereotype threat, and not having a fit with STEM as a career as well as difficulty in persisting due to a lack of STEM identification and sense of belonging (Freeman, 2020). Many underrepresented populations experience a lack of safety, belonging, engagement, and value during their time in higher education. LGBTQ+ students, however, are particularly prone to experiencing tension with a heteronormative and dichotomous gendered system (Bilodeau, 2009). Kimmel (2008) captured this heteronormative notion in his concept of "guyland," illustrating how American society promotes and values heteronormative masculinity, which prevents individuals of all genders from being able to express their authentic selves without consequence. In other words, the dominant discourse surrounding sexuality and gender roles places pressure on heterosexual, cisgender men to live up to unrealistic expectations regarding gender performance, and causes individuals of other sexes, genders, and orientations—the identities on the dynamic model of gender and sexuality (Jourian, 2015) that diverge from what society deems to be normative—to be viewed as less than or deviant. LGBTQ+

students can experience this pressure through deep-rooted binary systems in higher education institutions, as well as harassment or discrimination in curricular and co-curricular contexts (Bilodeau, 2009). However, these negative experiences are particularly prevalent in STEM fields where norms are centered on heterosexual, cisgender men's norms and expectations (Cech & Waidzunas, 2011; Linley et al., 2018). For instance, gay men in engineering must navigate a climate that favors and promotes heteronormative masculinity, which may impact their experience in curricular, co-curricular, and community contexts (Hughes, 2017).

Unwelcoming and non-inclusive departmental norms, cultures (Vaccaro et al., 2021), and environments for LGBTQ+ students in STEM can occur within different collegial ecosystems (Linley et al., 2018) including faculty, staff, and peers, and are often not perceived as safe spaces compared to other majors such as those in humanities and social sciences, which can affect student persistence and success (Bilimoria & Stewart, 2009; Cech & Waidzunas, 2011; Cooper & Brownell, 2016; Kersey & Voigt, 2020; Linley et al., 2018). Unsafe and unwelcoming departments can yield continued LGBTQ+ inequality in STEM fields as students perceive majors such as social sciences to be more inclusive of their identity compared to STEM where LGBTQ+ identities are not acknowledged or represented (Forbes, 2020).

LGBTQ+ students commonly report concerns about STEM faculty, peers, and professionals being impersonal and perceiving their identity as irrelevant to their work or facing outright harassment within these interpersonal relationships (Cech & Waidzunas, 2011; Freeman, 2020; Kersey & Voigt, 2020; Riley, 2008). LGBTQ+ students in STEM majors also often describe a felt need or desire to separate their personal life and identity

from their work (Friedensen et al., 2021), with some individuals choosing to not disclose or selectively disclose their LGBTQ+ identity (Vaccaro et al., 2021). Similarly, some TGNC students in engineering described their major and professional field as separate from trans culture (Haverkamp et al., 2019). Cech (2013) explained this separation as the depoliticization and meritocracy ideologies within the engineering profession. In other words, depoliticization refers to the norm within the engineering culture to focus on the technical aspects of the work, which is separate from social or political issues (Cech, 2013). This belief in separating technical and social issues is associated with the concept of meritocracy within engineering as the “pervasive prejudicial cultural norms” (Cech & Waidzunas, 2011, p.1) that ignore and devalue systemic oppression, injustices, and social identities, thereby marginalizing students and placing blame regarding academic struggles or attrition on a student not having the skills, ability, or determination to succeed in the major (Cech, 2013). In addition to bifurcation concerns of separating STEM content and social identities or issues, Friedensen et al. (2021) suggested the interrelationship between science and neoliberalism, specifically the neoliberal economy, influences the tension between LGBTQ+ identities and STEM fields. In other words, neoliberal politics hinder opportunities to challenge existing, oppressive systems, which would allow for progressive theories and practices that include LGBTQ+ individuals in STEM work.

The absence of social issues within STEM curricula can lead to non-LGBTQ+ students having difficulty relating to LGBTQ+ students due to a lack of knowledge about LGBTQ+ identities (Butterfield et al., 2018). LGBTQ+ students may also find it difficult to connect with students who share their identity since they might be more hesitant to out

themselves in STEM contexts and have minimal free time due to their rigorous curriculum, which can hinder their ability to get involved in LGBTQ+ communities on campus (Cech, 2013). Therefore, LGBTQ+ STEM students may struggle to develop meaningful interpersonal relationships or find a supportive community, which can affect students' coping strategies (Ekoniak, 2013; Kersey & Voigt, 2020).

Additional data specifically link LGBTQ+ students' decision to leave STEM fields to lower levels of sense of belonging compared to non-LGBTQ+ students in STEM (Cech et al., 2017; Freeman, 2020; Stout & Wright, 2016). The low sense of belonging in their discipline can be associated with experiencing discrimination through stereotypes, biases, devaluation of their work or skills, and burnout from having to hide or compartmentalize their identities in their STEM environments (Cech et al., 2017; Freeman, 2020; LaCosse et al., 2016). When examining student interactions with engineering faculty, professionals, and peers, researchers emphasize how normative masculinity pervades the culture, thereby pressuring LGBTQ+ students to alter behaviors, appearance, and conversations to adapt to masculine expectations (Hughes, 2017). For example, a gay man who adopts traditionally feminine mannerisms around his LGBTQ+ friends may feel he cannot be his true self around his engineering peers, and therefore might decide to talk and act in a more masculine way when in their presence. Experiencing these pressures takes an emotional toll on LGBTQ+ students and can affect their sense of belonging and persistence in STEM (Hughes, 2018; Stout & Wright, 2016). TGNC students may also have unique experiences based on the ways others perceive them. Some TGNC students who underwent a gender transition and identified (and were perceived as) women suggested that others had lower expectations of them compared to

when others perceived them as men (Kersey & Voigt, 2020). However, despite the gender discrimination, some students appreciated being perceived as a woman as it validated their identity and reduced gender dysphoria.

LGBTQ+ students in engineering and other STEM fields are also at risk of having difficulty maintaining their career in STEM, experiencing harassment, marginalization, and being undervalued due to discrimination and oppression within the field, which can impact their health and willingness to remain in STEM (Cech & Rothwell, 2018; Cech & Waidzunas, 2021). Additionally, LGBTQ+ students' experiences with oppression influence the way they make meaning of their identities and how they imagine themselves in the future, whether they remain in STEM (Vaccaro et al., 2021). While some LGBTQ+ individuals may not experience issues in the STEM workforce, others report hostile environments (Yoder & Mattheis, 2016) and try to determine who at work might be a trusted ally (Minei et al., 2020). In academia, some LGBTQ+ faculty reported a sense of invisibility of their identity in science and engineering, while others described a blatantly hostile environment for LGBTQ+ students, also leading to pressure, discomfort, and expectations of mentoring students and other faculty who share their identity (Bilimoria & Stewart, 2009).

Considering these various obstacles, it is not surprising that about 7% fewer LGBTQ+ individuals in a sample of 4,162 students were retained in STEM majors compared to non-STEM majors after four years (Hughes, 2018). Hughes' (2018) study only included sexual minority identities, not TGNC identities. No existing studies highlight TGNC retention in STEM, perhaps due to a lack of accurate and historical gender identity data on student records. Additionally, while 7% fewer retained LGBTQ+

students is not a drastic difference, it is important to consider what is contributing to the lower percentage and the experiences LGBQ+ and TGNC students have in STEM, especially since LGBQ+ students in Hughes' (2018) study indicated a higher interest in STEM through participation in research and labs, which was the strongest predictor of STEM retention. For example, researchers often cite mentorship programs as being a useful retention tool, especially for underrepresented populations. However, if LGBTQ+ students are unable to find a mentor who is supportive of their identity, they may struggle to succeed in their engineering environment and major. Additionally, students with multiple marginalized identities may experience additional barriers as they endure intersecting systems of oppression, as evidenced in the I-MMDI. LGBTQ+ students with disabilities or LGBTQ+ students of color, for example, might have trouble accessing resources to support both their LGBTQ+ identity and their disability or racial identity and experience further marginalization (Miller & Downey, 2020).

Similar to the LGBTQ+ and TGNC student experiences in higher education more broadly, recent literature also indicates that TGNC students in engineering value support in curricular and co-curricular contexts when available (Haverkamp et al., 2019). Finding a mentor is also helpful as participating in mentorship opportunities can be a predictor of self-efficacy and sense of belonging in STEM (Apriceno et al., 2020). However, it can be difficult for TGNC students to find a mentor in hostile climates for fear they will encounter discrimination based on their identity. When there is a lack of support for TGNC students in engineering, some students can find belonging, support, and community through trans\* kinship (Haverkamp et al., 2019). By participating in TGNC or LGBTQ+ communities, TGNC students can also foster resiliency as they negotiate

their identity in a hostile engineering climate (Kersey & Voigt, 2020). Additionally, students can actively resist anti-TGNC and anti-LGBQ+ cultures within engineering programs in co-curricular or community contexts, including online spaces, by establishing support networks and groups of underrepresented or marginalized students (Haverkamp, 2021; Yang et al., 2021b). However, student groups tend to have cultural scripts and norms that align with a single, primary identity of the group, therefore engineering organizations and identity-based student organizations risk being exclusionary or unwelcoming of students with multiple marginalized identities (Yang et al., 2021a). Thus, while joining a TGNC or LGBTQ+ organization may help foster resiliency for a nonbinary, queer, able-bodied, White, American student, for example, a cisgender, gay, Black, international student with a learning disability might feel the need to compartmentalize their marginalized identities and struggle to find a sense of belonging in the same organization.

### **Summary of TGNC Oppression in STEM Through a CTP Lens**

TGNC oppression that occurs within society and higher education institutions is also present within STEM majors, especially engineering since it is dominated by White cisgender men and perpetuates binary gender norms and ways of thinking (Cech & Waidzunas, 2011). Within these majors and fields, institutions and STEM professionals marginalize and oppress individuals who are not White cisgender men (Banchevsky et al., 2016; Hughes, 2017; Seron et al., 2018). Interpersonal interactions can result in microaggressions and harassment that privilege the intelligence and ability of cisgender men over cisgender women or TGNC identities (Grossman & Porche, 2014; Robnett, 2016; Steele, 2010). Additionally, the compartmentalization of social identities devalues



or negates student experiences through the depoliticization and meritocracy within the field (Cech, 2013; Haverkamp et al., 2019). These cisnormative perspectives create a hostile climate in which cisgender women and TGNC people experience stereotype threat and a low sense of belonging if or when they reject or diverge from norms that privilege heteronormative masculinity (Cech et al., 2017a; Foor et al., 2007; Seron et al., 2018). TGNC oppression emerges within engineering and other STEM fields when the established systems of oppression marginalize TGNC individuals, creating barriers that prevent TGNC students from fully accessing and participating in the major or field as their core, authentic selves (Jones & Abes, 2013). In engineering, the normalization of depoliticization and meritocracy manifests a deficit perspective that places blame on TGNC students for their inability to align themselves with norms instead of examining the systemic oppression that hinders their success (Cech, 2013).

Since White cisgender men dominate STEM programs and professions, TGNC students of color can also experience oppression (Foor et al., 2017). When considering the I-MMDI and the intersectionality of TGNC students of color and other identities such as disability, ethnicity, and socioeconomic status, students' experiences with oppression can differ. Perhaps a Latinx TGNC student who has a learning disability, for example, experiences barriers in being able to complete a lab assignment due to a lack of accommodations for their disability, but their professor attributes their incomplete assignment to their gender identity or race. Additionally, this student may struggle to find a mentor who shares or values their identities due to the underrepresentation of their race and gender identity in their major.

CTP sheds light on systemic TGNC oppression, while also emphasizing the importance of centering TGNC voices and experiences as well as those from other marginalized communities. Elevating TGNC and other marginalized identities can further highlight the systems, policies, and practices that give power and control to White cisgender men who oppress TGNC people by perpetuating binary notions of gender through curricula, policies, and interpersonal interaction. Challenging systemic TGNC oppression would involve resisting established norms and collaborating across marginalized communities to determine ways the oppressive systems within STEM can be undone to provide inclusive opportunities and liberation for TGNC students as well as individuals with other marginalized identities.

### **Summary and Restatement of Purpose**

The research in this chapter illustrates the presence of TGNC oppression in U.S. society, higher education, and engineering or other STEM majors. CTP provides a framework for understanding the degree to which TGNC oppression is embedded in U.S. society and institutions, while centering the voices of TGNC and other marginalized communities that endure administrative violence. Hurtado et al.'s (2012) DLE model illustrates the contexts in which oppression occurs at the interpersonal, institutional, and socio-historical levels including curricular, co-curricular, and community contexts. The I-MMDI also serve as conceptual frameworks for understanding TGNC students' multiple, intersecting identities in various contexts.

Given the limited data on TGNC student experiences in engineering, the purpose of this study was to understand the lived experiences of TGNC students in engineering programs as they negotiated their identities in a heteronormative field dominated by

White cisgender men. A part of this investigation was to examine the interrelated social and institutional systems of oppression that influence TGNC students' perceptions of their identity and experiences. Specifically, I strived to center and amplify TGNC students' personal narratives to understand how TGNC students negotiated their salient identities in engineering curricular, co-curricular, and community contexts. By gaining insight into TGNC students' salient identities, lived experiences, and strategies when navigating their experiences in engineering programs, current and future TGNC students may be able to gain helpful coping mechanisms and strategies for success. Therefore, this study sought to answer the following research questions:

- What are the lived experiences of TGNC students in engineering programs?
- In what ways do TGNC students negotiate their identities when their gender identity becomes salient in curricular, co-curricular, and community contexts?
- In what ways do systems of oppression influence TGNC student experiences in engineering programs?
- What skills and strategies do TGNC students use to empower themselves to persist in their engineering programs?

In Chapter 3, I discuss how narrative inquiry was an appropriate method to investigate each of these research questions. Through multiple in-depth interviews, I collected five TGNC individuals' narratives to understand their identities and lived experiences during their engineering program. Using critical constructivism as my guiding philosophical and paradigmatic framework within my qualitative study, I also

discuss how my methodology aligns with CTP in centering TGNC narratives and identities throughout the research process.

## CHAPTER 3: RESEARCH DESIGN

In this chapter, I discuss the rationale for my research methodology as I sought to understand the identities and lived experiences of TGNC engineering students. First, I discuss narrative inquiry and its applicability to this study. Then, I provide the philosophical and paradigmatic assumptions within my research. Next, I describe my research design including the sources of data, participant eligibility, recruitment strategy, and processes for data collection and analysis. After highlighting my research ethics and positionality as they relate to this study, I discuss the validation of the data I collected, analyzed, and produced, as well as the narrative inquiry quality criteria I followed when conducting my study. I conclude with a summary of my overall research design and process.

### **Narrative Inquiry**

Understanding the lived experiences and identities of TGNC students in engineering programs requires a qualitative research approach that centers their experiences and knowledge. Qualitative methodology allows for researchers to “study things in their natural settings, attempting to make sense of or interpret, phenomena in terms of the meanings people bring to them” (Denzin & Lincoln, 2017, p. 10). For this study, narrative inquiry was an effective methodology to explore the stories and lived experiences of TGNC engineering students.

Narrative inquiry is a specific form of qualitative research that allows for “human centeredness” within the research and “illuminates the real-life experiences of learners

and at the same time [is] sensitive to the broader connections to the individual's worldview" (Mertova & Webster, 2020, p. 18). This narrative approach enables researchers to value and "[honor] lived experience as a source of important knowledge and understanding," (Clandinin, 2016, p. 17) which aligns with CTP by centering TGNC voices and experiential knowledge (Kean, 2020). While other qualitative methods focus on specific phenomena or aspects of participants' lives, narrative inquiry allows the opportunity to examine participants' entire story to understand the significant moments as they perceive them, as well as the other features of their lives that impact their lived experiences (Mertova & Webster, 2020). By using narrative inquiry to understand the lived experiences of TGNC students, I upheld CTP values by centering TGNC narratives while also considering the various interpersonal, contextual, and systemic interactions—as shown in the I-MMDI and DLE model—that influence TGNC student experiences in engineering programs.

Three common elements of narrative inquiry involve temporality, sociality, and place (Clandinin, 2016). Temporality addresses the past, present, and future aspects of one's lived experience that influence their personal narrative, which is ever-evolving. Sociality, however, addresses the social, cultural, political, and other forces that influence the perception and understanding of a lived experience. For example, the experience of a TGNC individual in the U.S. is influenced by sociocultural norms such as the assumption that individuals are either a cisgender man or woman, and therefore any person who deviates from those expectations is stigmatized and victimized.

Place, the third element of narrative inquiry, refers to the physical environment and space in which an individual experiences their life (Clandinin, 2016). Considering the

primary research question of this study, the curricular, co-curricular, and community contexts in which TGNC engineering students interact influence students' narratives. Their experience with support, for example, may be different in an engineering classroom compared to a social setting with their LGBTQ+ friends. Additionally, they may negotiate their identity at a liberal, urban college differently than in their conservative, rural hometown. Together, the temporality, sociality, and place of narrative inquiry contribute to the detailed story of participants' lived experiences by examining the external factors that influence their parallel experiences, perceptions, and retelling of their narrative.

Narrative inquiry has numerous strengths including the ability to center participants' unique stories, acquire rich, detailed descriptions of their lived experiences, and collaborate with them to highlight the parts of their stories they deem significant (Mertova & Webster, 2020). However, collecting lengthy, detailed narratives can yield challenges. Unlike phenomenological studies that primarily seek common meaning across individual experiences, narrative researchers examine the detailed contexts and stories of each participant while also potentially comparing similarities and differences across narratives. To collect detailed, comprehensive stories, researchers must allocate ample time for each participant, which can include multiple interviews.

Additionally, researchers need to situate each participant within the temporality, sociality, and place relevant to their identity and story (Creswell & Poth, 2018). In other words, each participant has a multidimensional, complex story with unique contextual influences that researchers need to honor and, if applicable, compare to other rich and

multifaceted stories that have similar or divergent contextual influences. Therefore, the data collection and analysis processes require a lengthy, nuanced approach.

The collaboration component of narrative research is another strength of the method; however, it too can yield complications with ownership, construction, and presentation of stories (Pinnegar & Daynes, 2007). Despite the centering of participant narratives, the researcher is actively involved in the construction of narratives and benefits from the sharing of the stories through degree or career requirements, publications, and presentations. Therefore, there can be a power and privilege imbalance between researcher and participants when developing a narrative.

For this study, the strengths of narrative research outweighed the challenges as I dedicated careful attention to concerns of time and power by planning appropriately and implementing an ethical research design that provides participants with as much autonomy, opportunity for collaboration, and power as possible. Narrative inquiry is particularly appropriate for my study as I sought to understand the lived experiences of TGNC students in engineering programs. Given the underrepresentation of TGNC students in engineering, there was likely not a large enough sample at a single institution, thus an approach like an ethnographic study was not as feasible due to a lack of common culture and identities across different institutions. Additionally, attempting to use a method like grounded theory to develop a single explanation of TGNC experiences is a “reductive action” (Catalano, 2017, p. 237). A grounded theory approach would fail to acknowledge and describe the diverse and complex identities and experiences of TGNC students and would remove the focus and power from participants’ individual narratives, thereby conflicting with CTP (Catalano, 2017). Examining the individual, diverse



narratives of TGNC students at various higher education institutions by way of narrative inquiry allowed me to highlight experiences and influences unique to participants' identities, programs, and colleges or universities.

Overall, narrative inquiry was most appropriate for this study as I sought to understand the lived experiences of TGNC engineering students. Collecting detailed narratives yielded data that address the current gap in the literature and provided an opportunity for TGNC students to share their stories. Focusing on TGNC narratives aligns well with CTP as it centers TGNC voices and addresses contextual influences, which can assist in examining systemic TGNC oppression in society, higher education, and engineering. Additionally, narrative inquiry allowed for collaboration between the researcher and participants, providing an opportunity for TGNC individuals to share their authentic stories and construct their narratives in a meaningful way that will, ideally, support TGNC communities and disrupt existing systems that oppress TGNC students in engineering.

### **Philosophical and Paradigmatic Assumptions**

By focusing on individuals' lived experiences, narrative inquiry can be positioned "in relationships and in community, attending to notions of expertise and knowing in relational and participatory ways" (Clandinin & Caine, 2013, p. 168). With this in mind, I used philosophical and paradigmatic assumptions in line with a CTP theoretical framework that centered TGNC experiences and knowledge, while also examining influences between and from peers, systems, and sociocultural norms. To frame the ontological (nature of reality) and epistemological (nature of knowledge) concepts in the study, I adopted a critical constructivist framework as I was wanting to explore the

identities and lived experiences of TGNC students in engineering programs by way of their personal narratives. Using a critical constructivist framework allowed me to focus on the personal experiences of TGNC students, acknowledging that they constructed their identities in historical and social contexts while also keeping an awareness of the role of power and oppression that was present within socially constructed knowledge (Kincheloe, 2008).

Critical constructivism integrates a constructivist—also known as interpretivist—paradigm by emphasizing how identities and beliefs are socially constructed. Within constructivism, “what is of importance to know is how people interpret and make meaning of some object, event, action, perception” (Glesne, 2016, p. 9). The constructivist emphasis on how people perceive and understand people, objects, and life experiences aligns well with critical constructivism and CTP as these frameworks portray gender as a social construction and value centering TGNC identities and narratives to understand their experiences. However, critical constructivism and CTP also reflect a critical theory paradigm by emphasizing notions of emancipation and “[critiquing] historical and structural conditions of oppression and [seeking] transformation of those conditions” (Glesne, 2016, p. 10). Critical constructivism with a CTP perspective views gender identity as a social construct and highlights the way rigid and essentialized beliefs about gender identity oppress TGNC individuals but also limit non-TGNC individuals. Therefore, emancipation is valued within a critical perspective.

A critical constructivist view of TGNC students challenges social constructions of binary gender identity and historical gender roles by examining the social and institutional oppressions in DLE model contexts that hinder TGNC individuals’

opportunity and ability to access and persist in engineering programs. Considering the constructivism emphasis of the way individuals perceive and make meaning of their life experiences, and the critical theory elements within critical constructivism that highlight liberation through the transformation of oppressive systems, critical constructivism was an appropriate paradigm to use in this study. I sought to understand (constructivism) TGNC student identities and experiences in engineering programs while prioritizing the emancipation (critical theory) of TGNC individuals within oppressive systems in society, institutions, and degree programs.

By using critical constructivism, I made the ontological assumption that individuals construct their reality and identity based on their experiences, including the interactions they have with social systems and other individuals (Creswell & Poth, 2018). Additionally, I adopted the ontological assumption that perceptions of reality can also be flawed, as noted in critical theory. Using my specific research topic, TGNC individuals construct their identities based on their experiences interacting with others in society and their engineering program. Additionally, TGNC individuals as well as those with whom they interact, may have flawed perspectives (e.g., believing there are only two genders: men and women).

In regard to epistemology, I made the assumption that knowledge is co-created with individuals participating in research (constructivism) and can be transformative through discourse and action (critical theory; Creswell & Poth, 2018; Jones et al., 2014). As Clandinin and Connelly (2000) wrote, narrative inquiry is a “collaboration between researcher and participants, over time, in a place or series of places, and in social interaction with milieus” (p. 20). While I do not hold the experiential knowledge, central

identity, and narrative within this research, I worked with participants to capture their stories and ensure I presented their stories authentically and accurately. I also formed my perspectives of the epistemology within this study in the spirit of Nicolazzo's (2017a) concept of trans\* epistemology. Also grounded in CTP, trans\* epistemology focuses on the centering of diverse TGNC identities and experiences, meaning making, community, and activism. Nicolazzo (2017a) described the six tenets of trans\* epistemology:

1. Trans\* people may be *from* oppression, but we ourselves are not *of* oppression.
2. We all experience our trans\*ness differently as a result of our varied intersecting identities.
3. In and through community with each other, we have the power to heal and remake ourselves as trans\* people.
4. Our continued de/re/construction of our trans\* subjectivities spans material and virtual environments.
5. "Trickle up activism" and grassroots coalition-building are, and will remain to be, orientations for our community.
6. In/visibility and its varied meanings are central to our senses of self, community, and kinship. (p. 7-8)

Considering the six tenets of trans\* epistemology and critical constructivism, I understand knowledge as co-created and transformative through the centering of TGNC narratives in an effort to understand TGNC experiences and challenge systems that perpetuate TGNC oppression.

Since I wanted to examine the individual narratives of TGNC students' lived experiences in their engineering programs, I conducted one-on-one interviews and

provided participants the opportunity to share an artifact that was meaningful and representative of an aspect of their experience as a TGNC engineering student. One-on-one interviews allowed me to focus on one detailed narrative at a time, while being able to compare narratives and experiences through the data analysis process. Throughout the data collection and analysis phases, participants were co-constructors of knowledge as they shared their lived experiences and expertise through their narratives. My role, as the researcher, was to collaborate with the participants to discuss their identities and experiences in their engineering programs, while also considering the influence of power and oppressive systems. Through the researcher-participant collaboration, I ensured that the data I collected and analyzed accurately portrayed their narratives by sharing transcripts and my writing with participants.

### **Research Design**

In this section, I discuss my research design including the sources of data, eligibility criteria, and my strategy for recruiting participants. Then, I discuss my data collection and analysis processes.

#### **Sources of Data**

To collect narratives about TGNC identities and lived experiences in engineering curricular, co-curricular, and community contexts, I interviewed five current students and recent graduates from an undergraduate engineering program. Since I researched students' lived experiences related to their engineering program as opposed to a complete life narrative, I initially sought a sample of six to 12 TGNC students to provide ample opportunity to learn about diverse and individualized TGNC experiences, while also examining potential commonalities or themes across narratives (Beitin, 2012; Kim,

2016). In my sample, I strived to collect the necessary depth and breadth within student narratives to reach saturation (Kim, 2016). While my participant recruitment only yielded five interviews, I believe each narrative captured an appropriate depth and breadth, highlighting similarities and differences across diverse gender identities and experiences.

In addition to the participant narratives I collected through in-depth interviews, I also invited participants to share artifacts that reflected their lived experiences in engineering. The artifacts were meaningful objects that reflected an aspect of their experience as a TGNC individual in engineering. Artifacts could be something the participant or someone else created such as artwork, poetry, music, photos, journals, engineering projects, designs, or any other object that resonated with the participant. If the participant chose to share an artifact, the participant and I discussed the significance of the object to their experiences during the interviews. I provide my own observations about similarities and differences that emerged during our conversation about participant artifacts in Chapter 5.

### **Participant Eligibility**

Eligible participants included individuals who (a) have a gender identity other than cisgender including but not limited to transgender, gender nonconforming, genderqueer, and nonbinary, (b) were current undergraduate students who had started or were past their third year of engineering coursework at a U.S. university, or individuals who graduated from their undergraduate program at a U.S. university within the last four years—including current graduate students or working professionals, and (c) completed at least one internship, cooperative educational experience, or worked as an engineer during or post-graduation. By having work experience (e.g., internship, co-op, or

employment), participants were able to share stories about negotiating their identity as TGNC individuals in an engineering work environment. While internships and cooperative education can be curricular requirements, these also take place in industry or the community; therefore, students who participated in these opportunities could address their experiences in engineering community contexts. Additionally, limiting current students to their junior and senior years in their engineering program ensured they completed enough courses to have ample experience negotiating their identities in their program. For instance, a junior student may have finished five semesters of coursework and one internship, and therefore could speak to different experiences in curricular, co-curricular, and community contexts. A first-year student, however, would likely have just started their degree and a sophomore student may not have had a chance to do an internship or cooperative education rotation yet.

### **Participant Recruitment**

To recruit participants for this study, I used purposive sampling (Patton, 1990). First, I recruited participants by sending a call for participation to staff members of several LGBTQ+, STEM, and engineering professional organizations as well as student affairs and higher education organizations. These included Out for University (O4U), Out in Science, Technology, Engineering, and Mathematics (oSTEM), Society of Women Engineers (SWE), National Society of Black Engineers (NSBE), American Society of Engineers of Indian Origin (ASEI), Society of Hispanic Professional Engineers (SHPE), American Society for Engineering Education (ASEE), American College Personnel Association (ACPA), National Association of Student Personnel Administrators (NASPA), and National Academic Advising Association (NACADA). Out of these ten

organizations, I received five responses, only two of which agreed to share with students, members, or colleagues. A few organizations recommended I reach out directly to specific student chapters but given the vast number of chapters and outdated information, this was not feasible for every organization. Two organizations responded but denied my request. One organization wanted to charge me to advertise, and another was concerned about TGNC identity confidentiality and pressure by having staff or faculty members share the call with TGNC students. I clarified my intention was for staff and faculty members to share the call for participation with organizations more broadly, not necessarily targeting specific students. I also emphasized the voluntary nature of the study and students' abilities to not participate, but I received no additional response from the organization.

For my second round of recruitment, I shared the call for participation through a college student personnel listserv and via Facebook groups for LGBTQ+ higher education professionals and a general student affairs group. During this time, I also followed up with my round one contacts and attempted reaching out to other staff members if I did not receive a response.

After still not receiving many participants, I contacted each collegiate chapter of oSTEM that was located at an institution that offered engineering programs. Out of the total 115 eligible chapters, 6 responded either with confirmation they would share the call for participation. However, one faculty member of an oSTEM group replied out of concern of overloading TGNC students and needing to prioritize their department and school surveys first. This is understandable but concerning that one faculty member was



serving as a gate keeper and potentially not sharing the opportunity with TGNC students and allowing them to choose whether they wanted to participate.

To further bolster participant recruitment, I conducted a fourth round, contacting 89 LGBTQ+ or multicultural centers at campuses that offered engineering programs and had oSTEM chapters. My hope was staff members in the centers could share the invitation with engineering students at their institution. Out of the 89 centers I contacted, 17 responded either agreeing to share the call or asking for additional information so I could submit a formal request for the call to be shared. Two other individuals responded from the centers informing me they could not share my call for participation unless I gained IRB approval from their institution.

Lastly, I utilized snowball sampling (Patton, 1990) by asking participants to share the invitation to join the study with their peers who might be interested and meet the eligibility requirements. After four rounds of participant recruitment, I had a total of 11 individuals complete the secure interest form in which they could indicate their name, pronouns, gender identity, and email address. Six of the 11 individuals responded to my follow up email in which I thanked them for their interest and provided additional information about the study, confidentiality, informed consent agreement, and times to have an initial phone call to introduce ourselves, answer questions, and schedule the two interviews. Of the six participants, five were eligible.

As O'Reilly and Parker (2012) recommended, I offer transparency about my limitations and hindrances to my sample and saturation as I was not able to successfully recruit the intended number of participants. Given the challenges in the recruitment process as well as the underrepresentation of TGNC identities in engineering, I was

unable to recruit the desired six to 12 participants. However, by recruiting students from organizations and institutions across the U.S., I was hopeful I would be able to collect diverse narratives and experiences instead of all participants being from one particular region. Despite the slightly lower than desired number of participants, I achieved a relatively diverse group of students when considering geographic location, race, ethnicity, engineering major, and overall experiences.

### **Data Collection**

During the fall 2021 semester, I conducted interviews with five TGNC undergraduate students and individuals who recently graduated from an undergraduate engineering program. Beyond initial email correspondence during the recruitment phase, I had three conversations with each participant. The first was a brief phone call to begin building rapport, provide a brief personal introduction, discuss the aims of the research, review the informed consent document, confidentiality, their ability to withdraw from the study at any point, and answer any initial questions they had about the topic or process. During the first call, I also invited them to bring an artifact that was meaningful to them and reflected an aspect of their experience as a TGNC individual in engineering to the interview. The second two conversations were in-depth, semi-structured, open-ended interviews to elicit detailed narratives about students' lived experiences and strategies negotiating their identities in engineering curricular, co-curricular, and community contexts. These also included accompanying probing questions when elaboration was needed, with ample flexibility for participants' stories about their experience to steer the conversation. The discussion of the participants' artifacts also took place during the second interviews if they choose to share an artifact. When discussing the artifact, I asked

them to talk about the object and detail its significance to them as well as the connection to their experience as a TGNC individual in engineering.

Since participants were located all over the U.S., the interviews were held using private Zoom calls. At the start of the first interview, I had an informal check-in with the participant and then asked if they had any final questions about the informed consent document or interview process. I also requested they select a pseudonym for me to use in my field notes and writing. Interviews lasted about 60 minutes each, and I allowed for additional time if students wanted to share more or felt more time would be beneficial. The first interviews tended to run longer than the second due to the nature of the questions in parts one and two of the protocol (see Appendix A).

Interview questions focused on gaining detailed insight into TGNC students' narratives regarding their lived experiences in their engineering program including their salient identities, interactions with systemic oppression, and strategies for success (see Appendix A). All Zoom calls were video and audio recorded with permission for transcription purposes. After the call, I immediately deleted the video recording and saved the audio file for transcription. Additionally, after each interview, I wrote thoughts and field notes in a journal regarding each participant's narrative and potential connections between different interviews.

### **Data Analysis**

When analyzing TGNC student narratives, my goal was twofold. First, I sought to reconstruct the participants' individual narratives by following a beginning, middle, and end literary format, highlighting the individual's unique trajectory and experience (Clandinin, 2007). Second, to understand common and divergent experiences within and

across TGNC student narratives, I coded each interview and compared codes across participants. Before beginning analysis, however, I used Otter ai software which ran an initial transcription of uploaded audio files. I listened to each interview while reading the transcriptions, providing edits for accuracy and redacting or adjusting identifying information. After finishing my review and edits, I emailed the full transcripts to the respective participants for member checking, providing them about a month to make any adjustments or clarifying comments (Saldaña, 2016). Two participants responded confirming their receipt of the transcripts; one participant identified slight adjustments when the software labelled the speaker incorrectly (e.g., showing that it was me saying a certain statement instead of the participant). Member checking continued throughout the writing process to ensure I accurately quoted and captured their narratives. I received confirmations from all participants at least once, though I communicated with most participants two to three times during the member checking process. Three participants responded when I shared the narratives in Chapter 4; one person responded requesting I remove the filler words such as ‘like’ and ‘um’ from their narrative. I offered the same option to other participants after sharing the final draft and received two additional requests to remove filler words. One participant clarified a word that was not transcribed correctly, but no other participant requested adjustments to the final chapters of the dissertation. Through member checking, my aim was to involve participants in the process, amplifying their stories and experiential knowledge (Kean, 2020).

In addition to initial editing and member checking, I reviewed each transcript twice: first for general understanding of the individual’s narrative, and then a second time for analysis and initial coding. When reconstructing participant narratives, I used

thematic analysis to identify, organize, and portray experiences and themes within a given narrative (Braun & Clarke, 2006). When coding transcripts for narrative reconstruction and comparison, the first cycle of initial coding included a mix of In Vivo, values, and concept coding. Wanting to stay true to the narratives, In Vivo coding allowed me to capture specific words and phrases that TGNC students used when sharing their lived experiences. By identifying seemingly significant phrases and verifying with participants through member checking that these statements conveyed meaningful moments about their experiences, I ensured the highlighted In Vivo codes were authentic and accurate (Charmaz, 2014).

Values coding was also useful for this study as I wanted to “explore cultural values, identity, intrapersonal and interpersonal participant experiences and actions” (Miles et al., 2020, p. 67). While participants did not always directly address specific values, beliefs, and attitudes that would be highlighted when using In Vivo coding, values coding captured participants’ personal values, beliefs, and attitudes. Additionally, using values coding allowed me to,

explore the origins of the participant’s value, attitude, and belief systems derived from such individuals, institutions, and phenomena as parents, peers, school, religion, media, and age cohort, as well as the participant’s personal and unique experiences, development, and self-constructed identities from social interactions and material possessions. (Saldaña, 2016, p. 135)

By using values coding, I examined what TGNC participants valued as well as the various individuals and institutions that influenced their and others’ beliefs and perceptions about their identity. Therefore, values coding was useful in trying to understand interpersonal relationships as well as beliefs and attitudes in various contexts that influence how TGNC students negotiate their identities.

Given the literature on TGNC people navigating concepts such as passing, emotional tolls, resilience, and coping, concept coding was useful in examining actions, behaviors, and strategies that took place in TGNC student narratives. In addition to describing certain processes that emerged within students' stories, concept coding could also reference a broader implication than what a word or phrase appeared to be on the surface (Saldaña, 2016). For example, if a participant discussed reaching out to a TGNC peer after a troublesome interaction with a professor, I could code that experience as coping or, perhaps, seeking support. Concept coding was useful when piecing together an individual's story as well as comparing potential themes across narratives.

Once I completed the first cycle of coding, I used code mapping to list all codes within each narrative so I could create categories and themes. While code mapping allowed me to examine key themes within each story, I also compared categories across narratives by using code charting, which summarized primary takeaways within each narrative as well as categories that were similar or dissimilar between participants (Saldaña, 2016). During the second cycle of coding, I used pattern codes to examine any categories, themes, concepts, relationships, or influences that emerged (Miles et al., 2020). I examined these within each story, noting specific plot points in the students' narratives in which they arose. Additionally, I created a matrix by which I could compare common and divergent experiences across students' narratives. When re-reading transcripts and notes, I wrote comments, or "jottings" (Miles et al., 2020, p. 86), to make notes within and across narratives. The plot points assisted in writing each student's narrative, while the comparative categories allowed me to discuss similarities and

differences across student narratives. After finalizing themes, I also developed a figure to capture a graphical representation of my findings.

The artifacts were also part of the analysis I conducted on the collected participant narratives, though one participant chose not to incorporate an artifact in their interview. I also took note of my own perspective of the themes that emerged when discussing participant artifacts based on concepts that emerged from my review of existing literature. Similar to my narrative analysis process, I identified any similarities and differences across participants' artifacts. The artifact analysis, as part of the narrative analysis, was also included in the member checking steps so that the participants could contribute and comment on my perceptions based on their experiences. I also consulted my committee to debrief memos, emerging ideas, and findings throughout the data analysis process. My committee member who specialized in TGNC research assisted in holding myself accountable as he could provide critical feedback, especially when aspects of my privilege and individual experiences may have impacted my analysis and writing.

Like a story, there can be inferred meanings beyond surface quotes when analyzing and writing about data. Inferences can create a difficult dynamic in providing my own interpretation of the significance or meaning of an experience while trying to remain authentic to the students' narratives and lived experiences. However, by collaborating with participants through data collection and conducting member checks when sharing Chapters 4, 5, and 6 during data analysis, I provided participants the opportunity to clarify their intended meaning as well as their thoughts on potential

themes, patterns, and plot points in my presentation of their story. No participant disputed findings or requested content changes aside from removing filler words in quotes.

### **Research Ethics**

When using narrative inquiry to explore the lived experiences of TGNC students in engineering, it was critical that I honored and respected the values of each individual participant throughout the research process. To hold myself accountable, I completed the Collaborative Institutional Training Initiative (CITI) modules and drew upon the Structured Ethical Reflection (SER) process (see Appendix B), and further informed my research ethics through my five core values: empathy, inclusiveness, kindness, open-mindedness, and conscientiousness. These values not only aligned with critical constructivism and a narrative approach through the openness in exploring new ideas and learning different perspectives from individuals who are living their experiences, but they also aligned philosophically in being equitable and inclusive of the participants as we co-constructed knowledge and made meaning of their experiences. All constituents in the study had varying needs, so it was critical that I respected, included, and was mindful of those needs, while also consistently reflecting and expressing gratitude for everyone's contribution throughout the research process.

Beyond my personal values, the principles of autonomy, beneficence, and justice were also crucial to honor (National Commission for the Protection of Human Subjects, 1979). In relation to autonomy, I provided participants with complete and transparent information about the Institutional Review Board (IRB) approved study including the purpose of the interview and research, how I intended to use the data, and informed consent, with the option of withdrawing from the interview at any time. Additionally, I



provided my contact information and remained available to each participant if they had any questions or concerns throughout the process.

When considering beneficence, I minimized harm as much as possible. I informed participants at the beginning of the study about potential harm they might experience, though it would be minimal, as well as benefits from participating in the study. The primary opportunity for harm in this study was the potential recollection and telling of personal experiences involving their identities that might have been sensitive or difficult to discuss. To reduce the risk of harm, I encouraged participants to only answer questions or share parts of their story they were open to discussing. I also let participants know they were welcome to take a break or end the interview at any point if needed. Additionally, I provided a list of organizations and resources that participants could use if they experienced increased anxiety or other unintended harm during the interview.

I reaffirmed confidentiality in my study and reminded participants that all data would be safely secured until the end of the study, at which point the recordings would be permanently erased. The benefits, however, outweighed the potential risk in that participants might have (a) learned something about themselves throughout the data collection and analysis processes, (b) influenced change in policy and practice that could lead to positive change in engineering environments for current or future TGNC students, (c) shared stories and strategies that could help fellow TGNC students as they negotiate their identity in engineering environments, and (d) learned about coping strategies that other TGNC engineers utilized, which could help them as they continue their academic and professional path.

I strived to ensure the research benefited the TGNC community in engineering as opposed to using their identities and experiences to primarily benefit anyone else. I safeguarded participants by dedicating careful attention to my core SER values as well as being mindful of the risks and benefits to the participants throughout the research. Nevertheless, I benefit from using the interviews for my dissertation as will university administrators, engineering educators, professionals, and employers who can gain recommendations for improved policy and practice from this study. However, I am hopeful that the ultimate benefit was for TGNC students to share their narratives and strategies for success, which will ideally help current and future TGNC engineering students and encourage professionals in universities and engineering programs to center TGNC identities and experiences to create a more inclusive and integrated field for all gender identities.

### **Research Positionality**

When considering my role as the researcher in this study, I acknowledge my positionality and privilege in relation to my topic and the participants. While I focused on the participants and their lived experiences of being a TGNC engineering student, my positionality inevitably influenced my perspectives and relationships with participants. Acknowledging my positionality to participants and within my dissertation provided transparency in my potential biases as a White, American, currently able-bodied, pansexual, cisgender woman who, while not having an educational background in engineering, works closely with the LGBTQ+ student population in an advisory capacity. I have worked with engineering faculty, staff, professionals, and students in various curricular and co-curricular capacities since 2013. Collaborating with engineering

faculty, staff, community members, alumni, and students as a student affairs professional in an engineering school afforded me the opportunity to gain insight into the engineering culture. Having mentored and worked closely with LGBTQ+ engineering students, I also learned about some of the unique experiences they have within engineering culture. However, while I have connections to the LGBTQ+ engineering student population through my professional role and identify within the LGBTQ+ community, I was primarily an outsider to my sample population as I do not identify as TGNC, an engineering student, or engineering professional. To mitigate potential mistrust of my outsider status, I sought to build and maintain trust and rapport with participants by disclosing my identity and relation to the research topic during recruitment, data collection, and analysis phases. By disclosing and acknowledging my identities, goals, and perspectives, participants and I understood how my positionality affected my process, interpretations, and data analysis. I also hoped these strategies, as well as emphasizing participants' role in co-creating knowledge throughout the study, reduced concerns regarding the researcher-participant power dynamic.

### **Validation and Quality Criteria**

Validation refers to the degree to which qualitative data and findings are accurate (Creswell & Poth, 2018). Researchers can implement validation strategies through their data collection and analysis process, collaborating with participants, and using peers or consultants external to the study to discuss or review emerging thoughts and findings. Validation strategies can include data triangulation, reflection, member checking, and discussing research with peers (Creswell & Miller, 2000). I incorporated each of these strategies in my study.

I implemented data triangulation by reviewing (a) audio recordings and transcripts from the interviews, (b) transcripts and notes about participant artifacts (c) personal observations and notes in my research journal, and (d) documents that emerged from data analysis such as coding lists, notes on themes, or diagrams. In addition to cross referencing these data, I also used reflection to consider my positionality, potential biases, and any other observations or notes (Creswell & Poth, 2018). To promote validation beyond the scope of my solo actions, I performed member checking by sharing interview transcripts and my writing, including identified themes and formed narratives, with participants. Participants thereby had multiple opportunities to collaborate by verifying that the transcripts and my interpretation of the data were accurate, and further discussing findings or (mis)interpretations. I also discussed my ongoing research process, experiences, reflections, and findings with my dissertation committee. Having an ongoing discussion with my committee provided me the opportunity to acquire feedback, ensure that I was incorporating detailed descriptions and narratives, and discussed my research with individuals who are dedicated and familiar with my research topic.

In addition to validation, I used Clandinin and Caine's (2013) 12 qualitative criteria as benchmarks for producing quality narrative research. Clandinin and Caine name these "qualitative touchstones": relational responsibilities; in the midst; negotiation of relationships; narrative beginnings; negotiating entry to the field; moving from field to field texts; moving from field texts to interim and final research texts; representing narratives of experience in ways that show temporality, sociality, and place; relational response communities; justifications – personal, practical, and social; attentive to

audience; and commitment to understanding lives in motion (p. 169-176). I define each criterion below and discuss how I achieved each measure in my research.

### **Criterion 1: Relational Responsibilities**

Relational responsibilities refer to the mutual space and obligations that researchers and participants share in co-constructing knowledge and narratives (Clandinin & Caine, 2013). As the researcher, it was my responsibility to partner with the participants to present their story of being a TGNC student in engineering and identify themes within and across different narratives. The relational partnership between the participants and I was ongoing throughout the data collection and analysis processes, ensuring that data was accurate through member checking and data triangulation, and that the participants' voices, in line with CTP, were centered in the narratives and findings.

### **Criterion 2: In the Midst**

Clandinin and Caine's (2013) second qualitative touchstone acknowledges the permeable nature of research. In other words, research inevitably occurs at a certain time and place, under the influence of the personal lives of the researcher and participants. Hurtado et al.'s (2012) DLE model, for example, illustrates how socio-historical, institutional, and other contexts can influence an individual's past and present experiences. These contexts, in addition to interpersonal relationships that the research and participants have with others, influence the narratives that students share as well as the research experience. Thus, as the researcher, I was aware of temporality, sociality, and place (Clandinin, 2016) as they related to myself and the participants, and understood our experiences together and apart were ongoing, multidimensional, and influenced the research relationship, process, and outcome (Clandinin & Caine, 2013).

### **Criterion 3: Negotiation of Relationships**

Negotiating relationships refers to the ways the researcher directly or indirectly addresses participants' perceptions and relation to them (Clandinin & Caine, 2013).

When beginning the recruitment and data collection process for my study, participants could identify me as a doctoral student conducting research; however, my other identities such as my race, ethnicity, gender, and ability could also influence the ways participants perceived and interacted with me, and vice versa. While I could control how others perceive me, I was transparent with participants about my positionality and identity and used my values and SER to guide my practice in being empathetic, compassionate, and respectful of each individual's needs, identities, and experiences throughout the research process.

### **Criterion 4: Narrative Beginnings**

By reflecting on personal identities, experiences, perspectives, and interests, a researcher can situate themselves in the research process and topic. Clandinin and Caine (2013) referred to personal reflection as narrative beginnings. Within my study, I noted my own assumptions, experiences, and perceptions in my research journal before and after interviews and throughout the data analysis process. This served as a processing tool by which I could share my identities, experiences, and interest in the research topic within my dissertation. While I included my narrative beginnings, I kept the primary focus of the results and findings on TGNC identities and experiences.

### **Criterion 5: Negotiating Entry to the Field**

Clandinin and Caine (2013) defined field as an "ongoing relational inquiry space" (p. 171). As previously noted, researchers and participants must negotiate relationships

with one another throughout the research process. The negotiation process then continues within the field as the participants share their stories with the researcher, while still considering the social, institutional, and interpersonal contexts that influence the narratives and research. When I worked with participants, I both listened to each person's narrative and "[lived] alongside" (Clandinin & Caine, 2013, p. 171) them as they told their story and expressed themselves in unique ways through the sharing of a meaningful artifact. My goal was to center the participants' narratives and acknowledge various contextual influences in their lived experiences and my interpretation of their stories, all while integrating my core values in my SER.

#### **Criteria 6-7: Moving from Field to Field Texts, to Interim and Final Texts**

Data, or field texts, can be made up of interviews, observations, or artifacts (Clandinin & Caine, 2013). The interviews with participants and their artifacts served as the primary field texts in my study. From collecting participant narratives, to reviewing and collaborating in the narrative construction process, and finalizing research findings, I worked with participants to ensure they were able to share, edit, and collaborate on all portions of their narrative construction. Again, the research process all took place when considering temporality, sociality, and place (Clandinin, 2016). In other words, participants and I conversed, shared, listened, reviewed, and constructed narratives at different times, in various spaces, and with diverse influences that impacted the research experience and product. I honored, respected, and centered participants' needs, stories, and experiences throughout each stage of the research process.

### **Criterion 8: Representing Narratives of Experience**

In addition to incorporating temporality, sociality, and place in the research process and writing, these aspects also need to be represented in the final narratives and findings for my dissertation and any related future presentations or publications. Through this criterion, Clandinin and Caine (2013) encouraged researchers to avoid simplified “cover stories” (p. 173) that sacrifice the complex nuances of the narratives. The stories should, instead, include rich details that draw readers into the experience and highlight the multidimensional layers within and across diverse narratives. I aimed to integrate temporality, sociality, and place within the narrative construction and analysis process to share accurate and complex depictions of participant narratives. I also maintained confidentiality throughout this process by deidentifying students using pseudonyms, removing specific institutional or geographical identifying information, and ensuring the participants were comfortable with specific quotes cited throughout Chapters 4 and 5.

### **Criterion 9: Relational Response Communities**

Relational response communities “consist of people the researcher values and trusts to provide responsive and responsible dialogue about [their] unfolding inquiry” (Clandinin & Caine, 2013, p. 173). As a doctoral candidate, I have an integrated response community by way of my dissertation committee, with whom I had ongoing communication to discuss my research. Together, my committee consisted of experts in the field of student affairs, qualitative methodology, and TGNC experiences in higher education, which provided me guidance and accountability throughout my research. Additionally, I considered my participants to be a response community as well. Though participants were not obligated to participate in ongoing discussions of inquiry, I valued



their experiences, narratives, and role in co-creating knowledge. By centering their voices and including them throughout the research process, they too were a community that provided meaningful feedback about their narratives and findings.

### **Criterion 10: Justifications**

Clandinin and Caine (2013) called for narrative researchers to rationalize their research “personally, practically, and socially” (p. 174). Personal justification can occur, or at least start, through narrative beginnings. As previously mentioned, I kept personal memos in my research journal and provided a formal presentation of my justification through my positionality section in my dissertation. The practical and social justifications refer to the importance of the research. Chapters 1 and 2 provided a background of why this topic is critical, while Chapter 5 contains potential implications for research, theory, and practice.

### **Criterion 11: Attentive to Audience**

When considering the personal, practical, and social justifications of research, Clandinin and Caine (2013) suggested that the researcher must navigate various needs. In my study, for instance, I integrated CTP to center TGNC student narratives. I also, however, was required to present the research in a way that met academic standards for my institution’s dissertation requirements and conveyed implications and opportunities that can translate to various audiences including student affairs practitioners, administrators, faculty, employers, and TGNC students. While these could be viewed as potentially conflicting interests, I argue that presenting the accurate and authentic needs of TGNC students meets the needs of other constituents. While the application of the findings vary depending on the specific context, the heart of the narrative must remain

true to TGNC students' experiences. Therefore, I maintained my obligation to co-construct narratives with participants and accurately present their experiences and needs to various audiences.

### **Criterion 12: Commitment to Understanding Lives in Motion**

Though I strived to present accurate and authentic narratives, it is important to emphasize that “there is no final telling, no final story, and no one singular story we can tell” (Clandinin & Caine, 2013, p. 176). In other words, the participants' lived experiences and perceptions of their experiences—as well as those of the researcher—are constantly in motion before, during, and after the research relationship and process. Socio-historical, institutional, political, psychological, and all other contexts will continue to influence the ways people share and interpret the narratives that emerge in this study. Thus, I committed to co-constructing narratives with my participants, while also acknowledging the temporality, sociality, and place in which TGNC students' experiences and the research process occur(ed).

### **Limitations**

There were a few limitations to this study. First and foremost, I am a cisgender individual researching a topic about TGNC students and therefore hold a privileged identity. My cisgender identity may have dissuaded TGNC students from participating or feeling comfortable fully sharing their stories based on my identity and the related systemic oppression of TGNC individuals in U.S. society. While I strived to build rapport and create a welcoming interview environment for students to share their narrative, my inherent privilege may have been a barrier when working with TGNC students.

Additionally, my sampling method was limited due to the likelihood that it only included students who were successful, engaged, and perhaps out as TGNC while in their engineering program. In other words, by limiting the participants to students who were in their junior and senior year or have graduated, the sample did not include students who encountered barriers and did not persist in engineering.

Finally, by including students who have graduated from their engineering program in the last four years, there can be issues with immediacy of recollection in discussing their experiences. While all participants reflected and used self-reporting to some degree, the longer a participant had been away from their undergraduate education, the more difficulty they may have had when recollecting events or experiences.

### **Summary**

In summary, I used narrative inquiry to explore and understand the lived experiences of TGNC students in engineering. Specifically, I interviewed five participants using in-depth, semi-structured, open-ended interviews to elicit detailed descriptions of their experiences in curricular, co-curricular, and community contexts during their engineering program. While narrative research is a time-consuming, complex approach to acquiring data, it was appropriate for this study as it provided the opportunity to center TGNC stories and co-create knowledge with TGNC individuals, mirroring one of the core CTP tenets. While learning about TGNC student experiences and collaborating with participants throughout the data collection and analysis phases, I upheld ethical research conduct using my SER, reflection, quality criteria, commitment to the participants, and fostering of transparency and trust throughout the research process.

## CHAPTER 4: PARTICIPANT NARRATIVES

In this chapter, I provide a detailed narrative for each of the five participants. Each narrative elucidates the participant's lived experiences negotiating their gender and other identities, navigating systemic TGNC oppression, and integrating coping and persistence strategies in curricular, co-curricular, and community contexts during their engineering programs. I constructed narratives based on two 60-minute semi-structured, open-ended interviews per participant. Participants provided their gender identity and pronouns while completing the research study interest form and chose a pseudonym during the interviews (see Table 1). I intentionally did not ask participants to disclose any other demographic information on the initial form so as not to lead them in discussions about their salient identities. During the interviews, I invited them to discuss their salient and intersecting identities if they did not organically surface in conversation.

The narratives follow a chronological structure that highlights their decision to pursue engineering at their undergraduate institution, their lived experiences as a TGNC engineering student, a reflection on strategies and skills that helped them persist and succeed in their program, and their perspectives and experiences as they completed their undergraduate education or continued to graduate school. I end the chapter with a brief summary.

**Table 1**

*Summary of Participant Information*

<b>Pseudonym</b>	<b>Pronouns</b>	<b>Gender Identity</b>	<b>Race or Ethnicity</b>	<b>Student Status</b>
Jake	They/them	Trans/nonbinary	South Asian/Indian; Brown	Undergraduate
Mickey	They/them, She/her	Nonbinary/woman	Latinx	Graduate
Pan	They/them	Nonbinary	White	Undergraduate
Rain	They/them, She/her	Nonbinary	East Asian	Graduate
Solomon	He/him	Transgender man	White	Graduate

**Jake’s Narrative**

Jake (they/them) is a current undergraduate student who identifies as trans and nonbinary. “And as far as, like, a gender goes,” Jake shared, “I’m not really sure I have one.”

**“Change the Ratio”: Choosing an Engineering Program**

Jake, knowing they wanted to stay in their state for college, chose the only university that offered their engineering major of interest. “I’ve always been interested in helping other people and, you know, making the world a little bit brighter,” Jake stated. Having always enjoyed math and science, engineering felt like a good fit. They also had an older brother who pursued a related major in engineering, so they thought, “If he can do it, I can do it.”

At this point in their life and gender journey, gender was not a major factor when choosing their university. Jake shared,

I was mostly just like, "Oh, you know, this is a cool school." And thinking that I was a woman back then, I was like, "Oh, cool. I can change the ratio." And they'll be more likely to give me a scholarship and stuff like that.

Since engineering is dominated by men, Jake, identifying as a woman at the time, was excited by the opportunity to add to the percentage of women in the field. They also were encouraged by the opportunities to earn a scholarship due to the underrepresentation of women in their major.

### **“Thrown Among the Wolves”: Adjusting to College and Engineering**

Jake described their first year as “rough” due to taking two math classes simultaneously in addition to lab courses. “I was thrown among the wolves,” they shared, “without anybody telling me, like, you’re being thrown among the wolves.” Jake was accustomed to being the go-to classmate in high school who could assist with homework and questions that arose in class. Once in college, however, when considering “intelligence and academics”, they realized, “No, I’m normal. I’m definitely normal.” Jake recognized the pace and rigor of their program was different from their high school experiences, requiring them to adjust how they managed schoolwork.

As they progressed through their program, Jake worked with their advisors to alter the course load, spreading courses out while doing their best to stay on track to graduate. This helped them avoid another semester taking multiple math courses at the same time. However, their second year brought “hella mental health struggles” leading Jake to take a semester off. Jake reached out to various resources including the dean of students, counseling center, community programs, and support groups. Friends and

family were also helpful, “getting on board with treatment and getting better.” Taking time off from college allowed Jake to slow down and “be gentle” with themselves in college.

### **“Not Having a Gender is a Thing”: Discovering Their Trans/Nonbinary Identity**

During their second year of college, they discovered they identify as trans/nonbinary. Jake described,

I realized like, “Oh, they/them pronouns are a thing.” And then I realized, “Oh, not having a gender is a thing.” And it was very eye opening for me. And I was able to change my name. Not legally yet, but that's in [upcoming month]. But, like, I was able to change my name, experiment with that, get people behind that.

Jake learned more about TGNC identities and had the support and freedom to experiment with different pronouns, names, and gender identities that felt appropriate to them. As they continued in their gender journey and befriended other TGNC individuals, they began to consider other gender options such as being “gender fluid” or “gender flux.” They shared,

I hung out with a lot of trans masc people, especially trans men. And I thought, “Well, you know, I can relate to them on a lot of levels.” And I thought, “Well, maybe I'm more fluid in my gender.” There weren't a lot, I didn't really know anybody who was gender fluid or gender flux outside of like, people online, I guess. Like it, it was no personal example.

Learning how their trans masculine friends identified and presented, Jake was able to relate and considered a fluid gender identity. “But the only thing that really, truly stays the same,” Jake said, “is that I don't really have a gender. I'm just me. I'm just Jake at the end of the day.”

Jake also only dated trans people, which was “affirming” to them. They stated,

In trans spaces people are like, “Okay, what are your pronouns? How do you identify? And even if we don't get it, we respect it. You know, we love you. We care about, we want you to feel affirmed.” And that's been, that's been super great

for me, just to be able to be around trans people, but especially to date them. Because, you know, they, we get each other.

When dating or being around TGNC and queer friends, Jake felt there was an openness, respect, and understanding that was not present when they were with cisgender and heterosexual people.

Over time, they developed three friend groups. One group consisted of trans people and others who were questioning their gender. The second group had people who were acquaintances more than friends and lived in the same residential community. Lastly, Jake had a “core group” of friends that was made up of people of various majors “that [they could] show up with and feel comfortable with.” When discussing their core group of friends, Jake stated,

Well, I've known these people for a few years, a lot longer than other people. And they've made space for me to explore and also to accept me while I explore who I am. And I do the same for them. And I think we've just built up a level of trust that is necessary for me to be able to be more authentic.

They felt their core friend group provided the most support out of their different friend circles, and thus felt a sense of mutual respect and community.

### **“Nudge People into Thinking Differently”: Encountering Stereotypes**

When interacting with people in society and on campus, Jake sometimes encountered negative stereotypes about TGNC individuals. They shared,

I guess a perspective that I used to have was that like, trans people are just like little snowflakes, you know? Trans and queer people are snowflakes. We're very, I guess, sensitive? And I thought that was a bad thing. But now I'm like, we are sensitive sometimes. But you know, it's, it's in a good way. It's in a way that helps us be kind. But yeah, a lot of people seem to like tiptoe. Like, I guess allies seem to tiptoe around it. And they're like, "Yeah, we don't know how to talk to you."

Jake viewed others' perceived sensitivity of the TGNC community as a strength in being able to be empathetic and understanding of others' experiences, especially when facing



adversity. Experiencing negative stereotypes served as “a wakeup call” for Jake. “Not everybody is gonna think well of me,” they shared, “And it's been a wakeup call to like, just the unpleasant ways that people treat people like me. Or think about people like me.” Depending on the comments Jake received, they would either keep to themselves or “speak up” to correct and protect themselves. They stated,

Sometimes I speak up, like, I used to, I used to have a lot more energy, and I would speak up a lot. And I'd be like, "No, you know, this is why you're wrong." Or "this is why the stereotype is hurtful or harmful." And I would just explain it, and people would be like, "Oh, that actually makes sense." You know, like, or sometimes they wouldn't, but you know, I would at least nudge people into thinking differently.

Whether they received a welcomed response or not, Jake had to dedicate extra energy to defending themselves and helping educate others.

In addition to encountering stereotypical views of TGNC individuals, Jake also experienced individuals who were unsure about how to interact or relate to TGNC people. They shared a story about a student who was not sure if they were able to laugh at a joke that Jake made:

I went to a [LGBT student org] meeting. [LGBT student org] is like our LGBT club, I guess, for undergrad students. And we did trivia night, and I got the right answer. I was the only one that got the right answer on a question about a nonbinary person. I was like, you know, it's funny, because I'm nonbinary and the answer, the person that I answered was nonbinary. And I was trying to explain the joke to my friends. And they were like, "Are we allowed to laugh?" I was like, "Yes! You're allowed to laugh!" It's just funny.

Thus, Jake had to overexplain themselves to a student peer who identified as an ally but was unsure whether it was appropriate to laugh at Jake's joke. Even in fun, social spaces, they had to exert extra energy to explain their humor and identity.

## **“I Don’t Feel Like I Can Fully Show Up”: Negotiating Identity**

While in their undergraduate program, Jake did not always feel comfortable as a trans/nonbinary person in engineering contexts. They chose to not directly introduce themselves as trans/nonbinary, but they often shared their pronouns during introductions, which people in the program did not tend to receive well. They described,

I do introduce myself with my pronouns, but, like, people kind of side-eye me in my program still, even though it's, like, one of the more rewarding programs and it's one of the more, I guess, open programs, more diverse, but I still don't feel like I can fully show up there.

When disclosing their pronouns, their classmates would often do double takes and be confused by their name and pronouns. Jake said,

People will be like, "Wait, what was your name?" Or, you know, "Wait, what did you say?" Like, my name is pretty simple. I think the pronouns throw people off, and I guess they're not used to people introducing themselves with pronouns so, like, it's a little awkward.

Thus, Jake gauged peoples’ reactions and adjusted how they introduced themselves accordingly. “It’s always been a challenge to figure out which spaces I can identify myself correctly,” they shared. Jake added,

I realized that I had to, that I would be more comfortable not sharing too much. Um just being quiet about it, about my identity, I guess. And just not really reinforcing the pronouns or anything like that. I'm very lucky that I changed my name, not legally yet, but on the school system pretty early on. So, it shows up on my email, it shows up on [school software system], all those spaces, except for, like, legal documents. So, people only see Jake.

Since Jake changed their name in the system early in their college career, they primarily had to navigate the reactions others had regarding their pronouns. While their specific discipline had more gender diversity than other majors in engineering, there were not many TGNC people in the program. There were “a lot of queer people,” but Jake felt their classmates were not accustomed to people introducing themselves with pronouns.

These types of interactions made Jake feel uncomfortable, thus they found it easier to keep their identity to themselves in the engineering curricular contexts that made them uncomfortable.

Additionally, Jake was aware of their racial identity and social class in engineering curricular and co-curricular contexts. They encountered several instances of being tokenized by others such as being told they only earned a scholarship due to their race and gender, not because of their merit. They also explained a general sense of isolation and disadvantage:

Very often, I'm one of the few Brown people in class...it kind of makes me feel like an other, like maybe I don't belong here. It's like, I'm not being represented by other people. And class has, like my class, social class standing. I was always really, really, really poor growing up. Less so now, thankfully, but I still have to be really careful with money. So, like, that has influenced what I can attend. You know, I don't go on field trips with clubs and stuff. I don't pay club dues, which can be detrimental because, one, I'm not able to go to those events. And then, two, I'm not able to put that on my resume and be like, "Oh, look at me, I'm a well-rounded person," you know? I'm having to come up with free ways to sell myself, I guess, on a resume.

Jake did not feel a sense of belonging due to the lack of representation in their classes as well as the opportunities they were excluded from based on their inability to pay to participate. Thus, Jake took on extra work to build their resume and find connections where they could. While there were some people of color who were professors in the engineering school, they did not recall anyone who identified as South Asian, "specifically Indian." When they noticed faculty of color, they would think, "Oh, you know, I've got a smidgen of representation." However, they did not have anyone that "would match exactly [their] identity." They added,

It's also really nice to see people of color in faculty. And to see them and to realize, like, "Oh, I can have any kind of career I want. I can thrive and not just survive. Things can go well for me."

Having faculty who were people of color was reaffirming and meaningful to Jake, creating a better sense of belonging compared to curricular contexts with White instructors.

### **“Trust Helps”: Developing Support in and Outside of Engineering**

When describing contexts in which they were comfortable, such as with their core group of friends, Jake cited trust being an important factor in feeling comfortable enough to open up about their identity and experiences:

A level of trust helps. And then if we have some common ground, like, "Oh, I know you're bisexual," or "I know you're gay", or you know, like, you have a basic understanding of LGBT issues. And then hopefully you understand trans issues, or at least respect them. That often helps me open up a bit more. And I think when people ask respectful questions, I think that helps a lot.

Whether their student peers identified as TGNC or were part of the LGBT community, Jake felt safer, assuming a trust that there was a mutual respect and some degree of understanding about issues that TGNC individuals face. They shared,

So, I try to stay within the trans bubble. Because it's a little safer. I mean, even then it can be problematic, but I know we perceive each other pretty well. But outside of that, a lot of people seem to think that we're putting too much emphasis on our genders and on our expression, where "we're being weird about it," or, you know, "Why do you put trans first and not Brown first?" or, you know, like, we get a lot of questions. Yeah. And it's not always friendly.

When among TGNC friends, they had a mutual understanding and respect of one another. In different contexts, especially those within engineering spaces, Jake felt less safe and more vigilant about problematic questions and comments as well as general threats towards their identity. Even when in non-engineering specific contexts, such as in the general campus community at a protest, Jake received rude and inappropriate comments from strangers. Since their campus was dominated by engineering majors, they often

assumed that the discriminatory comments came from an engineering student, thereby adding to the discomfort Jake felt in engineering curricular and co-curricular contexts. Having supportive friends helped them process these negative encounters and validate their identity and experiences.

### **“Welcomed and Understood”: Changing Paths and Appreciating Connections**

Several years into their college career, Jake realized they wanted to switch majors to a different engineering discipline, which added another two years to their degree. Despite adding on time, they were “very happy” with their decision to switch, and “love being a [specific discipline] engineer.”

While in their former major, they shared a meaningful relationship with their advisor. Jake described,

My relationship with my advisor in [former major], um, she's a Black woman, I think she has kids. She's a single mom. She was incredible while I worked with her. You know, she listened and she cared. And I was able to be really open with her about, like, who I am, what I am. And she was very kind, and gave me a lot of hope for other students going through that program, because even though I transitioned out of that program, I have hope that, you know, other students that do go through it will be welcomed and understood.

Working with another person with underrepresented identities in engineering was refreshing to Jake, let alone someone who was also accepting and welcoming of their identities. While they did not have a bad experience in their new major, they did not have the same level of connection with another staff member in their new department.

### **“It Can Be a Little Scary”: Gender Negotiation with Faculty and Students**

Jake took a class where they noticed differences in how the instructor and classmates talked to students based on their gender. They shared,

So, I took a course this semester, and it was [major specific topic], and the professor was, he was pretty cool. But like, one of my classmates would ask a

question. He would look at her and be like, "What do you mean?" But when a guy would ask the same question, he'd be like, "Oh, yeah, whatever, this is fine." And you know, he'd go along with it. And so, I thought to myself, like, "Wow, if he can't even answer a woman, is he going to be able to answer me when I ask him questions?" Like, because my pronouns show up on [university software system], they show up in my emails. They show up everywhere because I don't try to hide them per se. I just don't think people notice them. But like, you know, just knowing the fact that they're out there. It can be a little scary, cause like, what are they going to be like?

After witnessing the way professors addressed women in class, Jake became concerned their interactions with the instructor and classmates would be worse because they identified as trans/nonbinary. Since they included their pronouns in the software system, they were already sharing their TGNC identity in some capacity and became fearful that others would treat them poorly. This made them "a lot less likely to ask questions," which is how they learned the material effectively, so it impacted their experience in the class personally and academically.

While Jake noticed and was concerned about the way people in engineering would treat them because of their identity, they enjoyed helping others and appreciated being around classmates who held similar mindsets. They said,

At least academically, it's really nice to meet people who have similar mindsets. And it's been really meaningful, to be able to work with them and to see, "Oh, people like me do exist, they may not be the same as me, but, you know, we are similar, we can get along and we can do meaningful work."

While Jake did not share similar identities and experiences with many of their engineering classmates, they were able to do meaningful work with them in their coursework.

However, when in curricular contexts, Jake felt their relationships with faculty and staff were "more surface level" compared to social contexts with TGNC people

because they “[got] to be [themselves] around [their] friends.” Curricular spaces were also challenging for Jake when interacting with classmates. They shared,

Academically is the toughest for me, because um, I have to be very careful, because like, I get assigned group projects, and if they don't like me, they're gonna rate me poorly. And, you know, I just have to kind of put myself aside and put the work first.

When working with classmates on group projects, Jake had to navigate tense situations when they felt targeted by someone. For example, one of their team members “said something really weird about religion” such as “y’all need to get saved.” Jake continued,

And I, I was so uncomfortable. And I was like, "Is it because, you know, because I have they/them pronouns?" Like and it seemed very targeted. I felt very targeted, I would say, I feel very targeted by this person and I felt like, you know, he was judging me for, you know, the way that I look cause I have [colored] hair and like, I use they/them pronouns, and I was like, I'm very visibly queer. And I just felt, I felt very judged and uncomfortable when he did that and so I, I actually put in my peer review that he did that. I don't know if it got anywhere, but I at least got to express my concern.

Knowing there were peer reviews involved in their project and final grade, Jake felt an added pressure of having to work alongside a discriminatory teammate who made them uncomfortable in order to pass the project and class.

While Jake tried not to intentionally alter their presentation or identity when interacting with faculty or students, they shared, “I guess my mannerisms might change a little bit. I’m not sure, I try not to pay attention to it because it’s kind of painful to think about.” Jake knew there were differences in the ways they interacted with people in different contexts but tried not to focus on ways they altered their gender around others to be comfortable because it was “painful” to not be able to safely be themselves in certain contexts. Whether it was their family not “[understanding] pronouns” and having to “roll with” them using incorrect pronouns or feeling the need to be overly polite and cautious

with instructors since “they’re in charge of [their] grades,” which can be “a deciding factor of where [they] get hired,” Jake “[had] to protect themself.”

Jake had some professors that were “cool” and would use the correct name and make sure others do too, even if they “may not understand the whole trans thing.” Using the correct name, pronouns, and gender-neutral language was often a “good signal” of an accepting and supportive instructor. However, if Jake was uncertain or uncomfortable around professors and classmates, they would hold back parts of themselves or ideas. They said,

The pronouns aren't always there. Just because I don't trust people to use them. So, I don't want people to weaponize them against me. My ideas are not always explained fully. Because like, like, in a paper, we talked about the [regional railway]. That was our group project. And we wanted, I wanted to talk about like social equity, and the [regional railway] has caused gentrification and things like that. And I couldn't tell them that it's a gentrification thing. You know, I couldn't tell them that it's often very much a gendered thing. I, like my ideas weren't as fleshed out as they could have been because I couldn't go into much. I felt like I couldn't go into much detail about why I wanted to talk about social equity.

Jake felt uncomfortable in some classes, viewing it as unsafe to share pronouns or ideas that would put them at risk for being targeted. Most of their teammates tended to be “cis het White men,” and if there were no obvious signs they would be supportive, Jake felt more comfortable holding back some of their ideas and parts of their identity. “I’m very, very different from them. My experiences are very different,” they said. Sometimes Jake would assume their teammates were not accepting by default while others would be directly discriminatory such as the person who said, “y’all need to get saved.” When asked about ways their gender influenced their relationships with others, they described,

I think my gender often others me. Because I'm, I mean, I'm not in the majority. I understand that. And I think a lot of people see that and they're like, "Oh, you're different. I'm gonna treat you differently." Um, I don't know. It's like a lot of little things, like, people will avoid me or they'll stop talking to me once they find out,



or if I introduce myself with pronouns, people get, like, a little shifty. Like, they'll be very, they look uncomfortable, like, very fidgety and very, like, their voice will quaver and, or quiver, sorry, that's the word. And they'll be like, "What's a pronoun?" And then they'll avoid me after that. So, it does affect the way people treat me. And it affects the way that I relate to them.

After experiencing people being “shifty,” “fidgety,” and “uncomfortable” when Jake shared their pronouns, Jake became aware of how their identity could impact their relationship with others. Thus, when they were uncertain about how classmates or instructors would react, they would often assume others were not comfortable and keep to themselves to stay safe. They shared,

People tend to like, pretend that we don't exist. They kind of pretend that, or in my experience, people tend to pretend that that part of my identity doesn't exist, that they can overlook it. And then they just overlook it. And they, you know, they act like, "Oh, you know, but there's no such thing."

Discriminatory classmates, instructors, and other members of the campus community would either harass Jake and other TGNC individuals or would fail to acknowledge their existence and experiences. Thus, Jake had to carefully negotiate their identity around others, especially in their engineering program.

The only person they recalled directly disclosing their identity to in their program was their advisor in their previous engineering major who was very accepting. Jake shared their pronouns but intentionally did not go into detail about their gender identity in engineering contexts for fear of backlash. “I always show up as Jake,” they said, “I’m just not loud about who I am often.” They will share if they think it will help them “backup what [they’re] saying,” but otherwise, Jake [didn’t] really show up in a way [they felt] they should be able to.” They added,

For the past two years, I’ve been very self-preserving, very protective of myself. It’s just, I’ve been put in situations where I feel like I’ve been threatened or in danger, either emotionally or physically. And it’s like, at this point, I just want to

live to see another day. You know, I just want to feel safe. And if I have to hide part of myself, I'm gonna do it. And that makes me very sad.

Jake experienced TGNC oppression in and outside of their engineering major and decided to prioritize self-preservation. While they did not share specific instances from the past two years that influenced this, they shared a general sense of exhaustion after spending several years advocating for themselves and the broader TGNC community. Jake said,

In the past, I have been pretty vocal about trans rights and gay rights and all the rights. And, you know, I've been doing, I've done that, for the sake, for my own sake, of course, but also for the others that I know, don't have the time or the energy to do it right now. And I guess, I've kind of like swapped sides where I no longer have the energy to do it because I've done it for years. And it's like, it's very tiring. I need a break. But I used to, I used to be more vocal. I used to show up to school protests in support of trans rights and stuff like that. And, of course, they were often very unpleasant because of other people. But yeah, I, I would do it for myself so that other people would respect me, but also primarily for my friends who are trans and gay.

Thus, Jake focused on self-preservation and held back, letting others lead advocacy efforts so they could take a necessary break.

### **“I Have to Be Able to Be Me”: Being Trans/Nonbinary in The Workforce**

Jake completed an internship in their major, which was a nice change of pace from coursework and helped them see the application of their work. They shared,

It was good to take a break from academics. It was good to get out there to see what people really think about the world, about the field, to get some work experience out. That was really good, very helpful. I couldn't really—, I was myself, I'm always myself. But I couldn't be my whole self, I believe. People, people out in [internship city] don't seem to care. I don't want to generalize, but like, the people I worked with, I'll use an I statement, the people I worked with didn't seem to care about like gender and stuff like that. Like, they were just like {inaudible} and I was like, "Okay, I can do this. I can keep my head down."

While they enjoyed their work with the company, they did not feel they could be their complete self with their coworkers based on comments they made. Instead, Jake mostly kept to themselves and separated their personal matters from work. Jake continued,

There's a built-in assumption that, you know, you're a woman in the field, and you just got to do your job and keep your head down. But people would also say things, like, one of my coworkers, I told him, you know, my pronouns are they/them. And he was like, "Well, I'm gonna have to use she/her for you because, like, you know, people won't get it." He asked me, you know, "What would you prefer?" And I said, "You know what, it's, it's fine either way. You know, whatever, safest for me in the moment." So, I did what I had to do.

Jake thus experienced a tension between wanting to present or share themselves while also wanting to fit in enough to maintain a safe environment at the company. They also heard stories from classmates about their experiences at other companies where it was "also difficult to show up as their full selves."

Having experiences as a trans/nonbinary person in engineering led Jake to be compassionate towards other TGNC individuals in their various jobs. "I'm a lot more aware of other queer and trans people in the workplace," Jake shared. They continued:

I've had a lot of campus jobs, and I tend to look out for, you know, my, I tend to look out for my LGBT siblings. And I tend to ask, it affects, like, how I introduced myself, how I ask other people, you know, like, "Tell me more about yourself" or, you know, "What are your pronouns?" Or "What name do you like to go by?" It also, I think it makes me a little more compassionate and empathetic. Because I know what it's like to be othered. And I don't want other people to feel that. I do tend to be a little more careful.

Thus, Jake looks out for other TGNC individuals in their work in addition to monitoring their own well-being. Knowing what it is like to be othered at work and in other contexts, they try to be especially welcoming and inclusive of TGNC coworkers.

Interviewing with other companies, Jake noticed language and behaviors of interviewers. They shared,

So, I recently had an interview with the company... And the guy who I talked to was very unassuming, like, he didn't assume my pronouns, didn't assume my gender, you know, used very neutral terms when talking to me, because he didn't know. And I like that. And that's a good signal for me to pick up on during an interview. Also, like, you know, the follow ups were very cordial. And like, of course, my pronouns are in my email, so he, like, he figured it out. But like, you know, just, I guess my concern is, I have to be able to be me where I work, even if it doesn't have to be loud. Like, I just, I just have to be me. I have to be respected. I'm getting, I'm working on getting my name changed legally, so that that won't be a problem anymore.

While Jake did not have a direct conversation about their trans/nonbinary identity with the interviewer, they appreciated their gender-neutral approach which made them feel comfortable. Knowing they can be themselves at their place of employment is important to Jake. By having their name legally changed and having experiences with employers who are accepting and inclusive made Jake feel more at ease about future employment opportunities.

### **“Power in My Identity”: Reflections on Undergraduate Experiences**

When reflecting on their undergraduate career as a whole, Jake stated “onerous” was an appropriate word for their experiences in their engineering program. While they encountered barriers and difficulties, they also acknowledged their accomplishments during their career along with moments of “joy.” The academic coursework was “tougher,” which added to the difficulty, but Jake also felt their experience was difficult “because of navigating [their] identity and how [they showed] up in the academic space.” The LGBT center on campus was relatively new when Jake started at their university, so the resources were minimal. Though there are programs and spaces for LGBT students on campus now, they had to spend several years of their college journey without ample resources and university supports as they negotiated their identities in their engineering program.

During their journey, Jake also reflected on their resilience, referencing a jacket they did patch and embroidery work on. The jacket was “a green cargo jacket with a black patch, and on the patch [was] embroidered a trans power fist.” They described,

When a friend of a friend was killed by police a few years ago, we did some protests and stuff. And this is what I wore to a lot of those protests. And a lot of the events that we held. So it reminds me of like, resilience and the power that I have... I've had to really stand up for myself a lot because I'm trans and because I'm Brown and queer, and you know, everything. But a lot of it's because I'm trans and I have to stand up for myself and advocate for me and for other people. You know, asking for appropriate bathrooms and getting people to respect pronouns and get them on the [university software] sites and all that kind of stuff.

Jake was heavily involved in TGNC advocacy in their community and at the university, fighting for TGNC rights and inclusion. They noticed initiatives in non-engineering departments, such as political science and history majors, seemed to get “a little more traction” than those within engineering. Jake described engineering as “a world of its own” that was “a little behind the times” in regard to the inclusion and celebration of underrepresented identities. “Faculty and staff [were] more accepting,” Jake shared, “Or at least [seemed] to be a little more chill about, you know, gender and sexuality.” They added,

I mean, we study theory on like fluid mechanics or mathematics. But we're not really taking the time to read about social constructs and gender and class and color and how those affect our existence. I know some of us do spend time doing that. I spend time doing that because it does affect my existence. But I don't see a lot of other people talking about it.

Jake saw the application and value in learning about social constructs and diverse identities due to their personal experiences with sociocultural issues that are present in society and engineering. However, doing so required extra work and time to learn social content that was not included in the curriculum. While the lack of curricular and social support of underrepresented gender and racial identities in engineering was tiring and

frustrating for Jake, they appreciated the strides they made in their program and at their university.

Whether Jake was participating in protests to fight for Black trans women's rights or working with the university to create gender neutral restrooms, they demonstrated their resilience and power in advocating for themselves and their community. However, even when fighting for gender neutral restrooms, Jake was aware that "people weren't happy about it," and thus had to focus on self-preservation, "[trying] not to pay too much attention to it." When someone, such as their boss, was not supportive of the bathroom initiative, Jake became uncomfortable presenting or negotiating their identity with them, thus making a tense environment. Jake also indicated having "selective memory" and attempting "to block" the difficult situations they experienced in their program and university experience to help with self-preservation.

While encountering barriers, Jake was also able to acknowledge the comfort and pride their jacket and advocacy brought them:

It's just brought me a lot of comfort throughout the years, especially when I was able to wear it. It's a little too small now cause you know how [age] year old shoulders are. But when I was able to wear it, it brought me a lot of comfort, just knowing that I have power in my identity, and I can bring about change for the better.

When reflecting on their time in their engineering program, they felt their experiences as a Brown trans person, along with their other intersecting identities, provided them with several strengths. Jake elaborated,

I have a lot of intersecting identities, and I bring a different perspective with me. And I think sometimes a little more empathy and compassion. You know, a lot of people are all about the math and the science, but you got to have some humanities in there, and some, and some compassion and empathy, yeah. Those are the words. So, I bring that to the table. I also bring, of course, you know, like, my intelligence and my knowledge, and how good I am at being an engineer. I

bring that to the table. But as a trans person, I think just being able to look at people and not necessarily assume anything about them can be a strength, but to let them reveal themselves. I think that can be a strength.

Having experienced adversity, Jake understood the importance of being empathetic and compassionate towards others. "Growing up," Jake shared, "not everybody was kind to me. A lot of people were very unkind." Thus, Jake provided the kindness to others they wished they received from people throughout their journey. For example, they helped a friend when they were going through a difficult time:

So, I have a friend. She was an engineer at the time, a [different major] engineer. I think she switched majors at some point, I don't know what to. But at the time, she was an engineer. And she just, you know, was going through it, and didn't know who to talk to. And so, she came to me and she's like, "Look, can I talk to you about this? You know, do you have the space for it?" And I said, "Yeah," and my listening skills really helped. Just to be able to sit there and say, "Yeah, no, that sucks" or "Yeah, no, you did this right." You know, just not as a counselor or as a therapist, I'm not either of those things. But as a peer, to be able to sit there and say, "You're valid," and, you know, to lift up a fellow engineer, a fellow trans engineer and to make her feel more confident in, you know, the way she handled things.

Jake found listening and helping their friend navigate a difficult situation to be rewarding. They appreciated the opportunity to help validate a fellow trans friend.

When encountering their own barriers, Jake also valued people who helped them. For example, Jake applied to a scam job through their university's job portal and the scammers tried to steal money from them. Jake then went to the career center for help:

And they were so generous with me. They, they just, you know, they listened and they heard my, heard my problem, and they were so respectful. And they didn't make me feel stupid or anything like that. You know, they, because like, I mean, I know, I, I don't look like your typical engineer student, I guess. But took me in anyways. And they were like, "No, we're gonna fix this. And we're gonna make it right. Because you deserve better." And so just like being able to ask for help when you need it. And knowing where to ask for help. Was really, that was really key to getting through that situation.

After experiencing instances of not being seen, heard, and validated in their engineering program, Jake felt relieved and appreciative of the career center staff taking the time to assist and correct the issue. Not only were they knowledgeable about the problem, but they “acted on their word” and “were also very kind and willing to listen, which helped [Jake] open up.” They were initially “a little worried” about asking for help because their “old name” showed up on the system that the career staff would see. However, Jake introduced himself as Jake and the staff addressed them correctly.

Jake also found the dean of students office and counseling center to be helpful and respectful when experiencing a personal matter or requesting changes to their systems. For example, the dean of students helped support them when they needed to take an incomplete during a difficult semester, and the counseling center implemented Jake’s recommendations of changing their intake form to have more gender options, a place where someone could express their identity in “a safe spot.”

Asking for help with personal and academic concerns was an important part of Jake’s college career. They shared,

I asked for help, especially with, like, personal things. Like, I have a therapist, and I've had a therapist for a while. And I have a team of doctors, you know, they look out for me, and we check in every couple months. They make sure my physical health is okay, too. Because that's, that's half the battle, you know, making sure your physical and mental health are there. And then, when I have academic issues, I just go up to my professors, and I'm like, "Look, am I going to pass this class?" You know, like, "Am I gonna be okay?" you know, "What can I do better?" ... And if they have time to talk to me, you know, they're, they're very generous with their advice. And they're like, you know, "You could go to tutoring or you could ask your friends for help." That's another thing I did. Instead of tutoring, I went to a friend who loves statistics, and she kind of tutored me on that. And she helped me pass that class, I think, because I don't think I would have passed it without her. But yeah, like using the tutoring center, using the academic resources that they provide, and then going to my professors and being like, "Hey, this is a situation, this is what's up. What can I do better? What can I? What can I do to



succeed?" Even, not at a level that other people would say is not great. But to me, it's, it's awesome.

Working with others allowed Jake to have additional support when needed and help them persist through their program. By having assistance and support with certain academic and personal matters, Jake was able to dedicate time and energy to self-preservation and advocacy for themselves and the TGNC community. When asked about things that were helpful when persevering after encountering negative stereotypes or discrimination, Jake stated,

Having friends who are allies to trans people. And just having a core group of friends, honestly. Whether they're virtual friends, or IRL friends. You know, like, they're both valuable, but just being able to sit there and talk to people about stuff and you're like, "Am I crazy? Or is this what's happening," and just to be validated, and to get support from them, and for somebody to hear me and see me for who I am, when I've experienced something negative is very validating and it's very affirming. And I think that's, that's really helped me make it through the past few years.

Having a community to lean on and process experiences with helped validate and support Jake. This was useful when encountering discrimination as well as the typical stressors that arise in college, especially in a rigorous engineering program. With appropriate support, Jake could dedicate their energy to self-care. They discussed spoon theory (Miserandino, 2003) when describing how to manage their stress and well-being in their engineering program:

Spoon theory is like, you have, like, let's say eight spoons. And you use each spoon once every day. And you get to use that spoon on whatever you want to use it for. But when it's used, it's used. And you have to wait for it to recharge. It's, you know, like how you spend your energy and your time. So just being able to manage your spoons. And knowing when to take a step back, and just let it go. Or take it up on another time when you have more energy. But knowing how to do that has been very helpful.

After experiencing burnout after their first year when taking multiple math classes simultaneously and being involved in many student organizations, Jake learned that “it was not sustainable” and they had to spend their energy carefully. Using spoon theory (Miserandino, 2003), self-preservation, and their support systems, Jake cared for themselves during a strenuous engineering program.

### **Mickey’s Narrative**

Mickey (they/them, she/her) is a current graduate student in engineering. They identify as nonbinary. As Mickey describes,

I identify as nonbinary. And usually, well, it's complicated, and I'm still figuring it out myself. But I'm, so, I identify as a woman most of the time, but I think I do that to make people feel easier about my identity. But sometimes I just identify as nonbinary in the sense that I don't really identify as a woman or a man, I just kind of been who I am as a person.

### **“Women in Engineering?”: Journey to College**

Having an artistic flair, Mickey initially was interested in photography and the arts as a career. Identifying as a woman at the time, they did not envision becoming an engineer mainly due to a lack of representation of women in engineering and people to influence them to pursue an engineering path. However, after their grandmother and mother noted their curiosity and love of applying math and science, they researched educational and career opportunities in engineering and learned how impactful the field was in helping people and society. After visiting several institutions with engineering programs, Mickey decided to pursue engineering as their undergraduate major.

Before entering college, Mickey interned at a lab where they were exposed to gender microaggressions. Mickey described,

I was working on my project. And I did the task that I was supposed to do, like, they gave me a task. And they were surprised, like, I brought it to my higher ups.

And it was these two older White men. And they were surprised I did it. They were like, “Wow, you did – you actually did the thing?” And I was like, “Yes, I did what you told me to do. Like, I know, I look small, and I’m only 17, but I know how to, like, you gave me this task. And why are you questioning my ability to do things?” So, I think at 17 I realized, “Oh, wow. This is going to be a bit difficult when I go into an engineering field, like, people are gonna question my intelligence and my ability to do things.” So yeah, it was – it was a bit frustrating. But obviously, I couldn’t, like, show my frustration towards them because of my age and where I was, I was an intern. So, I didn’t have power at all.

Mickey felt a power imbalance from their status as an intern, their age, and their gender after their supervisors were shocked they completed the task, presumably surprised because they perceived Mickey to be a woman. This understanding of additional barriers women faced in engineering stayed with Mickey as they looked at different institutions and searched for a program that felt like a good fit.

Mickey chose their undergraduate institution to gain some space from their home but still maintain a distance where their mom was close enough if needed. They had a tense relationship with their father, who was divorced from their mother, and prioritized being in relatively close proximity to their mother while in college. Additionally, when visiting their institution for an open house as a high school student, they also felt welcomed in the campus environment and could imagine being a student there. From enjoying the town where the university was located and appreciating the size and reputation of the engineering program, Mickey believed their institution was a good match. Campus felt like a home, and because of that, they thought they would not have the same degree of “emotional adjustments” that would be required if they attended other campuses they visited.

Mickey also appreciated the diversity on campus, specifically the organizations available for minorities in engineering including women in engineering as well as

transitional programs to assist students in adjusting to the rigors of an engineering curriculum. They searched for identity-based centers and resources on campus to support their gender, sexual orientation, and Latinx identities. Expecting their engineering program to primarily consist of White men, Mickey specifically sought out representation and opportunities for women in engineering. They stated,

I think at the time, I was mostly worried about men. Um, so, I wouldn't say it was probably racially and ethnically diverse compared to other places I went to, but I would say at the time, my biggest concern was, like, "are there a lot of women in engineering?" And when I was visiting, there was a bunch of other, like, girls my age looking at the program, so that gave me confidence that I wasn't going to be alone in this.

At this point in their life, Mickey did not know that they were nonbinary nor were they aware of the diversity and complexity that existed within nonbinary identities, so they focused on gender representation while identifying as a woman. As for their Latinx identity, they did not feel comfortable joining the Society for Hispanic Professional Engineers organization as it seemed too cliquy.

### **"I Couldn't Ever Belong in Spaces Like That": Transition into College**

During their first year, Mickey identified as a woman and had not yet started questioning their gender identity or sexuality orientation. They joined a living and learning community dedicated to women in science and engineering, finding the ability to live and engage with other women identifying students to be helpful as they navigated the first year of their program. This provided a welcomed opportunity for peers to formally check in on one another through tutoring and mentoring, and organically in everyday interactions. As Mickey stated, "people were constantly making sure that you were okay, which is, you know, really needed that first year." Their main focus was on their first year of coursework and successfully progressing through their engineering program.

While Mickey did not fully discover their nonbinary gender identity during their first year of college, they were aware of their gender identity a lot during their first year when they were in classes with hundreds of students. Mickey described,

It was mostly, like, men, especially White men, in those classes, and I felt so alienated in those spaces. Like, I felt uncomfortable, very, um, I just felt kind of unsafe too. Like, I just felt like I couldn't ever belong in spaces like that. And I saw, like other people like making friends in big classes, but I never felt like I could just be my 100% self in those sorts of settings, because I was just so overwhelmed by the fact that maybe there is one other person – two other people that look like me out of the 100. So yeah, those, I hated those classes.

Still identifying as a woman at the time, Mickey was acutely aware there were not many Latinx or women students in their classes; Most students were White men. When interacting with others, Mickey intentionally moved focus away from their marginalized identities so that faculty and peers did not tokenize them or link their presence in the program solely to their identities:

I tried to make it less obvious, I guess, that, like, I didn't want them to focus on the fact that I was Hispanic and female presenting, because I didn't want people —. So, you know, there's this kind of thought that if you're marginalized in any way, like, the only reason you got in this program is because of that, not because you've like, worked really hard to get there. Um, so I was always afraid of people thinking like that. So, I always, I kind of made it less obvious that I was like, I tried to make it less of a focal point and more like this is all the hard work that I've been doing. Look at all this hard work.

However, if given the opportunity to participate in an identity focused panel, Mickey eagerly participated to present their authentic self and share their experiences. Otherwise, they decided to not bring attention to their identity.

### **“Figuring Myself Out”: Settling in and Branching Out in College**

As Mickey became more involved in student organizations, they befriended other STEM students in their department, mainly women identifying students as they felt more comfortable with women at the time. As they continued their undergraduate career, they

were exposed to people outside of engineering with different identities and backgrounds, and their friend group diversified as their confidence and comfort increased. During this time, Mickey met gender nonconforming individuals including one of their friends who came out as nonbinary about halfway through their college career, which sparked a period of reflection for Mickey as they learned more about nonbinary identities. While they had moments during their childhood of being referred to as a tomboy and not identifying as a girl or a boy, they did not begin to consider the implications of their “self-conflict” until their friend came out. However, Mickey was quick to shut down their reflection as they were already exploring their sexual orientation and it felt too confusing to figure out both their gender identity and sexual orientation simultaneously. In tandem with feeling confused and overwhelmed by exploring their identities, they also felt scared due to comments their family said about transgender people in the past. Mickey shared,

I felt like at the time [my family] wouldn't understand because they've kind of said things in the past where, “Oh, I don't understand, like, people who don't identify as a man or a woman. Like, that's just how it is.” Or even people who are trans. Like, they don't understand why someone would want to, you know, be their true selves. Yeah, for them it's like, switching their entire worlds. Um, so yeah, it was really hard to kind of grasp that. It was exciting a bit because I was like, “Wow, I'm actually figuring myself out.” But in the end, it was very terrifying.

Mickey was also fearful of some of their friends' reactions due to concern they would think of them differently despite them still being the same person. However, there were also people in their program that Mickey was less worried about telling, at least in private, especially after someone they had a crush on during their senior year also came out as nonbinary, further challenging their assumptions about others and building trust in themselves and others.

While Mickey built trust in private with a few nonbinary individuals, those identities were not present in curricular contexts, such as the classroom, as they did not feel comfortable expressing their gender in those spaces. They perceived the institution to have mixed perspectives towards TGNC individuals. Some people did not understand TGNC identities, while others directly opposed or ignored them. Mickey stated, “So outside of engineering, it was definitely open...but within engineering, it felt like...you couldn’t really talk about these kinds of topics, like, they weren’t deemed appropriate to talk about in engineering settings.” They recalled an incident where an argument broke out among engineering peers about the importance of pronouns and there was an “air” where it “felt like you had to be focused on your classes, your homework, and getting good grades. And like anything else wasn’t as important.” Whether Mickey wanted to directly address the use of pronouns in that argument or disclose their identity in another space with the same people, they felt uncomfortable doing so due to the other’s anti-TGNC views and comments.

Despite the “air” within the program, Mickey formed a friend group with two students in their major with whom they developed a personal support system. One friend was an international student and the other was a nontraditionally aged student. In addition to studying together, the three friends were able to share their backgrounds and life experiences, rely on one another, and support each other personally in curricular and co-curricular spaces. After building trust with their friends, Mickey felt comfortable sharing their questioning of their sexuality as well as other personal matters such as their parents’ divorce and problems with their boyfriend.

## **“Hesitant In Those Spaces”: Questioning Identity While Abroad**

Before entering their junior year, Mickey completed an internship abroad where they became close friends with people in the program as they all lived together in a small residence during the internship. They cited this period as a peak time when they were figuring out they were bisexual and confused about their gender identity. Exploring their identity and feeling a general uncertainty being in a different country was overwhelming for Mickey. They were “very closed off” and “cried every day.” However, as time went on, they got closer and opened up, yet never felt comfortable sharing their questioning of their gender or sexual orientation. Mickey explained,

I think it’s because people that I was interacting with were, like, not obviously gender nonconforming, and straight. I think the fact that there wasn’t a lot of LGBT people within those communities I was interacting with, it made it harder for me to kind of express those ideas. Because I was afraid of how they would react if I said anything, because sometimes it’s hard to gauge, like where people’s thoughts are, even if they’re, like, a little bit more open about things, how open are they? Like, would they get mad at me or upset or something? So, I think that’s why I was hesitant in those spaces, while with my friends, I knew that they were, like, even if they weren’t part of the LGBT community, I knew their exact thoughts on it, so I felt right about it.

In an internship space, Mickey felt they had to dress nicely and be “ladylike” in their behavior and appearance. This idea was reinforced in an etiquette course where the instructors told women, “wear a fancy dress, but you want to make sure that you’re wearing simple colors with, like, a skirt and pantyhose and a heels and stuff,” which Mickey did not want to wear necessarily. However, in co-curricular contexts such as social organizations with friends, Mickey thought others cared less about their attire and thus felt less pressure. While they wanted to look nice for the organization, they did not feel pressured to dress or act a certain way.



### **“A Bit More Distant”: Ongoing Identity Negotiation**

During their junior and senior years, Mickey encountered challenges with their traditional and religious boyfriend and father giving them a difficult time regarding their gender expression, which affected their mental health and academics. After deciding to cut their hair and not shave their legs, they were met with criticism and questions about why they would challenge social norms and make their life more difficult. Mickey said, “Yeah, so definitely a few men in my life kind of, like, made me feel uncomfortable with even thinking about going outside of social norms of identifying and looking like a woman.” Those comments made Mickey feel pressured to grow their hair back out and conform to gender norms by attempting to wear more makeup and dresses. While the criticism continued, their dad eventually got used to the fact they were going to stay true to their authentic self and the comments bothered Mickey less as time went on. Similarly, their boyfriend would say hurtful things about their sexual orientation, which also helped Mickey better understand their identity and that they needed to end the relationship.

As Mickey developed their resilience to discriminatory comments and fostered a relationship with select supportive peers, they still did not feel comfortable being open about their identity with people in the department. Mickey reflected,

I was actually really close to a lot of people in the department, but I feel like I couldn't be as open with them. Um, and then, like, organizations and stuff, I felt like I, some of my friends were in the organizations that I was in, so I could be a bit more open with them, obviously. But if there weren't a lot of people in those organizations that I was friends with, I was a bit more distant. Like, I was part of the [redacted] Honor Society, which is a like an honor society for marginalized ethnicity people in all, all departments, so it was just STEM, so I was a bit more distanced towards them. I wasn't as open about who I am. Like, my struggles in life, sometimes I was a little, but I was very particular about, like, what I would talk about with them.

In addition to being distanced from certain peers, Mickey remained closed with faculty members. They did not disclose any information about their life or identity and kept their interactions professional by only discussing classes, graduate school, and other academic matters. If a faculty member inquired about how their family was doing, for example, they would keep their responses at the surface level with a general, “you know, good.” The one exception was when they were doing research with a faculty member and disclosed their mental health due to daily panic attacks that led them to withdraw from the research opportunity. Mickey stated, “And I think that was the, like, only conversation I’ve had with a faculty member, at least in undergrad, where I was, like, really open about what was actually happening with me and how I was really feeling.” The disclosure about the panic attacks and the supportive response from the faculty member allowed them to be closer than Mickey was with other faculty.

The majority of Mickey’s professors were older White, straight, cisgender men that reminded them of their dad. Given their discomfort with their father, they were also not comfortable opening up to similar faculty members. Mickey shared,

There wasn’t a safe environment to [open up] in. And some people had like the “this is the safe place to talk about” stickers in their offices. But I still feel like it wasn’t enough because, like, I hadn’t interacted with them enough. Or like, I still just didn’t feel like they cared, I guess, about wanting or, like, they had the time to listen. So, I think it was like, even if I really liked the faculty member, I felt like I was burdening them in some way if I talked to them.

Interactions with the majority of faculty were solely about class, and conversations felt “transactional” with simple hellos and goodbyes. Mickey remembered one faculty member who had a safe space sticker, which made them question why the other faculty members did not. They said, “But it’s like, I don’t want to figure it out. So, like, those

faculty members, I felt a little bit less secure, I guess, less safe around about talking about those topics.”

Thus, Mickey felt more comfortable being themselves in non-engineering contexts, especially in social settings compared to engineering curricular contexts. Though they were still exploring their identity, they felt more comfortable among non-engineering students compared to engineering students in curricular settings, especially with faculty members present, where they felt they had to be a certain professional way. In non-engineering contexts, they were able to discuss social topics, while their curricular contexts felt limited to engineering and research topics.

#### **“Internal Conflicts”: Senior Year Reflections**

By senior year, Mickey fully realized they were bisexual, but they still wondered, “am I a woman all the time?” Thus began a more focused questioning of their gender identity. However, the gender exploration diminished while they focused on graduate school applications, which occupied a lot of energy and mental space at the time.

Mickey felt their gender identity influenced their work in a positive way. “It definitely has made me more of a hard worker, because, um, I just feel like, I feel like I represent a very, like, small group of people within engineering, and I feel like I have to make a good example of myself.” However, this also left them feeling they had to “work like 110% harder than other people,” which led to them taking on more work and involvement in organizations. After graduating, Mickey felt burned out and decided to take a gap year before graduate school.

To convey their experiences with their gender identity in their undergraduate engineering program, Mickey selected a mixed media art piece (see Figure 4). They described the two figures in the center of the image:

I think it's the same person and one of them is kind of like bending down and crying. And the other one is kind of bending down and trying to comfort the other but not being able to do it, because it's like they're overlapping, and it's kind of like, it's a ghost and it's just not working.

Mickey felt this illustrated their exploration of their sexuality and gender:

I feel like it caused me a lot of pain, because I had a lot of, like, internalized homophobia and maybe just like, internalized, "Oh, I shouldn't be anything but a woman" sort of thoughts going on. But, like, I knew that I didn't identify with what society placed on me. And so it caused me a lot of anxiety. And, like, I cried a lot in college. But because of that, I tried to comfort myself, but I feel like I didn't do a very good job because I was so conflicted. And I like the differences in the colors as well, like how there's just kind of, like, conflict between these two characters, because the red and the blue are conflicting colors. So, it kind of resonated with me in the sense that there was a lot of conflicts – internal conflicts happening.

**Figure 4**

*Mickey's Artifact: Untitled*



*Note.* Copyright 2019 by Amber Robinson Pierce. Used with artist's permission.

They also reflected how this represented their challenges in reaching out for help given the independent and isolating climate in engineering “to figure it out on, by yourself.”

Mickey shared,

So, I think that really represents the struggles of each student, like, just trying to figure out questions and what they want to do in engineering after graduating too. And it's, it's very isolating sometimes. Even if you have good friends within your program. It can be very isolating just trying to navigate an engineering program.

Mickey felt the conflicting colors represented the way they and other students felt in the program compared to the program's expectations. To them, the yellow color represented a happier color that distracts the viewer away from the scene in the middle. Mickey

stated, “Like, you should be grateful that you’re here. But, like, obviously it’s very difficult.”

In addition to the academic and professional isolation, Mickey stated that the image also reflected how they viewed themselves versus how society viewed them. Throughout their journey of determining how to dress and act based on what others expected versus how they preferred to express their identity. Despite the tensions the image represented when considering their internal struggles, program expectations, and social norms, the image also reflected Mickey’s accomplishments in navigating and making it through these challenging situations.

Mickey described their overall experience during their undergraduate program as positive. They said, “I really learned a lot and challenged myself a lot. And I got to have these support systems and communities that, like, helped me through college that I think if I didn’t have, I would have struggled so much more.” When challenges arose, they were able to lean on trusted friends and family and use resources such as therapy to cope with personal and academic stress. With the appropriate supports, they grew personally, academically, and professionally, and became excited to make an impact in their engineering field.

### **“Make Space for Me”: Graduate School Beginnings and Quarantine Questioning**

Once Mickey started graduate school, they were more comfortable fully exploring their gender identity. In their first year, they frequented the LGBT center and met a trans woman in engineering who helped connect Mickey to other people. Additionally, Mickey found comfort and support with their partner who also identified as gender nonconforming and was in the same engineering program. Having figured out their

sexual orientation, being a student at a graduate institution with a strong and welcoming LGBT community and meeting many more trans and gender nonconforming students provided Mickey with comfort and space to focus on their gender identity journey. Mickey stated, “I definitely started exploring it more, like, not shaving my legs, because that’s expected of women, or my armpits, and the pandemic actually helped that a lot.” The quarantine that resulted from the COVID-19 pandemic also provided an unexpected time when they could explore their identity while not having to see many peers and acquaintances in person aside from roommates. While Mickey had questioned their gender identity over the years, they weren’t fully able to reflect on their gender identity until the pandemic presented time and space to explore their nonbinary identity.

During the pandemic, Mickey connected with people over social media, specifically Science Twitter, which included individuals with diverse genders and sexualities who were in science fields. Science Twitter became a sounding board they could use to inquire about pronoun options and gender identity, and be met with kindness, acceptance, and validation. With the virtual support of a queer science community, Mickey felt more comfortable and confident coming out as nonbinary and using she/they pronouns.

In addition to finding a community to explore their gender via Twitter, Mickey’s partner and friend who identified as a trans woman also were meaningful supports through their gender exploration, serving as sounding boards of people who identified as gender nonconforming and trans respectively. They referenced a particular conversation with their partner:

I pretty much one day, I just out of the blue was like, “I think I’m nonbinary.” And she was like, “Okay, let’s, let’s have a sit and let’s like, she’s like, “that’s,

that's great. Like, that's cool. Um, let's have a sit and, like, talk about it, so you can express your feelings." And I was like, "Yeah, I think I know, I didn't identify as a woman most of the time, but sometimes then feel like I don't" and she's like, "That's, that's totally fine. Like, that's great that you're, you're figuring that out." And so just kind of hearing her, I guess, validate my feelings was really nice. And just having her make space for me to talk. Because I feel like sometimes we live in a very busy world. And we are, like, not given the opportunity to just like, sit down and speak our thoughts.

Mickey's partner and peers served as helpful supports in their exploration, providing guidance and comfort. However, negotiating their identity with others was not always easy.

### **"Now I Have to Teach You": Ongoing Challenges in Engineering**

When considering curricular contexts, Mickey felt and observed that most older faculty did not understand diversity of gender identities, so they identified and presented as a woman to them. Other faculty and staff members, such as Mickey's graduate advisor, were involved in LGBT organizations and made them feel comfortable by participating on panels and being active allies. Mickey felt more comfortable being open about their identity with those faculty members and staff and did not feel a need to act like a woman in front of them.

While some people were supportive, Mickey typically hid their gender identity and sexual orientation in their graduate curricular contexts. They reflected, "sometimes I feel like people just don't want to know." To avoid negative reactions or making others feel uncomfortable, Mickey chose to act professionally, only discussing the engineering topics at hand while not fully presenting their gender identity and sexual orientation in curricular and co-curricular contexts, even if some people knew about their identities. In contrast, Mickey was more comfortable expressing their identities without fear others would treat them differently in social environments with friends. They were able to share



their identity without having to gauge the perceptions or reactions of their friends as they had to with students and personnel in engineering contexts.

During undergraduate and graduate school, Mickey believed people interacted with them in certain ways depending on the context and how others perceived them:

I think people interact with me, like, in certain ways, because they think I'm a woman. Um, like, they see me as a woman. But like, if I'm, I think people sometimes are either friendlier with me or, or are meaner to me, depending on which situation I'm in. But especially, like, with men, like if I'm friendly with them, then they think, "Oh, like, she's flirting." And I'm like, "No, no, I'm just being like, I'm just being nice, I am not single. Sorry." Oh, it depends definitely on like, who I'm interacting with and like, what kind of setting but I feel like people sometimes are not like, degrading towards me, but sometimes they're a little bit more like, trying to make things a bit more simpler because of how I look. And I'm like "I know that this is like a complicated topic or whatever, but I can still understand, like, science."

They observed the ways men attempted to simplify problems for them assuming Mickey was unable to handle complex problems or situations. When being personable with their classmates, some men would misconstrue their friendliness as flirting. Thus, Mickey gained an increased awareness of how others perceived their gender and treated them, which inevitably influenced their relationships and experiences with men in their class and work.

Mickey also noticed a difference in interacting with and disclosing their identity to individuals in non-STEM vs. STEM fields:

So, people, like humanities and all of that, they, I think they understand a lot more versus people in STEM. People in STEM, usually when I tell them, like, I'm bi or nonbinary, they ask for an explanation of what that means. And like, okay, "Now I have to teach you." But yeah, it's definitely very different.

While not all people in engineering were ignorant of different gender identities, Mickey stated those who were older in engineering tended to have more difficulty understanding diverse identities, which caused Mickey to have to take on the burden of educating others

about their identities. However, Mickey became more comfortable with their identity in graduate school compared to undergrad and adopted a “This is who I am. Like, deal with it or not” mentality, no longer feeling pressure to conform to dominantly defined norms for assumed heterosexual, middle class, White, cisgender women such as dressing in feminine attire.

### **“So They Feel Less Isolated”: Resiliency and Paying It Forward**

In addition to being bisexual and nonbinary, Mickey shared that being Latinx, though not as salient an identity compared to their gender, influenced their experiences. Combined with being bisexual and nonbinary in engineering, they experienced multiple marginalized identities in engineering. While they did not encounter any macroaggressions, they observed the lack of representation in the field, and became passionate about outreach for Latinx individuals to pursue engineering:

Especially my sexuality as well, like, having all these factors has made me do a lot of outreach and volunteering opportunities to make sure that people who are marginalized in engineering programs feel more comfortable so they don't have to experience some of the things that others have experienced. And so, they feel less isolated because even though I had friends, I was the only Latinx in my program for about two years, and then someone joined... And I was so excited that I could finally talk to someone about my heritage.

Mickey found the only identities people discussed in their program were women in engineering, including harmful stereotypes of women not being smart enough or needing to not be too feminine or masculine. Thus, they did not witness representation and conversation about their other identities, which made them feel isolated when considering their gender, bisexual, and Latinx identities. Mickey said, “That in of itself was impactful in a negative way, because that's just who I was. And no one was talking about it. So, I felt invisible sometimes.” By having multiple marginalized identities, Mickey was

passionate about being visible to future engineering students, so that students could see themselves represented in the field.

### **“Can I Talk to You?”: Strengths and Strategies for Success**

In the face of adversity, Mickey successfully completed their undergraduate program and is currently a graduate student. They attributed their success to their natural strengths as a team builder and being able to understand where others were coming from and listening to other’s ideas. Serving as a compassionate leader and peer, they would help others with problems and provide advice regarding personal and professional concerns. In addition to serving as a support for others, Mickey also sought out resources when encountering challenges. After struggling with panic attacks during a difficult semester of engineering coursework and pressure from faculty to do well, Mickey used the university’s counseling center. In addition to therapy, they started to disclose their mental health and struggles with their mother and friends. They shared, “So when I was having a hard day, I would tell them like, “Oh, I’m having a hard day. Can I like talk to you about this?” Leaning on others and engaging in physical exercise like yoga were helpful to their persistence.

Lastly, Mickey believed being themselves and not hiding helped them feel less invisible and assisted in overcoming negative stereotypes. Though their nonbinary gender identity exploration occurred more in graduate school, being open about their nonbinary identity has been freeing as Mickey continues their engineering career in graduate school. In addition to living openly as a nonbinary person, Mickey also finds their engineering outreach efforts to marginalized populations rewarding. These efforts help individuals with similar or different identities in their “engineering journeys.” By paying it forward,

building support systems, and identifying advocates in and outside of engineering, Mickey has been able to build community, support, and resilience in their engineering programs.

### **Pan's Narrative**

Pan (they/them) is a current undergraduate student in their final year of their engineering program. They identify as a nonbinary woman. As they describe,

What that means to me is that...I still very much identify with the part of me that is, that was born a woman, right? Like, I identify with a lot of those visible struggles. I often wonder if that's because I am not completely out as nonbinary and thus I feel like I cannot completely embrace that part of me. But being nonbinary, to me, is an expression of the fact that I –. A friend of mine put it as “it's not an expression of what I am but an expression of what I am not.” And I do not feel as though I fit perfectly within even the very loose categorization of what a man and a woman can be.

When reflecting on their identity, Pan also shared:

And, to be honest, I often wonder if a lot of this, for me at least, isn't associated with the fact that people can be incredibly uncomfortable towards women, especially in STEM. But I do believe there's more of it than that, because I have had the opportunity to be in some really amazing places in STEM. And I still find that I am happiest when people are using they/them pronouns for me.

### **“Put It in a Box”: Beginning Explorations of Gender and Engineering**

Pan was born in a small town near the university they attended for undergrad, which also happened to be where their father was an engineering faculty member. They initially wanted to avoid attending the university, seeking opportunities at other large institutions with queer communities. However, when considering the academics and other factors of the institution, Pan decided to attend as a way to “experience the place [they] had grown up in...away from some of the more crappy stuff about [their] home life and [their] past.” Attending the university as a student provided a way to have a new lens on life in their town and create a new experience.

Having a father who was an engineering faculty member, Pan was introduced to the field at a young age. While their father never pressured them to pursue engineering, Pan knew, at the age of 12, they wanted to become an engineer one day. At that age, they were fascinated by their father and sister working on cars, which Pan described as “cool” and “like magic.” They also enjoyed observing various ecosystems and playing with waterways, which later influenced their choice in major. As they progressed through school and began placing into advanced programs, they felt pressured by the school to pursue STEM due to their high math and science scores. Since their father had connections to STEM fields through their university, they had access to opportunities to apply math and science and solve problems through engineering.

During high school, Pan disclosed they thought they might identify as a boy to a crush. “Then,” Pan shared, “I think I looked at that feeling and I put it in a box. And I didn’t touch it again until my freshman year of college.” Growing up, Pan frequently clashed with their mother about their gender expression and the expectations doctors placed on Pan due to their mother having Pan later in life. When describing the tension, Pan said,

A lot of the rhetoric she had from the doctors was “this kid’s gonna come out severely fucked up, you need to be prepared.” And the fact that I can function on my own and society is absolutely wild to her. And between that and the fights that we had over clothing when I was younger because I either was getting teased at school for wearing boys’ clothes, and I was sick of it. Or I very specifically will never forget the day where I got up in the morning, I dressed myself and I was so proud of dressing myself and I came downstairs and she was like, “Oh, you’re wearing a boy’s shirt and boy’s pants.” And I was like, “So?” And it turned into, she made me go back upstairs and change. But I was like, “I don’t want to. I don’t understand why you’re making me change. I’m comfortable in this. Can I just wear what I want to wear?”

Pan disclosed that some of their physical features made them more comfortable wearing boys' clothing. However, the expectations and backlash from their mother aided in Pan feeling like they needed to change their appearance to make others comfortable and close their gender identity in a metaphorical box.

Aside from the conflict that arose from Pan's gender expression, they also paused exploring their gender identity as they were still figuring out their sexuality. They said, "Okay, we're gonna do this one piece at a time." Their mother was vocal about the dangers of their sexuality in their town, which in retrospect, Pan understands given negative interactions they witnessed with teachers harassing LGBTQ students and refusing to use TGNC students' correct names, reaching a point where one student broke down in tears. Witnessing and enduring these micro and macroaggressions at home and school, Pan pushed their gender identity further into the box. Pan thought, "Okay, I am just not touching this until later. We will worry about this potentially really life-threatening thing and life altering thing. Yeah, we'll deal with that in a couple of years."

With a tense and tumultuous family life, they left their home as soon as they were a legal adult. Pan then lived with a friend who provided positive affirmations and validated their identity. However, Pan still did not feel safe in fully exploring their identity at that time. When searching for colleges, Pan knew they wanted to explore the LGBT community in college despite not yet knowing they were specifically nonbinary. They shared, "To be honest, I think I knew, well, maybe I didn't entirely know I was something gender nonconforming, but I wasn't sure what it was. And to be honest, I wasn't in a place to explore that before coming to college." After visiting the campus and meeting with students who mentioned the quiet presence of an LGBT community on

campus, Pan solidified their decision to attend their undergraduate institution. They stated, “I was like, ‘Okay, they do exist. There’s something going on. It might not be the loudest and the proudest’ and that was okay with me.” Pan wanted to know that a community existed, but it was not a major factor at that point in their gender journey.

### **“Where the Work is Getting Done”: Gender in Engineering and LGBT Involvement**

Pan took an engineering leadership and ethics course during their first year, observing the gender differences within the field and the lack of action to change the culture. When describing an exercise in the class, they shared,

We talked about diversity and especially gender diversity in the workplace during a class and the classes were split up between boys and girls. The boys have their class, I think either the day after or a couple hours after we did. And in the girls' class, we had this amazing, long conversation about the importance of it and how you go about facilitating making people feel comfortable in these spaces. And then I found out later from a couple of male friends of mine that their version of that discussion was everybody stayed completely silent. They walked around the room to, they did that thing where you stand on the left side of the room if you agree with it, stand on the right side if you disagree, and depending on where you are, stand somewhere in the middle. They didn't talk about anything, they just kind of went through the motions. And that, I think, kind of summarizes how I feel about men versus women in engineering a lot of the time. I think it's very easy for everyone to go, "There are fewer women in engineering," and it's very easy for us to go, "That's a problem." It's very easy for us to go, "There's something" - it's very easy to point out, "Oh, well, it's like a men's profession." But I think we don't put—it's interesting to see where the work is getting done and where it's not. And I'm not saying all men don't do the work. But I'm saying a lot of them don't.

Faculty, staff, and students discussed gender diversity in STEM, albeit binary gender, yet Pan did not witness anyone taking intentional actions to make meaningful changes beyond merely making women comfortable in an unchanging environment.

While observing gender differences in engineering contexts during their first year, Pan also became increasingly involved in the LGBT community on campus, taking on

leadership roles, and developing a friend group consisting of other queer STEM students.

They shared,

Most of the people I was interacting with were other STEM majors. And you're like, "Ha, why is everyone in this club in computer science and engineering and chemistry?" Well, I think we were all just kind of looking for that more visible community.

While Pan could discuss or vent about homework with any peers, they felt they could "go on a 30-minute rant about the patriarchy and how [they] hate societally imposed gender roles" with their queer STEM friends who could understand and relate. In other words, with their queer STEM friends, they were able to discuss multiple diverse topics that were not limited to purely academic and STEM topics, as they found to be the case with most students in engineering.

### **"Loud Queer Person": Gender Exploration, Support, and Community**

Being away from their family and socializing with other queer students who presented their identity the way they wanted influenced Pan to return to questioning their gender identity. They started dressing more masculinely and had a friend help them shave their head, ridding them of their long hair they typically pulled back. While their hair grew out into the "worst mullet," they were able to appreciate what they saw in the mirror, exclaiming, "Oh, this is a horrible haircut. And I really like the way this looks on me." Despite not loving the exact hair style, they valued the way they were able to express their gender through their hair after being told they would regret cutting their hair short by others throughout their life.

Given Pan's interaction with their family, especially their father who was an older cisgender White man teaching engineering, Pan was hesitant around most faculty who shared their father's identity. However, one instructor who was also serving as Pan's



advisor for a project, saw them at a few LGBT events and called them into his office. This made Pan anxious, but when they arrived, he said, “I want to check in with you. Are you okay? Do your parents know that you’re queer? Are you comfortable at home? Is there anything I can do to support you?” Pan was shocked by their care and concern and described this as a “really big” moment. Having someone who was of an identity that Pan typically presumed to be closed minded in engineering reach out as a mentor with genuine care was refreshing and meaningful. Pan said,

Having him go, “I care. I care about you. This doesn’t change that. This doesn’t change how much of a good engineer I think you’re going to be. I still care about you and think you’re smart.” I think that was a pretty big moment. And it definitely, when I started to come out, it was definitely one of the things that made me comfortable going to professor’s and being like, “Hey, I have questions specifically related to this subject and how it interacts with my gender identity.” And that, that was nice.

Not only did this interaction create a supportive space for them with this one instructor regarding their gender identity and their ability within engineering, but it also provided Pan with comfort when needing to talk with other instructors if they had a working rapport with them.

Pan also was surprised when they met other queer engineers as some students intentionally hid their identity. They shared,

I found out at the end of the semester that the guy who I had been working with on my freshman design project for, at that point, in the whole semester was queer, and was just not comfortable coming into LGBT spaces because he didn’t want to be seen as that queer person. And it’s funny how often that comment came up that...I have had really long conversations about not wanting to be the loud, like, I don’t want to be perceived as this loud obnoxious person who only has one thing on their mind. But that thing is important and I want to talk about it.

Since engineering discussions and perspectives tended to be “black and white,” faculty and some peers viewed sociocultural issues as “messy” and something they “can’t

quantify.” Thus, LGBT engineering students did not feel comfortable disclosing their identity and did not want to come across as the “loud queer person,” too outspoken about the subject matter despite the topics being important to them. Additionally, several queer engineering peers reflected on how they “heard horror stories” about people being queer in engineering. However, when they connected with one another, there was always an automatic shared understanding and experience. As Pan shared,

I've discovered halfway through projects that one of my other teammates was a queer person. And we've had like, "Oh, you're queer." "Oh, you're queer." "Being queer in engineering is hard, right?" "Oh yeah." And that little extra nugget of interaction, and that connection that is able to be formed there just makes the process so much easier. There's an amount of understanding about the issues that we're both facing.

Most of the time, the conversations were not direct acknowledgements of being a part of the same community as much as noticing signs such as a queer sticker or pin on a backpack, which would be a welcomed signal to others who identified as queer. Having that connection and representation made Pan feel more comfortable in those engineering classes. They would take “solace in the fact that there was another human being who understood in the same space.”

### **“Going to Look in That Box Again”: Ongoing Identity Negotiation**

When exploring their identity, Pan felt they could be their whole self when “in a space where, one, [they] can talk about queer issues, and people aren’t going to look at [them] like [they’re] crazy.” Being able to express themselves in a fluid manner, such as wearing makeup and traditionally feminine clothing one day, then wearing “jeans and a baggy t-shirt” or traditionally masculine clothing the next day was exhilarating to Pan. In contrast, they experienced times where others made harmful comments such as “Oh, it’s, oh, you’re a girl with short hair,” or Pan’s personal favorite, “Oh, what a choice.” Being

able to simply be, without having to explain themselves or make others feel comfortable, was an important factor in being able to present their whole self in a comfortable way.

Pan became increasingly comfortable after changing their hair and dress style. Once they were settled in their major and started dating their partner, they decided “we’re going to look in that box again” and reflect on their gender identity. They slowly started integrating gender neutral language, exploring pronoun options in their speech, and gauging the way others interacted with them. Pan’s partner also transitioned during their time together, which helped them realize that it’s a process “people are capable of doing.” They referred to their partner’s transition to a woman as “one of the bravest things [they’ve] ever seen someone do.”

While they gained confidence in their nonbinary identity, Pan sometimes felt guilt about their identity after observing the way women were treated in engineering. They shared, “it makes it hard for me to feel comfortable being completely nonbinary, because I feel like I’m doing a disservice to other women in STEM by not continuing to be a woman and stuff.” Pan wanted to continue the fight for equity and inclusion for women in engineering and felt like they were not helping the cause by no longer identifying as a woman.

Exposure to more TGNC individuals, however, helped their comfort. For instance, Pan met a staff member of the university’s LGBT center, who they described as the first queer person they saw who looked like them. Pan said, “Oh, that’s who I want to be in ten years.” When the staff member was interviewing, she talked about her nonbinary or gender nonconforming identity, and used she/her pronouns as they did not cause her gender dysphoria. Pan shared,

And that completely changed how I thought about my own interaction with the language we use around gender. And that is part of why I'm still a little—. I'm not entirely sure sometimes if it's, "This word makes me uncomfortable because you're belittling me as a woman," or if, "This word makes me uncomfortable because I am not a woman. Or I am not just a woman."

Talking about gender with TGNC peers and the LGBT center staff member helped provide representation for Pan and sparked further exploration and reflection of their identity. Pan also specifically reflected on gender dysphoria and euphoria in a new way. When others referred to them using they/them pronouns or when their partner called them "boyfriend" or "joyfriend," they experienced gender euphoria. During this time of exploration, Pan reflected, "that was kind of the period when it all clicked."

Exposure to more "casually nonbinary STEM people" and non-STEM faculty and staff who identified as queer further helped Pan's gender exploration. By being in a space where people were intentionally using gender neutral language allowed Pan to feel more comfortable compared to spaces that were gendered and closed off to gender diversity. This encouraged Pan to integrate their name and pronouns, which they began doing in class by informing the instructor ahead of time. They reflected on their experience negotiating their identity with their professor and a friend in a non-engineering class:

And I told myself going into that class, no matter what, I would sign my work with the name I wanted to sign, and I would use the pronouns I wanted to use. I talked to the professor beforehand, she was super supportive and on board. And then I walked into class the first day and I saw [friend] and I freaked out a little bit. And I told myself, "You know what? This is a test. I don't think [friend] is gonna be particularly judgey. He's never seemed like that kind of guy. So, I'm gonna just go ahead and I'm gonna pretend that, I'm gonna act as though he's, not that he's not here. But I'm going to act as though we don't have this prior understanding." And after that, because we had a couple other classes together, he started using my pronouns and my preferred name in the other classes and it was wild... And it was really, really cool to have another person who not only accepted me, but also, it really kind of opened up a lot more to our friendship after that.

Having an instructor and a friend they already had a relationship with openly accept their identity further built rapport and trust between them. Pan intentionally did not use their preferred name in engineering spaces, but they challenged themselves to use their names and pronouns in a non-engineering class and were met with support and acceptance.

Throughout their college career, Pan also worked in an engineering lab that became a comfortable space. Similar to their experience with their friend who was in the class in which they decided to use their name and pronouns, several individuals who also worked in the lab learned of their name and pronouns through their own involvement in LGBT organizations and activism, and began using their correct name and pronouns in the lab without prompting. They also began to check in to see if there were other things they could incorporate to make Pan comfortable. Pan described the experience working in the lab with people who knew and were accepting of their identity as “transformative” and “one of the most amazing spaces [they’ve] gotten to be in as an engineer.” They said,

It seems so small, right? But now, having my pronouns – having one of the younger staff members ask, like, helping a student and look at me and go, “Oh, they can help you” instead of “she can help you” is just, it’s so good. And I cannot properly express that, especially in a place where I’ve spent a lot of my time and where I’ve made a lot of my, a lot of the engineers who I know from outside of, like, I met you at a queer event, I’ve met through working there, and I’ve gotten to know and gotten comfortable with working there.

The people working in the lab strived to make Pan and everyone feel as comfortable as possible, which created a supportive working environment.

Pan also connected with queer people outside of the university by attending a Creating Change conference. Pan described,

And that was really formative for me as a queer person, just in general. Because it was the first time I had been in a space that was only queer people, only people who are playing with gender, people who are talking about, you know, the socio-political issues between White queer people and Black queer people. It was—.

And I got to meet some really cool nonbinary people and I got to see a lot of different ways of expression, nonbinary-ness, and, meeting people who still looked like their birth gender, and were like, “No, I’m nonbinary, please use my pronouns.”

Having a space with other queer individuals who were able to discuss social issues and represent diverse ways of identifying and expressing one’s gender was refreshing for Pan. However, while Pan found support and comfort in spaces with queer people and allies, they encountered challenges in other engineering and STEM spaces.

Prior to leaving for the conference, Pan proactively contacted their instructors letting them know they would be missing class because they were attending a school sponsored event. They provided paperwork and inquired about making up work for the missed time. While most of their instructors were supportive, one professor did not provide support and accommodations. Pan missed a quiz due to their absence and asked to take it, but their instructor refused and said, “I do not accept this as a valid reason for missing class.” In hindsight, Pan knows that the professor’s lack of accommodation was against school policy, but they were too scared to take action at the time. They were just getting settled in their major and becoming comfortable with their queer identity, so encountering this response “shut [them] down” and led them to never attend the class again. Reflecting on the experience and other similar incidents, Pan said they were still hesitant to attend any instructor’s office hours for fear of discrimination.

### **“Two Halves of My Life”: Gender in Curricular vs. Co-curricular Contexts**

Having been involved in various areas of campus life, Pan observed how different units integrated identity into their programming. They reflected,

Because I’ve done a lot of things with [the university’s] new student programming, and a lot of the out of classroom stuff. How everything that you interact with on campus out of your classroom usually is super progressive, super

forward. Everybody introduces themselves with name and pronouns, like, we're going to talk about sexuality and gender orientation and the intersection of queerness and race, and we're gonna be really proactive, and it doesn't, that's not just a non-engineering space. That's also the new student programs for engineering in that experience. And then you walk into the classroom, and it's not that at all.

Pan experienced two different worlds and approaches to navigating diverse identities in their co-curricular and curricular involvement. Working in new student programming provided a supportive and refreshing space where TGNC identities were directly acknowledged while their identity was more hidden or ignored in engineering contexts.

As Pan described,

It almost feels like it's two halves of my life, they aren't very well married. Engineering is very professional, a lot of times very impersonal. And then everything else is very, even when it's professional, it's very informal. It's very, you know, rainbows and explosions, but that's because of where I put myself on campus.

Pan intentionally avoided interacting within engineering contexts "because they were scary, and they [couldn't]," especially as they were exploring their gender. Instead, they chose to spend time in non-engineering contexts where they knew they would be supported and valued both for their identity, academics, and campus involvement. This led to Pan barely knowing their engineering peers with whom they had several classes. When they attempted to form a friendship with a non-queer peer, Pan felt a "disconnect" and felt more comfortable with students in queer spaces outside of engineering.

Pan slowly came out to some of their professors. They brought a specific question about negotiating their gender identity and expression in the workforce to their professionalism instructor, which inadvertently outed them. They shared, "I need to ask her questions about how am I going to dress as a professional if I am trying to walk the middle ground. And she didn't have a lot of answers, but she was willing to help. And

that said a lot.” Even though the instructor could not provide direct guidance on how to approach gender norms as a nonbinary individual in the engineering workforce, she was able to help Pan, which was meaningful to them.

While Pan became more comfortable talking about their identity with professors one-on-one, tensions still arose when discussing social issues with engineering peers and colleagues. The general response from other engineers when discussing gender or sexuality was “I don’t care about that.” In other words, others were ambivalent to diverse gender identities or had a lack of understanding of queer experiences and issues. During certain engineering classes, sociocultural topics would arise. Pan described,

So, we talked about things like gentrification, which as a queer person, I have a really unique perspective on because there's a fun interaction between the LGBT, the White LGBT community, and the Black community in general, when it comes to gentrification, because we run away from, we ran away, we still do, from polite society. And then we would bring affluence into poorer areas that would eventually force out other people. And so when we have conversations about that stuff in class, I have to, there was—. And it's less so now because I've had time to decide if I'm comfortable. I've been to therapy. And I've, figured myself out more. But there was definitely a period of time where I was, terrified of expressing my opinions in those conversations, or talking to my professors about things that were related to queerness and all because of that interaction.

Bringing up social issues related to the class discussion was concerning for Pan as they feared backlash since they identified as part of the LGBT community. The interaction with the engineering instructor who did not view their absence from class to attend a queer conference as valid influenced their concern and hesitation having discussions with faculty. After the incident with the instructor, Pan ruminated, “Am I going to tell these people? Am I going to tell employers? Is this something I want to talk about when talking to potential internship opportunities?”



In addition to worrying about personal backlash, Pan was also concerned with coming across as a “trope.” They said,

Sometimes it definitely felt like there's this trope, right, of the problematic queer person who won't shut up about their queer issues. And I think I live with constant dread, that that person is me. Because I am frequently the person who goes, who, especially as I've gotten more confident in who I am as an engineer and as a queer acti—, as a queer person on campus. And as a nonbinary person, I've definitely gotten more vocal about those things.

When topics arose in class that the instructor and students were discussing from an engineering lens, Pan would bring up how those engineering, social, and political decisions had an impact on gentrification and queer communities or other marginalized populations. These issues were important to Pan, however they also were concerned as coming across as a trope and further harming the negative perception of queer individuals in the field. While a few peers were interested in the sociocultural conversations, which was validating for Pan, the instructor and majority of the class were not interested in the discussion or failed to see the connections and relevancy between the topics.

Given the lack of awareness or interest in queer identities, Pan was hesitant to open up to faculty. If Pan already had a relationship with the instructor, they were less concerned about disclosing their identity, but if they didn't know the instructor well or they weren't doing well in the class, they were less likely to open up about any issues they encountered. The instructor who was also Pan's project advisor during their first year was someone who they checked in with daily. The instructor who did not view their conference attendance as valid was teaching a class with hundreds of students, so Pan felt they were just another student. They said, “One of these people saw me as a number, I felt, and then one of these people saw me as a person.” Their professionalism instructor also treated Pan like a person by knowing and using their name, and being willing to

engage in conversation about identity and social issues, which created a comfortable environment for them.

### **“What’s My Experience Gonna Be Like?”: Assessing Workforce Climate**

Pan also negotiated their identity and tried to determine the climate towards LGBT individuals when interviewing for an internship. When talking with recruiters, they had to make a snap judgment about them. One recruiter commented they thought Pan did not like them because it took so long for them to talk at the recruiting event. Pan responded,

No, I’m just pausing because I don’t know what to say in this instant. I haven’t, I’ve researched your company, but I’m not sure if you’re someone who I can go, “Oh yeah. I’m Pan and I use they/them pronouns”...or if I have to, “Oh yeah. Hi, I’m Pan, and I’m just an engineer.”

They wanted to determine if it was safe to disclose their identity to the recruiter. Thus, Pan had to observe them prior to talking with them.

When interviewing for one internship in a state that is generally perceived as being anti-LGBT, Pan asked their interviewer,

“So, you’re in [redacted state], and I’ve heard some things. I’m going to be completely transparent, I’m queer. What’s my experience gonna be like?” She had all the answers. She quoted policy to me, she was like, “If you come work for us, I’m going to give you my own personal email address, and you’re going to email me the moment anything goes wrong.”

Like the professors who took a personal interest in Pan, the interviewer was invested in ensuring Pan felt comfortable at the company and provided ample answers and guidance. Pan did not experience any issues as a queer individual while at the company, but “got more shit” during the position “because [they] looked like a woman and [they were] the only woman” on the site. However, Pan expected oppressive gender dynamics when working in engineering. They shared,

But being a woman in an engineering space is just, ah, honestly, that was almost harder than I would, than I feel like being nonbinary would have been because at least then they wouldn't have been like, correcting themselves every like fourth introduction on like, "Oh, hi, guys. Oh, and lady."

Pan believed being perceived as a woman at their internship led to more direct comments from peers than would have happened if they were out as nonbinary. While coworkers may have still made offensive comments, there may not have been as much correcting or singling out in their job, which felt "alienating" to Pan. What made them feel some degree of comfort in the job, however, was having someone, the person they interviewed with, take an active approach in their safety and well-being during their time at the company.

### **"Just Not Aware": TGNC Perceptions on Campus and in Engineering**

Pan perceived their university to be relatively accepting of TGNC individuals. However, there were systemic actions within the institution that told a different story. For instance, an engineering center that focused on diversity received funding for diverse populations in engineering, but TGNC students were not included in the group of students for which they received money. Pan said, "I think they have trouble putting their money where their mouth is, but I think that's true for most institutions of that size."

When considering their experiences within their major, Pan conveyed, "my department is just not aware that I exist, to be honest. And because of that, they just don't do anything for us." While their major was viewed as trendier compared to other engineering majors, there still was a reality where to gain respect, engineers had to look "slick and clean cut, which is really hard to pull off as a trans person." Without the department having an awareness of diverse identities and expressions, they were ignorant to Pan's and other TGNC students' potential struggles with negotiating their identity in

the field. While the faculty seemed to be ignorant or ambivalent, the engineering staff advisors were supportive and proactive in sharing resources, funding, and other opportunities for LGBT students.

In general, however, TGNC identities and issues rarely emerged in conversation within engineering contexts. A student may have shared their pronouns during an introduction which baffled some other students, but in general, there were minimal meaningful and intentional conversations about TGNC identities. However, Pan constantly assessed the climate and how best to proceed depending on how others acted. Pan shared,

[Engineering] tends to attract people who have very strong opinions about things that don't always affect them...And, you know, there's a certain amount of guesswork involved in who those people are. And, you know, that can really limit how I interact with the space. And it can really limit how I interact with people in that space. Because if I see just one person in the class, or in a project being like, "Ah, God, why do we have to introduce ourselves using pronouns?" ... You know, it's fun to kind of be like, "Okay, I'm gonna dial back my full-blown interaction here a little bit."

Despite not many, if any, conversations around TGNC identities occurring in engineering spaces, Pan felt the need to further isolate from classmates who made comments that came across as anti-TGNC. In class, it was also clear that some instructors did not know the full extent of supporting TGNC identities, but some were willing to use correct pronouns and names, and help how they could. Not all classmates were "jerks" either, but those who made negative comments were usually the "loud minority" in class.

### **“Planting a Seed”: Gender and the Post-Undergrad Job Search**

As Pan begins to apply to industry jobs, they are carefully assessing different companies before, during, and after interviews to determine how to negotiate their identity and find a company that values them. One strategy Pan used was mentioning

their budget management and conflict resolution skills from being the president of a LGBT student organization. They shared,

I tried to bring up my work as a LGBT student leader at least once every interview, and I gauge how the HR person, the other engineers, whoever is giving the interview, reacts to that question. And if I've got far enough along in the process, I've gotten a round tour too with a couple of companies at this point, I usually ask a question about being queer and company culture. "What is the bathroom situation like?" And just to kind of get a gauge on, is this a concept that they're open to? They don't have to be masters of the language or masters of the like, "Oh, yeah, we're super diverse. And we all love our gender nonconforming siblings, and #MeToo, and Black Trans Lives Matter." That's not what I'm looking for. What I'm looking for is, is this person's reaction to this to roll their eyes? Or is it to actually be like, "Oh, that's cool. Let's talk about that." Do they see it as a valid part of my experience?

Whether assessing employer reactions or working with faculty with whom they are unsure they will be accepting of their identity, Pan found it helpful to "[plant] a seed, and then see how they react and if they can respect the seed enough to see it as a viable piece of information." If they truly valued their identity and didn't merely acknowledge or accept it, Pan was more willing to further discuss their identity. One person during an interview, for example, rudely challenged Pan on the relevancy of their LGBT student organization presidency to leadership roles and management at the company. This was an example of someone not reacting well to the seed Pan planted to gauge their reaction.

They also paid attention to the degree of interest prospective employers took in LGBT identities, wellbeing, and experiences at the company. Pan said,

I've also gotten responses from companies, they're just like, "We don't care," which is a response. But it's really not the response I'm looking for. That's not going to prevent me from moving forward with the interview process. And honestly, I'm not even convinced it would stop me from taking a job at this point. But it's definitely going to change how I interact with that workplace, because this is a part of who I am. And your not caring about it, and not having it affect how you see me as an employee are two very different things. Because I need you to care about it because this is an engineering field. There are people who are going to be shitty to me, there are people who have been shitty to me. And I need to

know that if I put a picture of me and my girlfriend on my desk at work, and someone throws it in the garbage can or if someone makes a pithy comment about it, you're going to have my back, because, if I'm gonna work for your company for a couple of years, I need you to be a little loyal to me as well.

While Pan was willing to work at a company that at least was not discriminatory towards LGBT individuals, they appreciated those that truly valued and respected their identity, not just merely acknowledged and tolerated it. Knowing there could be open hostility from coworkers in engineering, they wanted to ensure the company would have their back if they experienced harassment.

### **“Something I Always Want with Me”: Reflections on Gender Journey**

Pan decided to take additional steps in being more out. They shared, “I’ve started to actually leave a button on my back, on my pack, that has my pronouns on it. And that’s a pretty big step for me.” However, they were primarily only out to students and not engineering faculty and professionals.

When reflecting on their identity as a nonbinary person in engineering, Pan shared their treasured sunglasses with rainbow lenses reflected their experiences. The first “decent pair” of sunglasses they owned, Pan purchased a pair while at Pride, and then lost them instantly amid the chaos and traffic of Pride. However, they were reconnected with a similar pair shortly after. Pan described,

This fabulous drag queen handed me a pair off a float. And she, I remember, she had this big bushy red beard with flowers in it that matched her dress. And I looked at her and I was, you know, pretty baby queer, had only just started reopening the box that my gender was in, and I went, “Oh my God, you are the single coolest person I’ve ever seen in my life.” And I actually like the sunglasses. That was a little – I had also gotten my hair cut at that point. So, my hair was really short. And I took the first picture of myself in college that I liked of myself, sitting under a tree with short, shaved hair that’s turning into a mullet. And these, honestly, kind of dorky sunglasses. It was my single favorite picture of me that had ever been taken. I felt so good.

Newly re-exploring their gender, Pan connected with a queer or, perhaps, TGNC individual who reunited them with a pair of sunglasses that brought them pride and confidence in being able to take “pretty androgynous” pictures with the glasses and their short hair. The glasses became an item they always had with them and made them feel comfortable expressing themselves. Pan also paid it forward, in a sense, as they wore them when working summer camps:

And I realized that I was the only queer person on staff, or the only out queer person on staff. And they were STEM summer camps at [university]. So I gave my, I was like, “I can either be in the closet, and I can just get through the summer, or I can be out and I can be proud and I can be myself. And I can, and that’s gonna mean a lot to the one, one or two queer kids I see also.”

Just as the drag queen was meaningful representation to Pan, Pan strived to be representation for future queer STEM students. During camp, Pan intentionally used they/them pronouns and shared the story of their sunglasses with high school students, and marveled in the opportunity to possibly be a role model for them in the field. While this likely helped the students, it also boosted Pan’s confidence and “made [them] feel a lot more comfortable with being in an engineering space as a queer person.” They shared that the campers and their boss did not take issue with their pronouns or identity, which made them feel at ease and supported.

Over time, those glasses wore out, but Pan received another pair when attending an Out for Undergrad (O4U) engineering conference. With each time they received another pair of rainbow sunglasses after losing or breaking a former pair, Pan felt it was “destiny” when they received a replacement. During the conference, they felt “out of place” and got concerned after completing an interview with the sunglasses on their head.

They thought, “God, I must, I can’t possibly look professional like this.” However, the company continues to contact them. Pan said,

That company still calls me back because it felt so good to interview with a company that saw me as a nonbinary person, that used my pronouns, that cared about me as a, that cared about that aspect of who I was. And I just did. I did well enough on that interview, then the recruiter and the engineer I talked to were impressed enough that they still send me emails.

By wearing the sunglasses, Pan felt truly seen and respected by the company despite insecurities about not appearing professional enough. After receiving rejections from other companies, they felt they had a safety net with the company from O4U staying in contact. Again, the glasses became a reflection of their confidence.

The life cycle continued with the rainbow sunglasses as the ones from O4U broke. Pan purchased another pair for their internship, which are more professional and of better quality. The sunglasses remained a “favorite part of every outfit, because they’re just, there’s earned history there now.” While Pan had different versions of the sunglasses throughout their undergraduate career, the sunglasses remained a staple during their gender journey. Pan shared,

And they kind of model the transition, I think I went through as, especially around my gender as a queer person in STEM, where I kind of looked at it, and then I lost it for a bit, because I was just kind of, I was, “I’m not, I’m not ready to do this.” And then, I eventually got it back because the people around me were awesome and amazing. And, for a while, I felt like I had to be really performative and out and proud, and I still do a lot of ways. There’s still a lot of performativeness to it. But at the same time, it wasn’t something that could be a really big part of me, right? It has to be something small, like a pair of sunglasses that, it’s something that goes on my head, it goes on my face, it’s not acceptable in every situation. And it’s not something that I’m always allowed to have on. But it’s something that I always want to have with me.

As Pan applies to the workforce full time, they use their experiences with gender, as represented by their glasses, as a way to remain true to their identity, balancing



professionalism and pride. While making it through a rigorous engineering program, serving as a president for a campus LGBT student organization, and exploring their identity, the “sunglasses have always been with [them].”

When reflecting on their overall experience during undergrad, Pan described it as a “learning experience.” They said,

I learned how to be confident in a lot of different aspects of my life, whether it was my ability to lead an organization or to be out about who I am, and I'm still working on that one, to be confident in who I am as an engineer.

Pan cited their leadership skills as one of their top strengths, both in the LGBT community as well as in engineering when leading projects. Having experienced personal challenges as well as conflict during their time as a leader of a student organization, Pan also learned how to highlight problems and seek help while also helping other queer and TGNC individuals. While they encountered problems that caused them to freeze up and “hermit” during their time in college, such as the instructor not accepting their absence for a conference, they now would not hesitate to reach out for help from the dean of students or someone else. Pan also recommends that other queer students do the same, even if it means taking a friend with them or seeking help from other allies they trust on campus if they are scared or uncomfortable. During their experience as a student leader, they made connections to other campus members and leaders who were able to help students if an issue arose.

They also found therapy and self-care to be helpful when navigating the stressors of engineering, co-curricular responsibilities, and identity exploration. “Your mental health is worth more than your program,” Pan shared, citing the importance of making

time to be with friends and have fun. Through their personal growth, Pan learned how to become an engineer and negotiate their identity in various contexts.

Lastly, Pan's gender exploration is on-going. They shared, "I wouldn't be surprised if I were to think back on this in two years, I'd be a guy in two years, and that's kind of scary to say out loud, but my gender is currently in flux." This idea is particularly unnerving to Pan when considering the black and white "single answer" mentality within engineering. Thus, once they are in the workforce, they have concerns about being able to safely explore their identity in the same way they did in college.

### **Rain's Narrative**

Rain (they/them; she/her) is a current graduate student who completed an undergraduate degree in engineering. They identify as nonbinary. As Rain stated,

I identify as nonbinary, but not as trans. I think agender would be best way to describe it. But I guess, when I, the words I use, I'd be like, I'm queer, nonbinary person. But gay and lesbian also.

### **"Keep Growing My Mind": Pursuing STEM and Art**

Growing up with parents who were engineers, Rain developed an appreciation of technology. They enjoyed playing with Legos and building things as a kid. In high school, they were friends with other "Asian American kid[s] interested in STEM because parents wanted them to be," so Rain was around students with similar interests and backgrounds. In addition to their involvement in STEM, they also took a lot of arts and humanities courses, and developed a love of art. Rain also noticed "the difference between people who have that kind of education. And it was important to [them] to keep growing [their] mind related to that." Thus, when it came time to choose a college, Rain

knew they wanted to pursue a field that combined art and technology. They decided to attend an institution that had a joint program in engineering and art.

While gender was not necessarily a factor when choosing a college, once Rain started college, they acknowledged the challenges that women in STEM fields faced and was appreciative their school had a relatively even split between men and women. Rain shared,

I felt a lot of the things, sort of, that a lot of women face with being in a technical field, I just never felt that. I never felt like guys treated me that different than other—. I mean, they definitely treated me different from my other female friends, I guess. But I guess, once I was there, I definitely appreciated that we had that split.

Once in college, they noticed a different demographic make-up of the engineering field compared to the gender diversity that was present at their high school. Thus, when they entered their engineering program, they became more aware of how men treated them. Rain believed part of this was due to having more “socially aware” peers in high school, while many of their peers in their program were “neurotic or socially awkward.” “It was more like a general annoyance,” Rain said, “but it kind of resulted in that I’m basically not friends with any men from that program.”

### **“Drawn Together”: Making Friends Outside of Engineering**

At the start of their first semester, Rain struggled to find friends, feeling like they were “bad at making friends.” Now that they “had more freedom to present [themselves] the way [they] want, to do that more and to be more comfortable,” they wanted to be true to themselves while meeting new people and making friends. As their first year continued, Rain developed a core friend group of students who all lived in their first-year residence hall and joined the same service fraternity. No one in their friend group was in Rain’s

exact major, but there was a mix of STEM and art majors. “I think the reason we were drawn together,” Rain shared, “is we all kind of weren't super at home. Most of us weren't super at home in our existing discipline for one reason or another.” When reflecting on their friends from high school who were all pressured to go into STEM to some extent, Rain felt their “mutual dislike of [STEM] but somehow ability to accomplish it is what [held them] together.” When Rain started their engineering major and saw classmates had similar backgrounds and perceptions as their high school student peers, they “didn’t want to invest time in making that kind of friend.” They shared,

It sounds weird to me, looking back on it, but I felt like, I had already made friends with those kinds of people. I wanted to make friends with new kinds of people. And so, given a choice, I would always pick somewhere else to be rather than hanging out with those people, I guess.

Thus, Rain sought out a diverse friend group outside of their engineering major, meeting other art students, joining fencing club, and getting involved in organizations and activities with people who had common interests outside of STEM. Their residence hall was also a helpful place to connect with new people. “One of the first people I met,” Rain recalled, “was someone who's bisexual and it was the first, the third queer person I had ever met.” Both being a part of the LGBTQ+ community, Rain and this person “latched” and began to meet other people together, expanding their friend group.

### **“Butting Heads”: Gender Dynamics in Engineering**

When observing women in class and being perceived as a woman herself, Rain noticed their classmates who were men would take over the conversations and work.

They said,

If you weren't super smart and able to sort of hold your own, coming in a lot of times they would just kind of talk over you and solve their problem together... it felt like, "Oh, my-," it just makes you feel like stupid, I guess. Even if, I mean,

yeah, they are, they know this better than you, they're smarter than you. But it's not like an equal discussion, kind of?

Rain often felt less intelligent or capable next to the men in their class who would dominate the conversation and projects, which led to Rain not feeling like they were learning the content as well as the rest of their team. They also had similar impressions of the faculty and staff they interacted with, though Rain was unsure how much of it was how they presented themselves versus if the instructors “came off as not understanding what [they were asking].”

When working with instructors, Rain felt that men categorized them as a “kind of student to interact with” while women were “willing to sit in that uncomfortable moment and help [them] guide towards what [they’re] trying to ask better.” When Rain felt scattered or uncomfortable when attempting to ask questions to their instructors, the women faculty would patiently assist while the men would be dismissive or appear judgmental.

Rain, for the most part, felt comfortable asking questions in spaces where they knew and were relatively close with the people there. When in a curricular context or another setting where they did not know people as well, they shared,

I kind of just let other people take the lead unless someone asked me a direct question. Even if I personally had ideas, but I just didn't want to. Yeah, certain places will make me feel stupid for being stupid.

Rain was frustrated when trying to share their ideas and having men dominate the conversation and did not feel comfortable sharing their ideas for fear others would view them as “stupid.” Rain was aware gender likely factored into some of their interactions; They recalled an incident when they visited a teaching assistant (TA) during office hours for help with an assignment. They said,

Obviously, the TAs were very stressed because a lot of people there, but I just had a really negative interaction with this TA. I was like, "This is my code, this is not working." And they were like, "Did you read the handout?" And I was like, "Yes, I read the handout." They were like, "Did you read this section of handouts?" "Yes, I did." And then he looked at my code and he was like, "I don't know what's wrong with it." I was like, "Is this because—, would this have happened if I—." I don't know. It seemed like such an improbable, unreasonable interaction. And you just assume I was stupid or something?

Rain's awareness of their gender was heightened in this moment, thinking perhaps if they were a guy, the TA "would have started with looking at the code."

Rain had a similar experience of men taking over work and looking down on them while interning at a company after their first year of college. They worked on a team with a man and a woman who were also student interns and did not get along with the man on their team. Rain shared,

And very much I and the guy were kind of just butting heads a lot throughout. Part of it was personality, unrelated to gender identity, but I feel like part of it was also part of that, like, the other girl, ... she kind of just let it happen and was not, I guess, he was a little bit, you know, very much wanted to take the lead. It's not, you know, maliciously, but just kind of a not noticing way. And I was the only one who was also, had my own ideas with it.

Unlike the intern who was a woman on Rain's team, Rain wanted to share their ideas, which was difficult when the man kept taking the lead, not accepting input. They also felt if they presented less "gender neutral" and "more feminine," men in their class would perhaps be "more friendly with [them]." Rain recalled,

I guess, I don't remember this guy's name, but we were kind of in an extended friend circle. And we would work together. And I guess I would feel like, whenever I ask things or talking about things, it's always my female classmates responding to me. And then, whenever he talks, he only talks to one or two girls and everyone else, he kind of doesn't interact with directly. And that, that just kind of felt weird to me. Like we're just all the same. Like literally sitting in a circle, bro, like, what's up?

The men in their class seemed to want to be friends with the feminine students, but treated Rain differently than those students. When interacting with people, Rain felt they did not fit into certain groups. They stated,

I guess the, whether it was gender or sexuality, I just get the sense that sometimes, from hanging out, it's kind of like, I don't belong with either group, I guess. Because you hang out with guys, it's like, you're girl. And people were definitely weirder about that in the beginning, like coming through high school. And then, if I'm hanging out with some girls, it's like, I mean, I still kind of, I guess I didn't like meet very many people like me. I'm definitely not in a group. Like those kinds of people, I would just hang out one on one. So, in a lot of group settings, I feel always kind of like the way I express myself would be very different than the way everyone else expresses themselves.

Rain felt isolated noticing they presented themselves differently from others and did not feel like they belonged to a group. They believed this was a primary reason they distanced themselves from their engineering major and found more of a home in their art studies.

They did not feel their sexuality was as much of a concern as their gender because it simply was not discussed or was not something people “[seemed] to care about.”

However, feeling isolated due to their gender and then intentionally distancing themselves from others in the program “made it harder to get through the program, because [they] had fewer friends to ask for help from and stuff.”

While Rain struggled to find a fit in their engineering program when considering their gender identity and presentation, they shared that being Asian in engineering helped how others perceived them in engineering. They stated, “I don't feel like anybody has ever been surprised that I was a [specific major].” Rain observed their White friend who “put a lot of care into their appearance” receive comments that people were “surprised that she was in her major.” Even though Rain presented gender neutral, they believed their Asian identity, in a program that “skews very heavily Asian,” alongside their gender

presentation helped them prevent others from being surprised they were in their engineering major.

### **“The Other Perspective”: Comfort in Non-Engineering and Art Spaces**

Rain noticed the differences in how people interacted with other students based on their gender presentation, both in engineering curricular and industry contexts, as well as the pattern of men dominating projects with people they perceived to be women. Thus, Rain found relief in non-engineering contexts where they felt more comfortable being and talking about themselves. Since Rain’s degree was interdisciplinary, they also had more opportunities to connect with students of different majors in their non-engineering classes. When comparing their interactions with classmates in non-engineering and engineering classes, they felt they only experienced men taking command in the engineering courses. Rain shared,

Just also, I feel like a lot of people I knew in freshman year were not really challenged at all, throughout to senior year. I mean, a lot of people sought that out on their own, but it's like, you had to seek it out on your own.

Since many of the students in their engineering courses were not required to take certain types of general education or liberal arts courses, they had to seek opportunities out on their own. Rain had access to those courses being in an interdisciplinary program and found their classmates in the non-engineering classes to be more open. They continued,

I feel like if you have some experience or investment in the arts, you're open to this idea of, I don't know, leaving things uncertain, discussing things, and then the other perspective, like the classic STEM left brain thing, it's like, I guess people either don't care enough to engage with that to begin with...it seems like people just don't care.

When engineering students had to take general education courses, Rain observed students doing what was required without truly engaging with the material, perhaps due to a “lack



of curiosity in knowing or talking about other things.” Rain wanted to engage with material and talk with fellow students about their experiences when working on a particular topic for an assignment. They wanted to “connect” with others instead of taking an approach like, “Okay, well, I guess if you hate it here, I will also match your energy and we will just hate it together and get this thing done.”

### **“Floodgates Open”: Deeper Connections with Non-Engineering Queer Students**

Once Rain settled in their program and had friends in various majors, they were less concerned about “initial impressions.” While they were not particularly vocal about their identity, they also did not care as much about what others thought in regard to how they presented themselves. For instance, Rain would “not [assume] that someone would question or think [they’re] weird or something.”

However, if there were opportunities to connect with peers on a personal level, they found even their friends in their major would not be open about personal matters or sociocultural topics. Their queer friends, however, were the primary ones who would seek a conversation that was less surface level. They described,

Even my friends who were, I guess, people who are mainly [major] people never really talked about personal stuff. Even people I was friendly with, it was kind of more like, small talk, shallow personal, it's more just talking about classes, or memes or something like that. And yeah, I guess a lot of people who sort of, once you both know you're queer, it's kind of like, floodgates open. People are comfortable talking about whatever. Yeah, I find that those are the people who tend to just bring up personal stuff more openly. And then, yeah, then we'll get into politics or discussion of identity and our past and stuff.

Students in their program seemed to be closed off to personal topics altogether, while Rain’s queer friends outside of engineering were more comfortable talking about personal and political or social topics. In the broad undergraduate campus community, they believed students were generally “respecting you for who you were,” while people

in Rain's engineering major had a "really [strong] do not care vibe" as in "please stop talking. I do not, I will not be ingesting this info." While they were aware of people in their program who would intentionally avoid personal, social, or political topics, Rain distanced themselves from them.

Additionally, Rain knew of other queer students and faculty in their engineering major, but never became friends or connected with them. "It's possible," Rain said, "this, I don't know, this field is really just like the wrong place for me to be, to be honest." They felt "a little bit of extra outsidersness" feeling like they could not relate to heterosexual and cisgender peers due to gender and sexual orientation differences, but also struggled to relate to queer students because Rain did not share the same "enthusiasm" for their engineering major. They added,

Although I was, I guess, comfortable with some of the faculty and students. I never felt comfortable talking about personal stuff. I guess maybe it was this, this culture of, we're all here to the pursuit of knowledge and truth. And it's not that you'd be bad or you'd be, have a bad reaction talking about it, but it's like, we're just not interested in that. We're just interested in talking about ideas, [major] and algorithms and technology and stuff. And I guess that wasn't really a culture that I jived with. Just, I guess I wanted to talk more about personal stuff related to identity. And that kind of discussion, I guess, even with those people would have only happened outside of that curriculum. So yeah, in terms of professors, I guess, if I were to be in undergrad now, maybe I would talk more about that, but at the time, it felt very, I personally felt like, "Oh, I can't talk about this stuff with them."

Rain felt any identity related conversations were discouraged with people in their engineering major. While they were open to disclosing their identity and sharing their experiences, it did not feel suitable for the engineering environment where people only discussed engineering topics.

## **“Outside the Box”: Identity in Engineering vs. Non-Engineering Majors**

The fact that students in Rain’s major were closed off to different perspectives when it came to identity baffled Rain since their major required out of the box thinking.

They said,

Yeah, it's strange to me that in [major], it's all theoretical anyway... it's all about a problem and looking at it, at all the different angles. So, you're actively always thinking outside the box. And yet, when it comes to social or identity issues, there's such a discomfort with, I mean, this is based on, just off comments I hear or my own debates I get into, where suddenly uncertainty and looking at things in new angles is just out of the question for some reason. And so, it was important for me to keep both of those ways of thinking outside the box. And you can do that a lot deeper in college.

Having developed a personal and professional interest in an interdisciplinary field between art and engineering, Rain saw the value in applying out of the box thinking beyond the engineering classroom, but their peers seemed closed off to the idea.

Additionally, Rain felt they and other peers did not have time to take other courses to dive deeper into those sorts of theories in social or political applications due to the heavy course load required in their degree.

However, Rain connected with fellow art students in a deeper and meaningful way even if it was not explicitly discussing theory. They described a time they went to an art gallery show with peers where they were able to share an appreciation of art with peers and have their identity as an artist validated. When describing the complexity of the content at the art gallery, they shared,

I feel like there's, you can do things that are funny and shallow, but in a way that has some sort of depth. And is subversive in certain ways. And I feel like, that's kind of what that was, that's kind of the vibe I got from a lot of art school friends I was with. We didn't, we weren't the kind of people to just casually talk very deeply about critical theory or anything, but there was an understanding of how to create art that is subversive, or talk about things in, with context and stuff. Anyway, we did that gallery and I guess I really, it was really meaningful to me,

because it kind of felt like now I'm truly a part of this art space. And that validated my identity as an artist, sort of. Which I was really hung up about at the time.

At the art show, they observed and appreciated the deeper meaning behind the art displayed. Together, they experienced an understanding with their peers that was quite different from their experience with their engineering classmates. Rain felt they were truly part of a “community.” They described,

That was kind of moments of community I never felt in [engineering major]. Even, I mean, obviously, it's hard to do that in academic settings, but like, even at a [major specific event] that I do with friends in [engineering major]. It's like, maybe it's just the kind of people and the way I don't complement their personalities that I just didn't feel that kind of connection.

Rain did not connect with students in engineering and thus valued moments they found community with peers outside of engineering. They had a similar experience when they interned at an interdisciplinary lab on campus. Compared to their first internship where they did not get along with one of the men interning, Rain felt their experience at the lab was better. They shared,

Environment was very different. It was kind of like, I feel like anything that becomes interdisciplinary suddenly attracts people who are more understanding, even if you never talk about these things at work, but kind of the environment. And yeah, it's much more comfortable.

Rain sensed people to be more open at the lab compared to the company at which they previously worked, even when there were no direct conversations occurring about life outside at work. The lack of hostility and sense of openness made Rain feel more comfortable at the lab. Lastly, Rain interned at another company, but it was remote, thus their meetings were held via video conferencing. “There’s no impression for that,” Rain said, “because it’s, I almost feel like being on a screen removes a lot of this consideration of what identity is.” Thus, Rain was unable to determine their co-workers’ perceptions of

them and their identities as they were when in-person at the initial company and lab internships. Meetings over Zoom were simply “neutral,” and the expected “awkward” that comes from video conferencing.

### **“Normalizing Factor”: Exploring Nonbinary Identity**

While Rain had friends who were nonbinary in high school and college, “it didn’t click for [them] that they might be nonbinary as well. They said,

I didn't really internalize the fact that that, I don't know, something was missing there... I was dating a nonbinary person who presented as obviously very feminine, I guess. And that kind of made me, I guess, think more about what that— what nonbinary can encompass, then pandemic happened. A lot of time to just think about it. Yeah. And also, I think, I like really stopped interacting with people for school, right? And I was mainly hanging out with my friends. And that also kind of felt like, well, now I can just do whatever. So, I cut my hair. So, I used to have longer hair. And that, I guess seeing myself look that different. And that look kind of broke the wall that was separating me from that, I guess. It was like, well, gender is really not—gender presentation can really change how you feel on the inside too based on how you're looking. And then, yeah, I was more comfortable asking my friends to use they/them more often. And then that feeling, that also visceral trying something and then having it be validated enough to internalize it, I guess.

After Rain started dating someone who identified as nonbinary and learned more about the complexity and diversity of the identity, it resonated with them more. Their partner describing their experiences became a “normalizing factor” for Rain and provided a perspective outside of their university bubble since they did not attend the same university. Their relationship and learning more about nonbinary identities had a “big impact” on Rain as they witnessed their partner, who identified as a woman when they met, change how they identified to nonbinary and trans. Rain shared,

Things I assumed about the identity. I was like, "Okay, well, I need to reevaluate all this now." And I think that had a really big impact. And it was kind of, I don't know, an example of a person that I didn't have those kind of examples before. And also, I guess, feeling the way I presented at the time was attractive to anyone,

that really—. I was comfortable with how I looked and acted, but I never felt like anyone would find that attractive.

Witnessing their partner's gender journey challenged and expanded Rain's initial perceptions of gender and led them to reflect on their own identity and gender as a general concept. Through their relationship, they were also received validation of how they presented their own gender.

Rain experienced discomfort around their gender before but thought that was normal. Once they were introduced to the intricacies and complexities of other gender identities, Rain explored their own identity more. Then, once the COVID-19 pandemic happened and classes changed from in-person to virtual, they had an opportunity to explore their gender identity and expression by cutting their hair, using they/them pronouns, and presenting in a way that was more comfortable while not having to worry about interacting with classmates. They also became more interested and active in politics during the pandemic, which also led them to reflect and challenge gender norms. However, "having one other, at least one other person who was if not queer in some way, definitely clearly an ally of sorts and understanding of the issues" was helpful in their gender journey.

### **"Space that Doesn't Encourage Identity": Persisting in Engineering**

Rain found their undergraduate experience to be both "stressful and fulfilling," but they only felt it was fulfilling with the non-engineering aspects they pursued on their own. They shared, "I had to find that, the program didn't give me that. I had to find that within and outside on my own, I guess."

When reflecting on their undergraduate career, they described how a canvas belt they purchased at their university bookstore was representative of their experiences in their engineering program. Rain shared,

This belt. I feel like the belt thing is like, I started—. My fashion go-to or whatever is a tucked in T shirt, jeans, and a belt. And I didn't really start doing that till halfway through college. And I just really like, I don't know, the way that it, I guess, hides my upper body, I guess. Or like, the kind of shape it gives me. So um, this is the first belt I got that was one I bought my own and not like, my mom's, you know, "this is your professional belt." And it's from my school university store. So, it has the [mascot], or school [mascot] colors on it.... And also, I feel like it's pretty unique because of the plaid thing. And I feel it's just like, whether it looks good fashion wise or not, when I put it on, it's like, that looks gay.

Marketed as an extra-large men's belt, Rain customized it by cutting it to their length and adding holes to fit how they wanted. While there were aspects of their university and program they did not like, they "[felt] pretty at home there." Thus, the school colors on their belt were a reminder of their sense of school pride. Rain added,

I kind of, the whole, I mean, the way it kind of marked what I felt was a, an aesthetic that I was actually comfortable with, for once, that part of my college experience. And then, I was kind of like, well, I kind of DIYed my own curriculum, in a sense. So, it's, you know, it's kind of tied to that.

The belt represented their increasing confidence in their identity during their undergraduate career as well as customizing their college curriculum. They were able to pursue both engineering and art, finding comfort in spaces outside of engineering to process and explore their identity. "I'm glad I found like, my identity," Rain shared, "in a space that doesn't necessarily encourage you to look for an identity."

While Rain perceived their engineering program to be particularly isolating as a nonbinary person, they felt their university was "at worst...[apathetic]" towards TGNC individuals. They recalled a friend sharing that an instructor did not use their pronouns as

well as an incident where someone put “transphobic graffiti on some bathrooms,” but that was the only “direct attack” they witnessed at the institution, which was quickly addressed and admonished by the administration.

### **“Make Them Comfortable”: Negotiating Gender in Graduate School**

When starting a graduate program at their undergraduate institution, Rain noticed how their new program felt separated from the larger university. While they did not feel the university was very engaged with diversity topics, they believed their graduate program was more removed from diversity conversations. Rain shared,

I think there's definitely not as much of a push to make people, especially like, educate a lot of the people coming in from different backgrounds on that kind of stuff that you would have gotten if you were in undergrad.

Rain’s graduate program consisted of majority Chinese international students. Through their interactions with various students, Rain encountered many instances where there were differences in gender norms. While no one was “outright mean,” there was “a bit of insensitivity and a lot of assumptions” made by their peers. Depending on the people they were in a group project with, their level of comfort when interacting with others would change. They described,

And, if I was, I guess, comparing the group work we did. In a group where I was with another person who, you know, I kind of got their vibe. And this is like creative projects, we kind of discuss ideas as a team. I'm just a lot more comfortable sort of not holding back on ideas. And you know, presenting, "let's do this, like, crazy—" We did a drunken horse party game, or something like that. And then I compare that to an instance where we were, I just felt very—. We're like, coming up for an idea for a short movie film. And a lot of the ideas were like, "Yeah, this boy meets this girl, and they fall in love." And I just, didn't feel comfortable presenting, “girl and girl,” or “guy and guy,” or anything beyond that, just because that was, I would have been the only person and I would have to, I don't know, it's not like I expected to defend it. But it was like, "Well, what if, what if I have to, what if it makes the vibe weird now, because everyone's not used to that or something?"



In general, Rain felt more comfortable and confident expressing their ideas in graduate school compared to their undergraduate program since they were no longer in the same engineering curricular environment where they felt there were “expectations” guiding their interactions. However, the way they communicated in groups differed depending on the people there. If Rain perceived someone in their group to be TGNC or queer in some way, they felt comfortable offering ideas that may have challenged social norms.

However, if they felt they were the only TGNC or queer person in the group, they were concerned they would upset the group dynamic or their peers would not be accepting.

Rain generally felt uncomfortable disclosing their identity with their peers out of concern, perhaps, for others’ comfort. Rain shared,

I think there's this exercise in one of the classes where it's, “Okay go around the circle and talk about personal experience.” I definitely, I think we had to create a creative project where we "do something related to your personal experience." And I had a list of ideas. And I was like, "Well, I don't want to do something related to queer identity because now I have to think about, I can't really engage with that without thinking about all the other things around it." I mean, maybe part of that is just me not wanting to make these points, being overly sensitive to trying to hold everyone's hand around me. And make them comfortable. But that was kind of the impression I had gotten of them in the few weeks that we knew each other at the time.

While Rain wanted to discuss their identity and incorporate their experiences into their project, they were too concerned to do so for fear others would not react well or be uncomfortable. In addition to Rain’s awareness of others perspective, they also would get frustrated with the common storylines being offered by their classmates. “It would always be like...boy meets this girl and falls in love,” Rain said, which was frustrating for them because they wanted to create an original or interesting story line. To Rain, they got the

impression that because it's, the queer identity stuff was linked to a host of this general seal of progressivism...and the indicators that you're interested in these ideas, especially when you're in an environment where you can do anything, literally anything, any idea. And the fact none of those ideas came up.

Rain paid attention to the ideas and storylines their classmates would pitch. Thus, when their peers presented heteronormative story lines with binary, cisgender identities, Rain perceived them to be disinterested or not accepting of stories with TGNC or queer people. If an instance occurred that made Rain uncomfortable, they viewed it as a personal concern and struggled with whether to mention it to their classmates. When reflecting on a time in graduate school where their classmates had to make their group members as characters for a story, Rain shared,

They just gave me an outfit that I was like, this is just fiction, this doesn't matter. But it also made me feel very uncomfortable, this is not something I would wear at all. I'd be very comfortable wearing this. And I didn't want to, I don't know, make a fuss about it. But it really, just seeing myself like that, with my face on it, I guess, really bothered me. I didn't end up saying anything, because I felt like I shouldn't. It's kind of more of a personal thing to work through. But that discomfort was there. And I was thinking about changing it, I guess.

Rain did not disclose their nonbinary identity to other students in their group but was bothered by “the assumption that [they] would want to wear a dress.” Despite feeling discomfort with how a classmate depicted their identity as a fictional character, Rain decided not to bring their concerns to their group. Rain said,

If you haven't grown up in America, it's already really difficult to get pronouns...So explaining this concept of ...neither gender in addition to also a third pronoun, it felt like that was just not worth it for the kind of interactions we were having.

Since most of their classmates were international students and Rain was not sure about their awareness of nonbinary identities and pronouns, they were concerned that

explaining their identity would be too complicated and taxing of a conversation to have when they were only interacting for a few projects. They shared,

I do make my pronouns known. But I also, I guess, I put in the caveat like “Okay, she/her or they/them is fine”. And nobody, except maybe a few of my classmates, who are also queer, use they/them. But I'm not entirely sure if I only said they/them that they would actually use they.

While Rain included they/them as one of two options to use for their pronouns, most students used she/her, with only some queer students in the program using they/them when referring to Rain.

### **“Help You Through That Moment”: Strengths, Supports, and Future Anxieties**

While Rain was uncomfortable asking for help at times for fear of coming across as “stupid” to men in the program, they felt having a “pretty confident tone” was helpful. “People did kind of respect what I had to say,” Rain shared, which is something they observed women in their program struggling with when talking with faculty, students, and coworkers. Rain added,

I think for the same reason, kind of having that ego kind of made it hard to ask for help from people. So that's something I had to work a lot on. And also sometimes asking for help and having a negative experience from that.

They tried to ask for help confidently, but when there were instances where instructors or TAs made them feel “stupid,” Rain struggled asking for help. However, they did not feel a need to know what they were talking about as much when talking to professors since they were students and there was an obvious difference in knowledge. Rain felt more concerned with being confident around peers so they would be taken seriously.

While Rain had a negative encounter with one TA, they said most of their interactions with TAs were helpful when they needed assistance with coursework. They also found TAs would offer more support and “moral encouragement” rather than

professors who, at times, would be dismissive claiming “you’ll figure it out” without the appropriate guidance. Additionally, while they were not close with people in the program, Rain connected with a few students knowing they would be able to be an additional academic support when needed. Thus, Rain recommended not completely pulling away from an isolating program since they were able to rely on some student peers and not struggle as much through their coursework.

Rain also found emotional support to be beneficial in persisting through their program. They shared,

I don't really get a lot of emotional support from my parents. So, I relied a lot on my friends for that. And then, occasionally, my advisor who was the one female teaching faculty, or the tenured [major] teacher faculty kind of thing. Even if her life experiences are very different from mine, I just felt like a lot more comfortable. Like sometimes you just need someone to help you through that moment. So, I kind of just accidentally found all that. But I would say, you know, if you don't have that, that's something you'd want to establish whether inside or outside the program. So, I know there's also, I mean, at this point, there's also oSTEM, but when I started college, there was no oSTEM, so that did not, it was hard to find out who those people might be, but now it's a lot easier.

While TAs and student acquaintances could help with academic support, Rain found the emotional support from their friends and advisor to be essential when encountering difficult “moments” in college. Rain has a concern that once they finish their graduate program, it will be “1000 times worse” when working in industry. They shared,

Well, I think it's, it's mainly like, historically, there are a lot of men in it and then even now, the trickle of women coming in is getting larger, but it's still small. A lot of gender stereotype stuff that I didn't personally experience, but I'm aware of it, I guess. And even if I don't experience it outright, it still is less comfortable when I'm the only person who looks like me when in the workplace.

Despite a growing presence of women in the field, Rain is aware there are not many nonbinary individuals in the field, or people who look like them. They witnessed how working in industry might be during their internships and have concerns about

encountering worse issues when being a nonbinary person in engineering compared to the challenges they endured in their undergraduate and graduate programs.

### **Solomon's Narrative**

Solomon (he/him) is a graduate student in an engineering program and identifies as a binary transgender man. As he described,

For me, that means that I don't fall in the nonbinary spectrum, I find that that kind of masculine box fits me pretty well. It's not the gender I was assigned at birth. And so, I've gone through aspects of both physical and social transition in order to make that align more closely for me. At the same time, I would say that I'm gender nonconforming in that sometimes my presentation doesn't always line up with that, you know, I wear dresses and skirts sometimes and I talk in a more feminine manner.

### **“Queer Accepting-ish”: Transitions to College**

Solomon was initially interested in a non-engineering STEM field that was offered at a limited number of institutions. Thus, he was limited in his college choices based on which university offered his undergraduate major. However, another core factor in choosing an institution was the distance from his parents and family. “I wanted someplace that I thought would be more queer accepting-ish,” Solomon shared. He chose an institution with a queer presence that was located in a different region of the country from his hometown.

When applying and matriculating into college, Solomon was early in his gender transition, so he “just wanted to make sure that [he] wouldn't be the only person there. And that [the university] did have support systems in place.” While there was a queer community on campus, Solomon observed how the inclusive efforts the university advertised did not match his experience. He said,

Specifically, around housing, that was a big concern for me really early on in my transition. I wouldn't even say that my undergrad even handled that situation

particularly well. It's more like they at least advertised that they were trying, maybe, and most places don't do that.

While his university had policies and practices in place, Solomon described them as “not in any way shape or form effective,” especially when assisting with campus housing which was a system built around binary genders. Thus, as someone who was transgender and transitioning, the policies in practice were not effective when determining roommate assignments.

Having come out as transgender the semester before his first semester of college, Solomon also had to navigate discrepancies in his student records because his name did not match the name he used when applying to the university. Being involved in leadership, Solomon was aware of the name change policy on campus, however there were issues with the university's information technology (IT) organization because each department had their own IT program, which did not always communicate with or update from the central system that processed the name changes. Thus, TGNC students may have had their name appear correctly in one department, but incorrectly in another.

Solomon shared,

In my case too, my case was a little bit awkward even, because I applied under my birth name before I transitioned. And then I put my preferred name as [shortened version of name that can come across androgynous] to kind of have a little bit of a benefit of a doubt if my parents saw or anything.

To protect himself from parental backlash, Solomon adjusted his name a second time by shortening it. This led to the system having three different names on record: his birth name, actual name, and a shortened version of his actual name. When reflecting on the housing and name change policies, Solomon stated, “So, theoretically, yes, the services were available, but they weren't particularly robust and accommodating people who

circumstances change or occupy different parts of campus.” The systems acknowledged gender within and beyond the binary to some degree, but the systems and policies could not accommodate fluid identities in practice.

In addition to name discrepancies, he started hormones a few weeks prior to the start of the semester, so he also experienced people being confused about his gender. As he described,

So, there was confusion for most people about my gender for probably the first half a year that I was there, like, I didn't have a lot of obviously masculine features yet. And a lot of my clothes was old and not particularly flattering, etc., etc. So, it took a little bit for me to kind of get to a point where people recognized my gender on a regular basis. But we got there eventually. It didn't take too long in the grand scheme of things.

During his first semester, he recalled faculty and student peers who “couldn't quite tell” his gender. This put Solomon in a situation where he either had to educate those around him, or let it go. He cited this as the time he was most aware of his gender since he had to “[navigate] it on an everyday basis.” He shared,

Which, I mean, you know, in some senses, I'm looking at, since being binarily trans is, like, there is a gender box for me to slot into that people eventually recognize. And for a lot of some nonbinary people, that kind of navigating people's confusion and assumptions doesn't ever really stop.

Solomon reflected on ways he was privileged compared to nonbinary individuals due to being able to transition to the binary gender he identifies with, therefore, eventually reducing the confusion from others. Once the second semester started and he was further along in his transition, he did not encounter confusion from peers and instructors as much.

### **“Inclined to Combine Ideas”: Leadership and Interdisciplinary Engagement**

When starting college, Solomon took on leadership positions in the transgender activist group at his university and was also involved in STEM organizations on campus. However, he did not have as close of friends and community in the STEM organizations compared to the queer and trans community. Through his experiences and leadership in the queer community and student organizations, Solomon developed a core group of queer friends, many of whom were in STEM fields as well. During his leadership roles and out of “[his] own curiosity,” he learned about gender theory and queer theory, which he believed gave him an interesting interdisciplinary perspective. He described,

A lot of scientists never really get exposed to sociological theories. And I think that's kind of to their detriment because it changes the way that you think. And so, I find that I'm more inclined to combine ideas, and have hands in different disciplines and mix and match my knowledge than my peers are necessarily. It influences just how I think about problems.

Through his personal journey, academic curiosity, and experiences as a trans student leader on campus, Solomon learned theories that helped him understand gender and constructs in a way that changed the way he approached his thinking in his field as well.

Solomon observed a somewhat accepting nature in the general campus community towards people based on sexual orientation but did not perceive people to be inclusive or welcoming of TGNC students. Being in a geographical location with citizens who held majority conservative perspectives and being at a “party school” with a “large Greek life presence,” Solomon perceived many students to be transphobic, homophobic, and generally less accepting of minority students. He described it as the “rich conservative students” as one group and students “on academic scholarships who were from minority or poor backgrounds” as another group. Tensions arose more with the



“rich conservative students,” while the “minority or poor students were super accepting and chill,” which made groups on campus seem “polarized.” He shared,

I mean, I wouldn't say I directly faced a lot of obvious transphobia. It was more linked to homophobia that was tied to the way I present my gender, which is related to my transness, but a little bit different, like, I would get called f\*g a lot. I just would. Just like walking down the quad in my university. That was a thing.

Hearing f\*g used in a “derogatory sense” was offensive, and also jarring as he never heard that term used in a non-joking manner in the geographical region he grew up in. In addition to his own experience with transphobia and homophobia, he heard other stories and experiences from his many TGNC peers who were “asked really insensitive questions during class or get stares places.”

### **“The Water We Were Swimming In”: Experiences in Engineering Contexts**

About a year and a half into his college career, Solomon changed majors to engineering. He was fascinated with his first STEM major, admiring a well-known trans man in the field. He thought, "Okay, well, I think this is really interesting. And I know that I could probably work in this field. And at least I wouldn't be the only expert who's trans." However, while he appreciated the field, he was interested in a major with more intensive math applications.

When starting the engineering program, Solomon felt “pretty overwhelmed.” He believed he was lucky since he, in general, felt he “was in the best place mentally and health wise,” so he was better able to navigate the struggles that occurred when transitioning to engineering. With reduced personal challenges, he was able to handle academic stress more. However, it was still academically overwhelming. Having transferred into engineering after his first year, he had to transition into and catch up on more challenging and rigorous coursework. He shared,

So, I was behind, and I felt it. I really enjoyed what I was doing, like, I was passionate about it. And that pushed me forward a lot. I feel like if I hadn't already developed kind of, like, my core group of friends outside of engineering, I would have felt more isolated. But by that point, I was living with one of my friends who I had made from back in my [previous major] days. And I still had a lot of connections through my leadership. So that kind of buoyed me up. I, like I said, I don't think if I had that, I think I would have been pretty lonely, though. And I still ended up isolating more than I was used to, just because of the volume of work. And because I didn't have a core study group within my department for that aspect of socialization. So it was, it was a hard transition. But I was really glad that I did it.

Solomon felt isolated in his new major, but knew it was the right decision due to his passion for the subject. Despite being isolated, having a core group of friends prior to transferring into engineering helped him through an otherwise lonely transition in his new major.

As Solomon progressed through his program, he connected with some peers in engineering who were freshly starting the program as new students and were therefore taking the same courses as him. Solomon said, "So then I had more of connection. What do you know, they were like, the only other queer ones. But no, they're great." While he was unable to connect with his most people in his specific department, he found other queer students in engineering with whom he developed a connection, and thus felt less isolated in his program.

In addition to feeling disconnected due to transferring into engineering later than his classmates and not having an established study group or friends in his program, Solomon also did not feel comfortable expressing his gender identity in engineering contexts. While faculty would not use slurs or be outright discriminatory, he was frustrated by ways professors discussed gender. He shared,

Professors would use examples of phenomena, like, "Oh, let's assume that, you know, for our distribution, x is a man, y is a woman. We're just gonna pretend sex

and gender are the same thing." And I remember one—this was, this is the wildest flippin thing.... we organized a professor lecture because a lot of people really liked this professor, apparently. And we had him do like a guest lecture. And it was about [science topic]. And in [different engineering major] and stuff, and so 45 minutes, all about [science topic]. Last little bit, we're just taking questions and stuff. And then at the end, unprompted, no reason to go into this, he just goes on this five-minute rant about how trans people don't belong in the Olympics because of hormones, or whatever.

During classes, his professors conflated sex and gender and only discussed it in binary terms. When organizing and attending a guest lecture, Solomon also felt uncomfortable given the offensive, inappropriate, and off-topic comments the lecturer made. While he did not perceive his instructors to be “[openly] hostile,” like he did in other parts of the university, he perceived “a lot of people” in the “engineering realm” to “knowingly or unknowingly...hold kind of bigoted views about trans people.”

Given his interactions in the engineering program, he would go into “self-preservation” mode and assume most people in engineering were transphobic. “I don’t want to go to all the effort of getting to know you,” Solomon said, “only for like, to turn out you’re secretly a transphobe.” Being involved in non-engineering and engineering organizations, he compared the two types of environments and experienced more welcoming and open people in the non-engineering contexts:

I remember when I...began being involved in leadership for [non-engineering STEM] club. I was like, "Hey, can we start using pronouns when we're doing our interest?" And people are like, "Yeah, sure." That was nice. Engineering, not so much.

Solomon found support in non-engineering spaces and within the queer community. In his engineering program, he felt like he did not fit into the norm and expectations within engineering. Solomon said,

It was specifically the fact that I was not the same type of masculine that a lot of the men were, but I wasn't a woman. And so, I just didn't quite have a space

where I fit. Nobody in my department was mean to me or anything, but it was just kind of awkward. You could tell that they didn't really vibe with me. And I wasn't really vibing with them. And it's not the kind of, I guess, environment or people that I would want to talk about my big gay life and all that stuff with. So, it's just, yeah. It's not like I would ever directly try to hide anything. Like if I felt like wearing a crop top, I'd wear a crop top, and that would be that. I just probably wouldn't talk to anybody about it.

While Solomon did not receive any direct comments, there was an assumed gender norm and way to exist within engineering that he did not fit. He still expressed himself the way he wanted but kept to himself while doing it and would not discuss his identity with student peers or instructors.

Expressing his gender made Solomon feel comfortable, but also distanced him from people in his department. Balancing his self-expression and the tension it created with others in his program added more mental strain to his experiences. He shared,

It does take extra energy as far as like—. It's kind of both. I'll be like, "Ah, it feels a lot nicer and more comfortable for me just presenting authentically myself." But also, it takes that extra energy of, you know, gauging how people are reacting to it, wondering if I maybe pushed a little bit too far this time, or if it's maybe making a negative impression on other people. And just kind of navigating that it is a little bit of extra stress and energy that I don't always have. So, it kind of goes both ways. It's not really an easy either or kind of thing.

Presenting his gender was comforting and rewarding for Solomon, but he would become drained when navigating people's reactions to his presentation, wondering if he "pushed a little bit too far" or it was harming the way others would relate to him. Solomon also described his presentation as being in "levels" depending on the context. He said,

I think when we're talking about specifically engineering environments, I'm a little bit more on the hypervigilant side. I usually dress pretty masculinely. I usually try to be a little bit less overtly gay. When it comes to places like math club, where it's kind of in between, I'm less vigilant about it. And I just kind of let my personality do whatever, but maybe I don't dress as flamboyant or as feminine. So, and then when I'm in more like overtly accepting environments, like my trans club, or when I'm just hanging out with friends, then it's just whatever.

In engineering environments, Solomon was most aware of his gender identity. In his other non-engineering STEM club, he presented more masculinely than he did in queer contexts but was more comfortable compared to engineering environments. For example, he would “pitch [his voice] down” or “try to flatten [his] affect” on occasion when in STEM contexts. However, when he was with his trans club or with queer peers, he felt he could present himself freely. When reflecting on what makes non-engineering or non-STEM spaces more comforting, he shared, “just knowing that there are other people that are like me and are guaranteed to be on my side is really nice.” He knew people who shared his identity or were in the same community would “have [his] back or understand where [he’s] coming from,” especially if “anything were to occur.” Versus in the engineering and STEM spaces he was in, he was hyper aware of being the only trans student. Solomon described,

There's this kind of stress that comes with me being the only one there and that I feel like I have to be doing a good name by other transgender people. And so even if something were to happen, I feel like I can't bat for myself as much, because I'm also, like, I can't be, you know, the angry trans activist stereotype. If I'm the only trans person there, and people perceive me as being the angry one. And so, I have to dial back my behavior then like, I don't, like, who's actually challenging the transphobic ideas?

Being the only trans student he was aware of in engineering and STEM spaces, Solomon did not feel he had peers who would be able to back him up if a transphobic incident were to occur. Additionally, he did not feel like he was able to tackle problematic comments on gender, pronouns, or anything else that arose because he felt pressure to represent the trans community and did not want to come across as the “angry trans activist stereotype” and thus be dismissed or viewed as “unreasonable” by others. For example, he would have felt more comfortable “calling people out” or shutting down the guest lecture when

the topic changed to trans people in athletics if he had support or was not concerned about being labeled as a stereotype. He also was aware of an “implicit assumption” that he thought many people had in his field that “trans people don’t understand science,” to which he countered, “I’m literally proof that that’s not true.” Whether directly addressing stereotypes or being aware of their existence, the stereotypes and negative perceptions weighed on Solomon.

When considering instructors specifically, Solomon also felt an added stressor of them holding power over their academics and career. As he explained,

And these are all the people that I have to work with, and work with on a daily basis, and who are going to be writing my recommendations, and referring me for jobs. And so, in a lot of ways, even if they don't feel that I'm someone they can connect to, or relate to, or hang out with, I still am relying on them having at least a positive intellectual impression of me. That means that I'm kind of limited in how much I'm able to defend myself in those kind of environments. And so, I don't feel as comfortable there.

Thus, Solomon had an added concern to not being perceived well in the sense that it could affect which instructors were willing to write a recommendation or assist with job referrals.

Solomon also witnessed microaggressions from engineering faculty members, but the microaggressions were sexist and targeted towards women. Since he identified as a transman during college, he felt the sexism “[didn’t] directly affect [him] anymore.” Solomon struggled to recall specific incidents as there were many small occurrences that built up, but also because there was a general ignorant climate of engineering perceptions towards women and TGNC people, or anyone who did not subscribe to traditional gender identities, expressions, and norms. He said, “It's hard to point to specific things because it's more like it was just the water that we were swimming in.”

There also was not much gender, sexuality, and racial diversity in their department. Solomon described it as “monocultural” while other engineering departments had slightly more diversity. In another engineering department, he felt he “had more of a connection and positive relationship with [his] professors,” which were not present in his program. Due to the consolidation of different engineering departments at his school, engineering students had opportunities to take classes within different or overlapping departments.

While other engineering departments had slightly more diversity than his major, Solomon was amused when reflecting on the vast gender discrepancy when comparing his engineering major to his former STEM major. “Wow. I—yeah, I think before I switched over all my professors were women.” There was also “a decent mix of people” in their former program which created a warmer, more inviting climate than his engineering major. “I feel like I stuck out a lot less,” Solomon shared.

Additionally, during his transition, Solomon encountered some “medical issues.” He stated,

Some trans people, especially, particularly for me, my transition has included a lot of medical issues, which I found difficult to explain a lot of the times to cisgender professors, or at least communicate to, like, “Oh, yeah, I’m out for elective surgery. Don’t ask me about it.”

Solomon needed to talk with his instructors about missing class but did not want to go into detail about why he would be absent. While he did not want to have to educate his instructors, he also did not want his instructors to think he was not dedicated to class or his major because he had to miss class:

And it's just been, it's a weird experience. It can almost come across sometimes, like you're not as committed, I guess, or people don't expect you to like, be in engineering if you have other sorts of things going on with your life. And they

don't structure the curriculum such that it's very accommodating to you if you're spending an hour of— plus a day on the phone with your insurance companies. So, if you're talking about systemic, I—, there wasn't ever anything in writing that was like, the people can't make excuses for x, y, or z if they're under, if they're just getting trans surgeries. But there is that kind of judgments. And also, it's really hard to be constantly trying to navigate. I don't know, like seven, eight classes with mountains of work, and it's a lot.

Having to navigate the health care system and medical issues was stressful enough but having to communicate to his instructors who may pass judgment on his identity or engineering ability while also carrying a heavy course load was overwhelming for Solomon. Since he transferred into his major and did not have an established support system to lean on in the program, he struggled to catch up as easily on classes. Solomon stated,

It's easy to fall behind. There isn't a lot of supports. So, one thing that I encountered was a lot of people would assume, "Oh, you can rely on your friends in classes for notes." And I mean, as we previously established, I wasn't really connected with my classmates, in part because I was trans. And so sometimes I would send out mass, you know, just texts or emails to people in my department, like, "Hey, if you have notes for this class, that would be great." And I wouldn't get a response. So, it's like, "Okay, I guess I don't have notes for this class that I'm missing three weeks of and I don't really have a way around that."

Thus, Solomon had a lack of support from instructors and classmates, feeling isolated both for his trans identity and transferring into the program later than others. His instructors were not accommodating and did not understand why it was “harder for [him] to maybe make all of those accommodations [himself].” In addition to being trans, Solomon also had a bleeding disorder, which had been associated with many of the medical issues he encountered during his transition. He shared,

And, just in general, managing my case has been a little bit weird. I had reactions to hormones when I first got on them and all this kind of stuff. So, those two kind of tie in together. I would—. I'm also not super open about this, but I am autistic. And that does mean that I sometimes get more socially drained than the average person. So, there's also an aspect of, I understand that this, like, I do need to



advocate for myself, and I really do try to, but also, it wears on me a little bit more than I think people would expect it to and there can be some kind of difficulty to empathize with that sometimes.

Given Solomon's intersecting identities, he had a more difficult time than most of his peers having to advocate for himself. Since he did not want to provide detailed explanations to his instructors and did not feel they would be supportive, he had to take on more of the burden, which was exhausting.

When working in industry, Solomon found the company staff to be more accommodating than his experiences with faculty in academic contexts. He shared,

I remember having really weird experiences when I was in industry because I expected there to be more judgment, but mostly, they just want you to tell them exactly what you want. As long as you tell them that they're fine. Which I was a little bit shocked by.

Having had difficult experiences getting accommodations with his professors and courses, he was surprised when he could more easily get accommodations at work and could directly state his needs.

During his program, Solomon completed an internship at a different university that introduced him to the specific branch of engineering he'd later pursue in graduate school. The program also operated through a diversity center and most all participants had a background in campus leadership and were in a STEM field. There, he met other transgender engineers for the first time. "I was amazed...They do exist somewhere!" he exclaimed. Additionally, the people he reported to were aware of his identity and "were fine with it." While he still encountered similar issues with the university when it came to housing, for example, it was a "pretty positive experience" due to the people they worked with and the work itself.

## **“Decompressing with Trans Folx”: Celebrating Community While Challenging Stereotypes**

After encountering a college career’s worth of challenges with a hostile climate towards TGNC people in his major and policies that were exclusionary in practice, Solomon participated in a meaningful event during his senior year. He described,

So, I mean, most colleges that have any kind of trans presence usually celebrate Trans Day of Remembrance in some capacity. But the past couple of years that my college had done it, it had just been super depressing. Yeah. And that particular year, they'd also decided to hold a march for trans rights earlier in the day. And so, I was like, “Well, everyone's gonna be exhausted.” And it's been really depressing the past few years, and they've been, you know, Trump administration introducing a lot of transphobic policies. And so, it's like, “Well, I mean, we still want to honor people's lives. But then, also, I don't want everybody to leave here just incredibly depressed for the next week before Thanksgiving.” So instead, we organized a [parade]. And it ended up going really well. So, we had kind of a beginning presentation. They, you know, delved into some of the biographies of people who had passed in the past year, and then had a [parade] celebration instead. And it was meaningful for me because I felt like I was able to connect with a lot of people through it. But also I felt like, I don't know, it was more strength giving than anything else. And that wasn't something that I'd experienced in a really long time.

Joining together as a community to celebrate trans lives in a way that celebrated the strength and joys of the trans community was a welcomed event after difficult times on campus and in society.

During his senior year, Solomon also developed meaningful relationships with faculty members outside of engineering who helped the trans activist group operate after previous staff left. The faculty worked through the diversity center at the university and helped the organization function during a staff turnover. Throughout his undergraduate career, Solomon only became close with one faculty member in a different department, and a postdoc student. Thus, most of his close connections were outside of engineering.

However, while he received support with his trans student organization and some faculty members, he still encountered incidents that made him aware of the “angry trans stereotype.” While at a town hall meeting, Solomon raised questions to the person leading the meeting on general health on campus. He asked the speaker questions in a professional manner, perhaps some were a “little snarky,” but nothing “crazy.” The following day, Solomon received an urgent call that he needed to report for an interview with the main diversity center on campus. He met with the primary staff members who oversaw the student organizations and requested an interview about the town hall meeting the night before. He described,

Because, director called apparently an emergency meeting that morning. Invited the director for our diversity division, and then a bunch of other people to complain about how me and this other trans student who was there, were just obnoxious. And, personally talking to him and how hurt he was and how he doesn't even know why they fund our department if that's the way the students act and all this kind of stuff. And they wanted to hold a follow up meeting on how to proceed, but then me and the other student weren't invited to it. So, to get our perspectives, the overseers wanted to interview us so they can actually quote us during the meeting that was about us, that we weren't invited to.

Solomon shared the questions he asked with the interviewers who were surprised it was not anything provoking. The interviewers responded with, “That’s it?” They then asked what the other trans student asked and Solomon explained he was just there with him.

Given the outrage from the speaker and the emergency response from the diversity center, he felt he and his trans peer were being perceived as troublemakers. He shared,

I think they started reading it as being "antagonistic" in big quotation marks, because about halfway through our conversation, the director started misgendering my boss, and I interjected and was like, "Oh, they use they pronouns." And they just seemed a little bit shocked about it. And we kept on but I'm like, “Was the fact that I asked someone to correct my boss's pronouns, like, did that, did that really—? I hope not, but I really don't know.”

After asking questions to a speaker and correcting the diversity director's incorrect use of someone's pronouns, Solomon was concerned he was being viewed as "antagonistic." Additionally, they interviewed him and then failed to include him in subsequent conversations about what happened. While this incident occurred outside of an engineering context, he said he had similar concerns with engineering professors, where if he "[corrected] something minor like that and you [could] see people just kind of like, recoil or like, I'm being mean or something. It's like, 'No, I'm just explaining to you people's pronouns.'" Solomon stated,

Yeah, people are frustrating. Yeah, so that's, that's why, that's probably the biggest kind of stereotype is that trans people are over reactive and making a big deal out of nothing. And they're here to terrorize language and the concept of sex. That's just, ugh, I'm so tired.

When such events would happen, Solomon found solace in "decompressing with other trans folx" and commiserating with comments such as, "Do you believe what these people think?" He found comfort in his community, though he acknowledged he did not have access to them all the time. So, when he was in a position where he needed to comfort himself, he enjoyed singing to "process a lot of [his] emotions" whether by himself or with a community choir, which felt like a safe queer space.

While his experiences in his engineering program were "draining," Solomon's passion for his field made the program "life giving." He enjoyed his interests and the content he learned, but "it [was] really the environment that [could] be draining," which continued into graduate school.

### **"Little Anxious There": Seeking Acceptance in Industry**

While in graduate school, Solomon worked for a contractor and was intimidated to be working in that office. Interns could pick specific city and state locations, so he

requested a location that tended to be perceived as more accepting of LGBTQ+ identities.

Solomon said,

I suspected that maybe that would be a better environment. And it turned out to mostly be the case. Like, it was one of those things where I was really anxious going into it because of my perceptions of, like, “Okay, these are people who are interested in national interests in the country. National interests are generally against transgender people.” So little, little anxious there.

Solomon took several steps to try and work in a welcoming space that was open to TGNC identities. He ended up having a nice roommate and everyone he worked with was queer except for one person, which helped him feel more comfortable as well. Several of his co-workers worked with the contractor before and they later disclosed they were anxious about meeting him out of concern someone less open-minded would join the team. He shared,

They didn't know anything about me going in. So, it's kind of like a, like obviously, I can only speak about my experience, but I think it is pretty common to have that kind of anxiety. They're, you never know quite what you're going to get. And I ended up being pretty lucky. It's, it was pretty obvious that that wasn't the opinion of most people in the company necessarily. There—. I was there during pride month. And so, the company was sending out, you know, ethics training promotional videos around LGBT topics. Which were of dubious quality, but they were trying. And they had a whole [communication software] channel dedicated to like, so people could discuss their opinions on the videos. And there were a lot of people who have some pretty sketchy opinions about trans people. Just, out there. And, you know, people who monitor those messages wouldn't remove them and all that kind of stuff. So, it seems like, at least among the intern cohort, most people were pretty supportive. And it was more older company members, where it was kind of hit or miss. I kind of had to feel out what was considered professionally appropriate. It's like, I have a lot of blouses and stuff that I like wearing but I'm like, “Maybe I should wait a hot sec.” And so, I know this specific older adults that I'm working with. And eventually it was like, “Okay, no, this is fine. I'll be fine.” But yeah, it was a different environment.

Solomon perceived a common anxiety with his coworkers being anxious about someone “closed minded” joining their team. While the interns felt comfortable with one another, they still were hesitant and concerned about perceptions and actions towards TGNC

individuals in the broader company. Thus, Solomon felt he had to monitor his gender expression, such as his outfits, when around older members of the company. One way he did this was “adjusting small things at a time or asking kind of small inconsequential questions that may kind of get an idea of where [his] supervisor’s politics lie.” As Solomon described,

Like, okay, I won't wear a blouse, but maybe I'll wear something that's got a lot of pink on it and see if I just get any weird looks. And then I don't get any weird looks. So, I'm like, "Okay, that's cool. Maybe I'll wear some cute shoes." And just kind of scale it up. Or, I don't know. I'm trying to think. I could mention that "Oh, yeah, you know, I'll probably be up in [city in internship state] for the weekend. There's a lot of celebrations, including, you know, pride.... I wonder what your opinions on that are?"

After sneaking in comments in conversation to assess how his supervisor or coworkers would react, Solomon was better able to determine if others would receive his identity and gender expression well. He acknowledged a “divide between how gender identity is accepted in academic settings versus in industry settings” and thus he was not surprised by needing to take the additional steps to determine his colleagues’ views.

Solomon also acknowledged his particular field may have more rigid perspectives about gender diversity since, compared to other engineering fields, his field was especially dominated by White men. He shared,

A lot of this, no joke, I know—, probably half the women I know who are also in my field have been advised at some point, like, "Oh, why don't you just do astronomy or neuro or something? Not because you're not good. But because there will be other women there. And you will not find other women in this field." And they're like, "Well, I want to work on the [specialty field]. So, I guess I'll just be here." It's, yeah. It's specifically my field. I know, engineering in general, you know, kind of a mixed bag. But my choices of discipline definitely did not do me any favors.

Solomon experienced the lack of inclusion in his own field and learned of microaggressions his women peers endured about fitting into their desired field.

## **“Trying to Feel Comfortable Myself”: Reflections on Identities and Presentation**

When reflecting on his sexual orientation and gender identity, Solomon discussed how he presented in different contexts. He said,

Specifically in the presentation aspect, I'm, at this point, I've transitioned enough. I'm a guy in all situations, regardless. But I do adjust how effeminate or obviously gay, I guess. So, I'll, sometimes without realizing it, I'll code-switch how I'm talking. That's probably the most obvious one. But also then I'll adjust what kind of clothes I wear. Or kind of how touchy I am. Cause there, you know, there are different cultures around how touchy you are with other men or whatever. So, it does depend on the context.

When in a space where many people held conservative or traditional views towards gender identities, such as engineering curricular contexts and industry, Solomon adjusted his mannerisms, speech, and dress. In comparison, he felt most free to be himself with queer friends such as their housemates or their peers in the gay men's chorus in his community. “I can show up looking like whatever. Nobody cares. It's great,” Solomon said.

When in spaces where there was mixed support of TGNC and queer identities, Solomon felt relatively comfortable, and sometimes went ahead and spoke and dressed how he wanted. He may still have had some “awkward” moments with people in his lab, for example, but since there were many people who were supportive of his identity, he did not have as many reservations about presenting his gender how he wanted.

However, despite feeling relatively comfortable in his lab and similar spaces, parts of his identity were still absent in those spaces, such as his sexual orientation. As he shared,

It's this kind of weird dynamic that I encounter a lot where my being a trans man, like, someone who has transitioned to being man is less valid somehow if I'm also gay. I don't know why that, like, I've experienced that even with my own family, but it, definitely encounter that a lot with other people. And so, when I'm trying to

get myself more seen in a masculine sense or I see that, I feel like it's going to be difficult with a particular set of people I tend to play down the more gay aspects of my personality.

While Solomon identifies as a man, his identity as a gay man was less valued and respected in certain spaces, such as engineering contexts. Thus, he felt pressured to adjust his presentation around people who valued heteronormative masculinity. When he was around queer peers, he did not feel the need to adjust his mannerisms or dress, but when around cisgender men, he felt ostracized. Solomon described,

It's really hard for me to integrate with groups of cis men. I mean, gay cis men as well, but mainly straight cis men. And part of that, I mean, part of that's the difficulty that I had integrating in my department at my undergrad. I had a similar problem with my program that I transferred from where, you know, I often find that people pay lip service to the fact that I'm a man. They'll use my pronouns, they'll use my chosen name, and stuff like that. But they'll address me differently than the other men in the room. If I'm walking in, their vocal pitches will change. If they're having guy's night, I will conspicuously be the only man not invited. Even if they don't like some of the other people they invited, and I know that for a fact, because I'm on my gossip. It's like, there are just kind of little things all the time where it's like, "Okay, they don't really see me as one of them." And it's not even necessarily, like, I want to be seen as exactly like them, but my gender is not different from theirs. And so, it's weird that I'm being excluded on that front. So, I would say, it does make it very difficult for me to form a close relationship with cisgender men. I have my partner and I think that's probably the only serious cisgender male relationship I have in my life. Yeah. One of the, I mean, there are some positives to being trans. And I think one of them is that it does give me, as a man, still some insight into sexism. It obviously, it didn't impact me in the same way it does cis women. But I still have some experiences with it growing up. And I like that it allows me to empathize with them in that way. It kind of adds a different dimension to my friendship with them, which I appreciate. Helps me support them. So yeah, it, my gender does definitely impact my relationships with different group of people. Not always in a negative way. But it is different.

Being in a program with mostly cisgender men, it was difficult for Solomon to feel integrated and connected with others in his department. While people would use his pronouns and name, they would exclude him from groups or events where other men were included, despite them all identifying as the same gender. Having been socialized as



a woman growing up, he had a different perspective into sexism and gender dynamics from his cisgender peers, but he still only felt a close relationship with one cisgender man, his partner.

One of Solomon's friends directly addressed the other students who were isolating him, and the men acknowledged they were doing so and still failed to change their behavior. Solomon shared,

I think that's probably the most stressful part about it, though, is because a lot of times, I feel like I don't have the ability to say anything myself, because I'm the only one in those spaces. And I'm already doing so much to make sure that I'm not making people feel too uncomfortable. And like... Yeah, I'm trying to feel comfortable myself, so it's like, "Okay, well, I could bring this up, and then make things awkward for everybody and wear myself out with something that they won't really accommodate anyway, or I could just find better friends."

When he was the only person in those contexts, he did not feel comfortable voicing his concerns. Therefore, Solomon had to take on the additional burden of deciding whether to address the situation when he already tried to do what he could to feel comfortable in a tense and unwelcoming space.

### **“When People Do the Pronouns Thing”: Disclosing Gender Identity**

Solomon received various types of responses when disclosing their gender identity. When working with their professor after transferring graduate programs, he shared he was transgender. He said,

And she was, you know, maybe a little bit surprised, but broadly supportive of it. And she went on this whole diatribe, kind of long, winding anecdote, I guess, the conclusion of which was that, you know, she has left wing politics. So, like, "Okay, thanks for that..." She's been active, like, obviously, she won't out me to people in my lab. But she's been doing a lot to kind of smooth things over with me coming in and trying to make me feel welcome, which I really appreciate

Solomon felt the professor's comments were a bit strained, but was appreciative that it was a relatively positive, accepting response. Additionally, she followed through with

actions that helped him feel welcomed in his new program, which was a stark contrast to his experience in their previous graduate program. Solomon shared a prior experience in his first graduate program where he accidentally sparked a conversation about pronouns while in class. He described,

At my previous graduate institution, I had my pronouns in my Zoom name... and at the beginning of class, I forgot to mute myself. And so, you know, my thing popped up on screen and people saw my name and whatever. And somebody in the class just went on a whole rant about how it's so annoying when people put their pronouns and stuff and how it's so useless and how transgender people don't even exist. All this kind of stuff. So I, to counter that point, I came out and I was like, "No, I'm transgender. I actually really appreciate it when people do the pronouns thing. Just FYI."

The student “apologized in kind of a non-apology way,” which Solomon acknowledged, but then ended the conversation after the student kept trying to message him. Others in the class meeting were silent, “letting it happen,” thus he felt the need to address the comments. He was also left unsure as to whether others agreed with the student making the comments or if they were too nervous to say anything. Regardless, he described the encounter as “stressful” and something he did not ever want to deal with, let alone in an early morning class.

### **“Can You Do Anything Else for Me?”: Navigating Harassment**

Solomon encountered multiple instances of micro and macroaggressions at his first graduate institution, but the worst of his experiences was with a classmate who stalked and harassed him. Due to privacy concerns, Solomon shared minimal details of the harassment, sharing more information about the need for accommodations and supports. The institutional structures in place were confounding and did not provide Solomon with the support he needed. There were several organizational layers including Title IX and identity-based harassment programs, which he described as “evil genius”

because there were four different programs that “on paper” were there to help with harassment cases. However, the primary and well-resourced “harassment organization [had] very prohibitively strict definitions of what [constituted] harassment.” Since the definition of harassment was restrictive, it was difficult to receive full support from the organization “even if you have like a decently serious and, like, obvious and verifiable case of harassment.”

He eventually was referred to a lower-level organization who offered a “mediated conversation” between Solomon and his harasser, where the organization would remain “neutral” and not “take sides.” He shared,

And I’m like, “That’s—. You agree that transphobia took place here?” And they’re like, “Yes.” And like, “And you want to remain neutral in this conversation?” “Yes.” “And you want me to sit down with someone who has been harassing me? In the same room?” They’re like, “Yes.” Like, “Can you do anything else for me?” “No.”

The services the organization offered were not acceptable or appropriate to Solomon. He was also frustrated that the university acknowledged the severity to the point “that it would qualify [him] on the basis of identity-based harassment of, like, Title IX,” however, he did not want to deal with Title IX as it had a problematic legal history when being applied to TGNC students. While the institution acknowledged the severity criteria, there were constraints such as “it hadn’t occurred for a long enough period to be considered persistent,” thus they were limited in what they could do to help. Solomon exclaimed, “Okay, well, I’m trying to not be actively harassed for longer than I have to be. So could you maybe help me out?” With no help from organizations, Solomon had to try and work out accommodations with his instructors to avoid his harasser who was one of his classmates. He shared,

The results of not having that support from the institution meant that I had to reorganize my life in order to prevent the harassment myself, which is a really labor intensive thing to do, and obnoxious, and people shouldn't have to do that. Examples of that are I would individually tell my professors what was going on.... So, I'd ask them to turn off private messaging in class. There isn't a way to block people over [software communication system], which is what a lot of my classes were using for collaborations. So, I just didn't have access to classroom collaboration... And there also isn't a block on university email. So, what I ended up having to do is contact the IT department and individually work with just, kind of like, you know.

Solomon thus had to take on the additional burden of figuring out how to avoid his harasser classmate, on top of navigating the stress of being a graduate student, feeling “disconnected from [his] cohort,” and having a harasser in the first place. Additionally, compared to his undergraduate institution, his first graduate institution was located in an unwelcoming town. Solomon said,

Cause it was [undergraduate university city]. If I walked around in a skirt, which I did sometimes anyway. But if I did that in [state of previous graduate institution], I would be stared at in restaurants and on the streets and bus drivers and what have you.

After feeling uncomfortable in and outside of their graduation program, trying to work alongside his harasser, and continuing to not receive support from the university, Solomon decided to transfer to another institution, entering an autonomous, complicated, inaccessible, and non-standardized process for transferring institutions as a graduate student.

### **“Still Feeling It Out”: Fresh Start in A New Graduate Program**

Fortunately, Solomon connected with his new graduate advisor and explained the situation he was trying to leave at his first graduate institution. She advocated for him to transfer into his current program and remained a support for him. This was particularly helpful as the transfer and fellowship, or grant, applications were tricky to navigate as he

did not want to include detailed accounts of exactly why he was transferring and wanted to ensure the prospective programs that his transfer was not due to academics or research ability.

As he transitioned into his new program after experiencing trauma from his harasser at his former graduate institution, he felt unnerved. Solomon said,

Yeah, at my current institution, it's, I don't know, I'm kind of, I guess I'm still feeling it out. I think I'm being a little bit more anxious about it than I maybe need to be. But I just had such a negative experience at my previous institution that I, it's been a little bit hard for me to recover from that, I guess.

Having encountered discrimination from peers in his previous program, he had a newfound anxiety of whether he could trust his classmates. He shared,

It gets to me too, because it's one of those things of, like, it's always, at least in academic settings, it's always my classmates. And I would assume in, especially in other environments its usually people my age who are, you know, generally my allies in these kinds of situations, but in academic settings, for whatever reason, it's reversed. And it's really stressful because those are the people that I rely on for social support, usually.

Thus, starting at a new institution, he was more anxious to open up and rely on classmates, people he would have thought he could rely on as some form of support. Additionally, most all of his classmates were cisgender men, so he encountered several layers of isolation and challenges in connecting with peers. As he considers his future career, Solomon carries the anxiety and uncertainty about how open others will be towards him as well.

### **“Build a Community Outside of Engineering”: Persisting through Challenges**

Solomon described himself as “a pretty effective worker” as he navigated different responsibilities and challenges throughout his engineering programs. From leadership responsibilities to his medical challenges, to negotiating his identity in various

environments while being a student in a rigorous program, he became “used to juggling a lot in not enough time.” While he experienced several points of isolation when transferring into engineering as an undergraduate major and transferring graduate schools, he built skills as an independent worker, which helped him when he encountered professors that did not have an effective teaching style.

While he would sometimes feel “down on the fact that, [he]...felt kind of disconnected from [his] classmates,” it helped him to observe and remember that not everyone stayed in engineering, especially after the first year. He said,

But in retrospect, it's one of those, like, "Well, I'm not connecting with these people." But none of them ended up staying in engineering anyway. And the kind of self-reliance that that teaches you is actually helpful for you to keep moving through engineering. So, I don't know. It would be nice if you could find connection with the maybe ten or 15 people out of your class of however many that are going to actually stick it in engineering to the end like you are. But, statistically speaking, most other people aren't going to find those people either. And, you know, by the time you do actually have your final pot of people, you'll have maybe a few semesters with them. And so, if you're not fully integrated with them at that point, it's not a huge deal.

Solomon understood the importance of connecting with peers in one’s program but acknowledged that students do not need to overly stress about finding permanent connections with classmates as not all of them will always be there and it can be helpful to develop independent skills as well. However, it was important for Solomon to find a community, even if it was outside of engineering. Solomon shared,

I try to build a community for myself outside of engineering. I mean, in general, I think that's a healthy thing to do. But in my situation, in particular, I'm not going to find out the trans people in my departments. And I do need that, personally. Yeah. So, I mean, when I was in my undergraduate career, I had, you know, my activities that I did, and they had connections in the community group in [undergraduate university city] and my friends in different departments. And so, I had a pretty large support network outside of engineering. And sometimes those connections are a little bit easier to make. Maybe, because it's sometimes easier to find people that you have things in common with, so that way if you're doing

connecting through hobbies and stuff, definitely so. And I still do that. My housemates are queer, here in [current graduate school city], so, and then they have their own connections to the queer community, and I'm in queer choir here. And so, for me, that's been really important, is having this kind of touchstone outside of engineering to remind myself that there are things in life and also, other trans and queer people do exist, just not in your day job.

Being in a major that has next to no TGNC representation, Solomon found it helpful to have a community and support system outside of engineering. Through his connections in his leadership roles and involvement with university and community organizations, Solomon established a support network that helped him persevere when he encountered challenging situations. He added, "I would encourage that over settling for mediocre or bigoted people in your department, honestly." While some people may feel they are limited to connect with peers only in their program, Solomon encouraged, "You really don't have to do that."

### **Summary**

In this chapter, I presented five narratives about TGNC students' lived experiences in engineering. Each story detailed the challenges of negotiating underrepresented gender identities and navigating oppression in engineering curricular, co-curricular, and community contexts. Additionally, the narratives highlighted the strengths and coping strategies students used when persisting through their engineering program.

In Chapter 5, I present each of the cross themes as well as a discussion of the findings. Within the discussion, I elaborate on themes that were interwoven across participant narratives, illustrating similarities, diversity, and complexity in TGNC engineering students' lived experiences. Additionally, I situate the findings in my theoretical frameworks and existing research that I reviewed in Chapter 2.

## CHAPTER 5: FINDINGS

In this chapter, I discuss the joint findings from Jake, Mickey, Pan, Rain, and Solomon's narratives. I organized the findings into four categories: university climate, engineering climate, identity negotiation, and strengths. Table 2 shows a summary of findings that emerged across all narratives. In the university climate section, I review the TGNC oppression participants experienced in their campus communities and through institutional policies and practices. I also highlight the ways participants built LGBTQ+ and TGNC community through formal involvement in campus student organizations, leadership, and activism as well as the ways they were able to explore their identities within these supportive communities. All participants found more welcoming and inclusive environments and communities in non-engineering contexts compared to engineering contexts, which I review at the end of the first section.

Second, I describe the engineering climate through participant voices, including the ways engineering programs impacted students' mental health due to a rigorous curriculum and oppressive environment compared to other majors. The underrepresentation of racial, ethnic, and gender identities as well as gender dynamics also influenced participants' experiences with the engineering climate. Additionally, participants detailed the impersonal depoliticization (Cech, 2013) characteristic of the engineering climate, which led to surface level relationships with engineering faculty, staff, and students. In contrast, participants developed more meaningful relationships with LGBTQ+ and TGNC peers outside of engineering contexts.



**Table 2**

*Emergent Themes Across Narratives*

<p>University Climate</p> <ul style="list-style-type: none"> <li>• TGNC Oppression             <ul style="list-style-type: none"> <li>○ Campus Community</li> <li>○ Institutional Policies &amp; Practices</li> </ul> </li> <li>• Building LGBTQ+ &amp; TGNC Community             <ul style="list-style-type: none"> <li>○ Student Organizations, Leadership, &amp; Activism</li> <li>○ Identity Exploration</li> </ul> </li> <li>• Non-Engineering Environments</li> </ul>	<p>Identity Negotiation</p> <ul style="list-style-type: none"> <li>• Curricular Context             <ul style="list-style-type: none"> <li>○ Erasure</li> <li>○ Mental Burden                 <ul style="list-style-type: none"> <li>▪ Navigating Stereotypes</li> <li>▪ Gauging Reactions</li> <li>▪ Adjusting Identity</li> <li>▪ Educating Others</li> </ul> </li> <li>○ Isolation</li> <li>○ Support                 <ul style="list-style-type: none"> <li>▪ Active Allyship</li> <li>▪ Inclusive Actions</li> </ul> </li> </ul> </li> <li>• Co-Curricular Context             <ul style="list-style-type: none"> <li>○ Degrees of Comfort</li> <li>○ Support                 <ul style="list-style-type: none"> <li>▪ Queer &amp; TGNC Camaraderie</li> <li>▪ Validation</li> <li>▪ Paying It Forward</li> </ul> </li> </ul> </li> <li>• Community Context             <ul style="list-style-type: none"> <li>○ Anxious Anticipation</li> <li>○ Assessing Work Environment</li> </ul> </li> </ul>
<p>Engineering Climate</p> <ul style="list-style-type: none"> <li>• Mental Health</li> <li>• Underrepresentation</li> <li>• Gender Dynamics</li> <li>• Impersonal Depoliticization</li> </ul>	<p>Strengths</p> <ul style="list-style-type: none"> <li>• Self-Preservation</li> <li>• Compassion</li> <li>• Building Community Support             <ul style="list-style-type: none"> <li>○ Decompression</li> <li>○ Identity Validation</li> </ul> </li> </ul>

Third, I detail participants’ experiences negotiating their identities in engineering curricular, co-curricular, and community contexts in line with Hurtado et al.’s (2012) multi-contextual model for diverse learning environments (DLE). Specifically, in curricular contexts, I discuss the ways participants encountered identity erasure, mental burdens navigating stereotypes, gauging peoples’ reactions, adjusting their identity

accordingly, and the added task of educating others about their identity and experiences. Participants also experienced isolation and identified ways they found support in curricular contexts, looking for active allies or those who used inclusive practices in their interactions with TGNC students. I use the term active allies in reference to individuals whom participants described as being an ally through active inquiry and engagement in supportive skills and actions, not people who merely used ally as an identity label. In co-curricular contexts, participants discussed the degrees of comfort they felt depending on the people they were with in specific environments, comparing engineering contexts with non-engineering contexts. Participants were also able to find support in co-curricular contexts by forming a camaraderie with students, faculty, and staff who also had underrepresented identities, developing support systems with people who validated their identities. Some participants served as supports for future generations of engineering students, especially those who shared underrepresented identities, through outreach initiatives. While participants encountered similar experiences in community contexts as curricular and co-curricular contexts, they experienced a specific type of anxious anticipation about their work environment and colleagues compared to their classroom and co-curriculars. Additionally, they had to adopt different methods of assessing their work environment to determine if the employer and employees were accepting of TGNC and people with any underrepresented identities.

Lastly, I present the strengths participants shared in their narratives, with common themes of self-preservation, compassion, and building community support with individuals with whom they could decompress and receive identity validation. Throughout the chapter, I incorporate concepts and data from previous literature to

contextualize the findings from this study, while also grounding the discussion in my three frameworks: CTP (Spade, 2015), the DLE model (Hurtado et al., 2012), and the I-MMIDI (Jones & Abes, 2013).

### **University Climate**

Being involved on campus was a central part of most participants' experiences at their university. Jake, Mickey, Pan, Rain, and Solomon built community with TGNC peers through participation in formal student organizations, as well as through friendships and relationships; this served as a support system when they encountered TGNC oppression. Many also found comfort in non-engineering curricular and co-curricular environments on campus such as in art departments and diversity centers. In the following subsections, I discuss the experiences participants had with TGNC oppression, building LGBTQ+ and TGNC community, and non-engineering environments on campus.

### **TGNC Oppression**

While there were few university level incidents of transphobia, such as the anti-TGNC graffiti at Rain's institutions, participants experienced various levels of oppression. Pan and Solomon were particularly attuned to administrative violence (Spade, 2015) and TGNC oppression due to their leadership positions in student organizations, however, all participants were able to assess the campus climate based on their own interactions and experiences within the institutional context (Hurtado et al., 2012). Whether they witnessed transphobic comments and actions on campus or personally attempted to navigate ineffective policies and practices, every participant

experienced TGNC oppression while a student at their undergraduate and graduate institutions.

### *Campus Community*

When first visiting their respective universities, most participants described their campus as welcoming. However, once they matriculated into their programs and settled into campus, they were privy to campus dynamics and TGNC oppression. Solomon, for example, who began a physical transition just before college, was met with strange looks and glances by individuals who “couldn’t quite tell” his gender identity, and thus not perceiving him as passing as a man at the time (Catalano, 2015b; Nicolazzo, 2016a). While others’ confusion was uncomfortable and harmful for him during his transition, he also acknowledged his privilege in identifying as a transman as people who identify and present as nonbinary likely navigate the confusion of others daily. Previous research supports this claim, suggesting the gender binary creates added challenges for gender nonconforming and nonbinary people, putting them at a heightened risk of discrimination compared to individuals who can pass as a man or woman (Fiani & Han, 2019; Miller & Grollman, 2015; Nicolazzo, 2016a, 2017c). Observations comparing transgender and nonbinary people’s experiences with passing are not meant to amplify a false gender binary, but to acknowledge how TGNC people experience oppression differently. Systems of oppression encourage individuals to compare experiences with gender perceptions and passing and engage in discourse that erases TGNC people and centers cisnormativity (Bradford & Syed, 2019; Johnson, 2016; Spade, 2015). Individuals with multiple marginalized identities must navigate several systems of oppression, which also influences their diverse experiences (Jones & Abes, 2013). Thus, engaging in a

monolithic discussion of identity and experiences is an anti-liberatory effort that upholds TGNC oppression (Spade, 2015).

Both Solomon and Pan received offensive comments, insensitive questions, and confused stares. Solomon attributed some discomfort from other people to be more homophobic than transphobic, such as when students called him a f\*g while on campus. At his first graduate institution, Solomon perceived the institutional context and larger community outside of the institution (Hurtado et al., 2012) to be oppressive towards TGNC and queer students, causing him to feel uncomfortable on and off campus. After experiencing a hostile department, campus, and town, Solomon felt relief when transferring to another city and institution. Thus, Solomon and Pan had to navigate cisnormative perspectives on campus which placed TGNC identities in a deviant category, resulting in glares and discriminatory comments (Johnson, 2016).

Mickey and other participants shared that TGNC inclusivity depended on with whom they were interacting, attributing the oppressive perspectives towards TGNC individuals to the region of the country they attended college, or the sociohistorical context (Hurtado et al., 2012). Mickey, for instance, believed they were in a part of the country that was less welcoming and open during their undergraduate program. Solomon also commented on the campus population divide between “rich conservative” students and students who were from “minority or poor backgrounds,” which led to siloed groups on campus where the “rich conservative” students seemed to be less accepting of LGBTQ+ and TGNC people. Thus, the “rich conservative” students upheld norms and perspectives that benefited themselves and disadvantaged TGNC students, especially students like Jake and Mickey who faced multiple intersecting systems of oppression due

to their race, ethnicity, gender, and sexual orientation (Box, 2020; Jones & Abes, 2013). From a CTP perspective, the dominant culture on campus served to emphasize the oppression of TGNC and all marginalized students (Spade, 2015), while adding to oppressive historical, organizational, compositional, psychological, and behavioral dimensions within the DLE model (Hurtado et al., 2012).

Participants assessed oppression towards TGNC and other marginalized communities on campus by observing actions, inactions, and comments from administrators, faculty, staff, and students who held anti-TGNC perspectives. Rain, for example, felt their campus was rather apathetic towards TGNC students, while Jake grappled with the realization that “not everybody is gonna think well of [them],” which required them to be cognizant of microaggressions towards them in the psychological and behavioral dimensions of the climate for diversity (Hurtado et al., 2012; Nadal et al., 2021; Seelman et al., 2017a; Vaccaro & Koob, 2019). While Rain appreciated the university’s immediate response condemning the transphobic graffiti, their single response to a transphobic incident did not negate or disrupt the problematic, anti-liberatory compositional, psychological, and behavioral dimensions on campus, which directly influenced their sense of belonging (Hurtado et al., 2012). In other words, university administrators appropriately responded to the incident, but seemingly put minimal effort into proactively disrupting TGNC oppression on campus. Thus, participants continued to navigate TGNC oppression through interpersonal interactions and when navigating administrative violence (Spade, 2015) through institutional policies and practices.

### *Institutional Policies and Practices*

Solomon, Jake, and Pan directly addressed oppressive policies and practices within the DLE institutional context (Hurtado et al., 2012) that seemed to serve more as lip service to diversity and inclusion efforts than effective resources. Solomon had to navigate changing his university student records since his listed name and sex from when he applied were no longer accurate. The change in identity markers led to complications with Solomon getting appropriate housing assignments and consistent records with his name during his undergraduate career due to information technology systems' inability to accurately share updated student record information across platforms. Therefore, he encountered different names on his record depending on which system a department used. Acts of administrative violence (Spade, 2015) emphasized institutional dynamics that inhibited identity authenticity (Jones & Abes, 2013) and excluded TGNC students when, for example, a university system or person used their wrong name, pronouns, or gender (Lieberth, 2020).

When using university resources, Jake identified processes that excluded TGNC students and took action to center TGNC experiences and needs (Spade, 2015). Thus, Jake demonstrated leadership, advocating for name change processes, TGNC inclusive bathrooms, and intake forms in the counseling center that incorporated all gender identities, not just a pre-selected few, which could assist with TGNC students' sense of belonging (Lieberth, 2020). In addition to personally fighting for effective institutional policies and practices, Jake also witnessed their university develop more robust LGBTQ+ resources and programming.

While most participants acknowledged TGNC policies and practices on campus, mainly name change processes, Solomon experienced the most difficulty with administrative violence (Spade, 2015) in institutional policies and procedures when encountering harassment at their first graduate institution. His university only provided mediation without any clear administrator or staff member to serve as a support for Solomon even after acknowledging that TGNC harassment took place in his case. While the university provided Title IX coordinators, they served the interest of the institution, not Solomon or other students. Thus, coordinators exacted administrative violence by failing to address transphobia (Spade, 2015). Knowing Title IX legislation historically excluded TGNC identities (Curtis, 2016; Kimmel, 2016; Kirkland, 2006), Solomon also felt uncomfortable using the Title IX related resources. Thus, considering CTP and the DLE model, Solomon had to navigate institutional policies and resources (Hurtado et al., 2012) that reinforced cisnormativity, oppressing him through policies and practices that rendered him invisible (Spade, 2015).

Without support from his university, Solomon absorbed the burden of developing accommodations with each of his instructors to ensure he avoided his harasser in class. Thus, Solomon repeatedly had to meet with instructors to discuss his need to have physical and communication distance from his harasser, such as disabling communication features on course software so his harasser could not contact him. This added stress to a scary and overwhelming situation. After a year of trying to navigate the situation on his own, Solomon decided it was best to transfer to another institution, which turned out to be another inaccessible and inefficient process since it is uncommon for students to transfer institutions once in graduate school. Given the sensitive, non-academic reason



for his transfer, he also struggled to articulate his reason for transferring in his applications. Fortunately, he connected with his new graduate advisor, explained the situation, and had someone else advocate on his behalf during his transfer process. At his new institution, his advisor provided TGNC centered support that seemed to indicate a more inclusive curricular context and climate for diversity in comparison to his previous institution and location.

### **Building LGBTQ+ and TGNC Community**

When encountering TGNC oppression and administrative violence via institutional policies and practices in various DLE contexts (Hurtado et al., 2012; Spade, 2015), Jake, Mickey, Pan, Rain, and Solomon found safety, support, and liberation through building community with LGBTQ+ and TGNC individuals on campus, or what Nicolazzo (2017c) called trans\* kinship networks. By connecting with student organizations and getting involved in leadership roles and activism, participants developed powerful and meaningful support systems that centered TGNC identities and incorporated community experiences and activism (Spade, 2015). Participants were also able to understand their core selves within various contexts and systems of oppression, especially participants with multiple marginalized identities (Jones & Abes, 2013). Meeting TGNC people also helped participants normalize their experiences, challenge their understanding of gender, and create a welcoming space to explore their identity.

### ***Student Organizations, Leadership, & Activism***

When searching for colleges to attend, many participants intentionally looked for resources and services that were available to LGBTQ+ and TGNC individuals within the institutional context (Hurtado et al., 2012). Assessing the compositional dimension of

their university, Solomon stated, “Just knowing that there are other people that are like me and are guaranteed to be on my side is really nice.” After dealing with problematic family members and partners who were not accepting and understanding of their sexual orientation and gender identity, participants found core friend groups who accepted and celebrated them. Jake described a mutual trust, common experience, and safety that came with befriending or even dating LGBTQ+ or TGNC individuals. Similarly, Solomon stated, “I met other trans people there, and they’re super chill with trans people, because they have to be.” Participants connected with others who shared, validated, and liberated their LGBTQ+ and TGNC identities when they had family members, engineering instructors and classmates, and other people in their life who would not support them (Goldberg & Kivalanka, 2018; Hetzel & Mann, 2021; Nicolazzo et al., 2017). Together, they were able to enact principles of CTP by joining together, providing support and mutual aid (Spade, 2020), and engaging in resistance through activism on campus (Spade, 2015). Thus, when experiencing uncomfortable campus or engineering climates, participants created positive psychological and behavioral dimensions (Hurtado et al., 2012) through their LGBTQ+ and TGNC communities.

Pan, Solomon, and Jake also participated in formal and informal leadership roles through student organizations and the campus community. During their undergraduate careers, they helped advocate for resources, visibility, inclusion, and TGNC liberation such as name change policies, gender identity options on campus forms, and changing Trans Day of Remembrance to be strength-based. Through these actions, participants demanded inclusion, recognition, and a transformation of systems within the institutional context to better accommodate and liberate TGNC students (Spade, 2015). By having

leadership roles and directly engaging with initiatives, Pan, Solomon, and Jake were also privy to campus politics, perspectives, and administrative violence (Spade, 2015). For example, Solomon had access to information about the troublesome logistics of the university information technology systems not streamlining name changes in the system. Additionally, administrators and staff demanded he meet with them after a campus speaker claimed Solomon and another TGNC student asked “antagonistic” questions. Therefore, Solomon navigated oppressive historical, organizational, compositional, psychological, and behavioral dimensions of the climate for diversity personally as a trans student as well as professionally as a leader on campus (Hurtado et al., 2012). Through each of his roles, he advocated for TGNC liberation and resources (Spade, 2015).

While all participants discussed interest in activism and politics around LGBTQ+ and TGNC identities, Jake, Solomon, and Pan situated activism as a central part of their campus experience. Jake, for instance, participated in many trans protests, commenting on the resilience and power within the TGNC community (Nicolazzo, 2016b). However, they also acknowledged the drain that occurred when confronting TGNC oppression during protests such as witnessing Black transwomen getting arrested and receiving harmful comments from individuals who disagreed with the protest efforts. “I was, like, shouted at and told that people, like, like, specifically that my friend was violent and wrong and, you know, things like that. And then um, I’ve been called a few choice names online,” Jake said. Thus, while activism was rewarding for Jake and other participants, oppressive responses to activism and CTP efforts created challenges for participants to manage their mental health and well-being on campus.

In response, through their communities, Jake and others participated in mutual aid (Spade, 2020), supporting their TGNC peers, especially those with multiple marginalized identities who had to navigate multiple systems of oppression (Box, 2020; Jones & Abes, 2013). Forming a community that incorporated both power in activism and support impacted individual and group resilience (Nicolazzo, 2016b) and liberation (Spade, 2015). Participants' communities and trans\* kinship networks (Nicolazzo, 2017c) also served as supportive safe spaces for them to explore their identity, being able to attend to their core authentic self (Jones & Abes, 2013) that was often hidden in engineering contexts.

### ***Identity Exploration***

Pan, Jake, Mickey, and Rain discussed an intentional separation from parts of their identity when exploring their sexual orientation and gender identity. Although they experienced degrees of internal conflict related to their gender identity throughout their lives, they felt overwhelmed and fearful in an unsupportive family environment when trying to make sense of their sexual orientation and gender identity simultaneously. While they were aware they were not cisgender and heterosexual, they had to focus on one salient identity, navigating one system of oppression at a time (Jones & Abes, 2013). Therefore, participants determined their sexual orientation first, and then developed their gender identity in college, Mickey not fully exploring their identity until graduate school where they connected with the “strong” LGBTQ+ community presence on campus.

Developing strong connections with LGBTQ+ and TGNC friends through non-engineering co-curricular contexts (Hurtado et al., 2012) created a supportive space for participants to explore their identities. While several participants knew nonbinary

individuals prior to or at the start of college, they did not consider the breadth of identities and experiences within the nonbinary categories, such as those in Jourian's (2015) dynamic model, until they were introduced to more nonbinary individuals and had an opportunity to reflect, ask questions, and process their core identity with others (Jones & Abes, 2013). For example, Mickey began questioning, "Am I a woman all the time?" Rain, Pan, and Mickey explored their identity after witnessing their partners come out as TGNC. Listening to their partner explain their nonbinary identity, Rain experienced a "normalizing factor" where they better understood their discomfort with gender and reevaluated their perspectives on gender identity. "But I'm, I'm just a normal, like, this person who just has some discomfort with gender kind of stuff," Rain said. Pan described witnessing their partner go through their transition as one of the "bravest things" they had seen, which made them look in their metaphorical gender "box" again to reconsider their own gender identity.

Participants had residual cisnormative familial and social pressures in oppressive socio-historical contexts (Hurtado et al., 2012; Spade, 2015) to conform to binary gender expression. Once they met others who defied cisnormativity, nonbinary participants became more open and curious to other ways of identifying and expressing themselves (Johnson, 2016). Pan, for example, appreciated being around people who used gender neutral language and learned that it was acceptable to use she/her pronouns while still identifying as nonbinary, depending on one's specific dysphoria with language, as their LGBTQ+ center director did. Observing the way people used language, hairstyles, and clothing to present their gender helped participants along their own identity journey, providing moments of liberation where "it all clicked." Thus, participants were

introduced to diverse ways of identifying and expressing their gender, viewing their options in line with Jourian's (2015) dynamic planes instead of a linear continuum. As other TGNC people disclosed their gender identity, participants developed a trust with their TGNC peers in sharing their identity exploration. Having a support system helped participants, such as Pan and Mickey, navigate their internal conflicts with external social and familial pressures and systems of oppression (Jones & Abes, 2013; Spade, 2015), helping them not have to go through their identity discovery alone (Goldberg & Kuvallanka, 2018; Hetzel & Mann, 2021; Nicolazzo et al., 2017).

The COVID-19 pandemic, which paused participants' in-person meetings and obligations, also provided an isolated time for participants, specifically Rain and Mickey, to explore their gender identity and presentation. Rain felt more comfortable cutting their hair during the pandemic when they did not have to see many people in-person and started requesting their friends to use they/them pronouns. Similarly, Mickey decided to explore their identity by not shaving and consulting TGNC people on Science Twitter about gender presentation and pronoun usage. While researchers have documented social networks as being helpful supports to TGNC individuals as they explore their identity (Goldberg & Kuvallanka, 2018; Nicolazzo et al., 2017; Stolzenberg & Hughes, 2017), Science Twitter was especially helpful to Mickey during a time of extreme isolation. Rain and Mickey, having a more virtual presence on campus during the pandemic, were able to freely explore their gender identity with a safe, focused community of their choosing while not having to negotiate their identity with classmates, professors, and others on campus. Thus, the COVID-19 related isolation sheltered Mickey and Rain from in-person interactions with oppressive systems and contexts (Hurtado et al., 2012; Spade, 2015),

allowing them to explore their gender identity and expression more freely with safe, interpersonal connections (Jones & Abes, 2013)

### **Non-Engineering Environments**

In addition to developing strong bonds with LGBTQ+ and TGNC students on campus, participants also had friend groups that included students in STEM and non-STEM majors. Interacting with students across disciplines provided participants the opportunity to compare perspectives and experiences in non-engineering and engineering environments within the institutional context. With the opportunity to form friendships with students in non-engineering majors, Rain intentionally steered away from STEM friends since their high school friends were students with similar experiences who bonded over mutual frustrations with STEM. Thus, college provided an opportunity for Rain and the other participants to expand their friend group and learn different perspectives in non-STEM curricular and co-curricular contexts (Hurtado et al., 2012).

All participants perceived non-engineering classes and people in non-engineering majors to be more supportive and accepting of TGNC students, which aligns with research indicating LGBTQ+ students perceive non-STEM majors such as arts, humanities, and social sciences to be more welcoming of their identity (Bilimoria & Stewart, 2009; Cech & Waidzunas, 2011; Cooper & Brownell, 2016; Forbes, 2020; Kersey & Voigt, 2020; Linley et al., 2018). Solomon, for example, found their non-engineering STEM club to be open to TGNC inclusive pronoun use while Mickey perceived arts and humanities majors and environments to be more accepting towards TGNC students. “So, people in, like, humanities and all of that,” Mickey said, “they, I think, they understand a lot more versus people in STEM.” Jake also noticed non-STEM

departments “get a little more traction with their ideas” than engineering because faculty, staff, and students were more open and inclusive of TGNC students. Thus, participants noticed the differences in compositional, psychological, and behavioral dimensions within the institutional context between engineering and non-engineering contexts (Hurtado et al., 2012).

By encountering welcoming people in arts, humanities, and non-engineering departments, participants were more comfortable disclosing their identity with people outside of engineering. As Rain shared when referring to working in an interdisciplinary lab, “I feel like anything that becomes interdisciplinary suddenly attracts people who are more understanding.” Thus, they felt more comfortable as a nonbinary person in an interdisciplinary lab compared to engineering environments. Participants were able to discuss their identities more openly and authentically present themselves more in comparison to when they interacted with people in engineering environments, perceiving less threatening oppressive systems in non-engineering contexts (Hurtado et al., 2012; Jones & Abes, 2013). Mickey and Rain intentionally avoided classmates in engineering, choosing to find friends in other majors with whom they could openly discuss their identity and social issues. Thus, participants developed primary support systems outside of engineering to offset the chilly climate in engineering (Forbes, 2020), finding spaces in which they could center their TGNC identity with a supportive community (Spade, 2015).

### **Engineering Climate**

Consistent with prior research (Bilimoria & Stewart, 2009; Cech & Waidzunas, 2011; Cooper & Brownell, 2016; Forbes, 2020; Kersey & Voigt, 2020), compared to arts,



humanities, and some non-engineering STEM majors, participants perceived engineering to be an unwelcoming environment for TGNC and all underrepresented students. Jake described engineering as a “world of its own” and “behind the times.” Solomon also discussed his experiences in engineering as if there was a common understanding that the climate in engineering was a hostile climate for TGNC individuals, mentioning “it was just the water that we were swimming in.” The rigorous nature of the coursework created stress for the participants, influencing their mental health in addition to the stressors they encountered related to their identities in and outside of engineering contexts. Participants were also acutely aware of the homogenous demographics, or compositional dimension (Hurtado et al., 2012), in the predominantly White, heterosexual, cisgender men engineering field, which often created an uncomfortable environment for underrepresented students. The gender dynamics within engineering also created tensions when interacting with men in various engineering contexts. Lastly, all participants noted the impersonal nature of engineering, where conversations and relationships were surface level with an intentional focus on professionalism and purposeful exclusion of social topics.

### **Stress and Mental Health**

While relationships and conflicts outside of engineering impacted participants’ mental health, such as family struggles and TGNC discrimination (Effrig et al., 2011; James et al., 2016; Lefevor et al., 2019) in socio-historical, policy, and institutional contexts (Hurtado et al., 2012), participants often cited the demanding engineering curriculum as a central stressor during their undergraduate career. Jake described their program as “onerous” overall, having experienced extreme stress towards the beginning

of their degree by taking two math courses simultaneously and having to adjust to a different pace and course content compared to high school. Mickey sought research and other opportunities outside of their coursework and began to experience panic attacks, leading them to discontinue their research and seek counseling. Similar to Jake, Mickey became overloaded once they entered the courses that no longer felt like a review of content they learned in high school.

Solomon and Jake changed programs during their undergraduate career, Solomon transferring from a non-engineering STEM major and Jake changing their major within engineering. Thus, Solomon encountered additional difficulty in navigating the challenging courses while also being behind in the required coursework for his program. From the start, he felt like it was easy to fall behind, especially while trying to navigate surgeries and other personal matters outside of class. When advocating for himself to receive class accommodations to tend to his health, Solomon felt concerned that his engineering professors would think he lacked commitment to engineering, echoing sentiments that one's identity and personal matters are irrelevant to their work (Cech & Waidzunas, 2011; Freeman, 2020; Friedensen et al., 2021; Kersey & Voigt, 2020). Solomon shared, "They don't structure the curriculum such that it's very accommodating to you if you're spending an hour plus a day on the phone with your insurance companies." Thus, the faculty members and curriculum failed to acknowledge and include TGNC needs, disadvantaging TGNC and other students who encountered personal challenges while in their program (Spade, 2015).

While participants persisted through their program, they all encountered a substantial amount of stress in their curriculum. Feeling burned out after a stressful

program, Mickey took a gap year between completing their undergraduate degree and starting graduate school. Jake also took a brief break during their program to focus on their mental health after experiencing extreme stress from their coursework. The combination of needing to take a mental health hiatus from classes and changing engineering majors to a program with a rigid curriculum, meant Jake had to add two years to their degree.

### **Underrepresentation**

During the college and engineering program search process, Jake, Mickey, and Pan, identifying as women at the time, were aware of the underrepresentation of women and gender bias in engineering (LaCosse et al., 2016; Robnett, 2016). Thus, they sought resources to support women in engineering, which Grossman and Porche (2014) identified as a coping mechanism that helped students' confidence in pursuing STEM fields. When Mickey saw other women in the program, they thought, "I [am not] going to be alone in this," helping them feel a sense of belonging when considering the compositional dimension of their major (Hurtado et al., 2012). While lack of representation of women or shared identity can impact students' perceptions of their major or university (Leyva et al., 2020), being able to identify supports and classmates who shared their identity was helpful for Mickey. As they explored their gender identity more in graduate school, they connected with other TGNC students in engineering, which helped them feel more comfortable knowing they were not alone in their graduate program.

Solomon noticed a change in department demographics and compositional dimension (Hurtado et al., 2012) when changing from a non-engineering STEM major to

engineering. His new engineering major was “pretty monocultural” and made up of “a lot of White guys.” Despite identifying as a White man, he felt like he “stuck out a lot less” in his former major due to there being more gender diversity. He also was aware he was the “only trans person in in the department.” Thus, his trans identity often felt salient when he was the only one, especially when assessing whether others in his department were supportive or a threat to his safety (Jones & Abes, 2013). Mickey and Pan were also aware of their departments’ compositional dimension (Hurtado et al., 2012) consisting of predominately older, White, heterosexual, cisgender men, which reminded them of their fathers, with whom they had a strained relationship. The demographic reminder of their fathers made them feel less comfortable around instructors who shared their fathers’ identities.

While Jake also did not witness much TGNC representation in their engineering major, they were aware of individuals in the department who were queer, women, and identified as an underrepresented racial or ethnic identity in engineering. There were people who identified as Asian in engineering, however, there were few people who shared Jake’s identity. Jake assessed the identity of faculty in curricular contexts (Hurtado et al., 2012) and shared there were “few Brown people in class,” providing just a “smidgen of representation,” but “nothing that would match exactly [their] identity.” However, Jake appreciated when they saw faculty, staff, and students who were not White as it sent a message that students of color could “thrive and not just survive,” contributing to Jake’s sense of belonging (Foor et al., 2007). Having representation of marginalized identities among engineering faculty, staff, and students can help establish inclusive spaces and experiences for TGNC students and influence their perceptions

towards the departmental climate (Garvey et al., 2017; Simpfenderfer et al., 2020). Thus, TGNC students of color were able to identify others who encountered similar systems of oppression while negotiating their racial, ethnic, and gender identities in engineering (Jones & Abes, 2013), identifying community that could help them feel a sense of belonging (Spade, 2015).

Mickey conveyed difficulty in expressing their identity due to a lack of others sharing their identity in the department. This created a double bind (Cross et al., 2021) for Mickey negotiating their underrepresented gender and ethnic identities in engineering. In graduate school, they connected with other Latinx students and “was so excited that [they] could finally talk to someone about their heritage.” Thus, their Latinx peers became a counterspace in which they could be their authentic selves and support each other (Ong et al., 2018). Since they did not connect with Latinx students in their undergraduate program, they isolated more and chose to not discuss their Latinx identity as they did not want to be tokenized, thus minimizing their ethnic identity, even when it was salient, to avoid discrimination and oppression (Jones & Abes, 2013; Jourian & McCloud, 2020). Rain, identifying as East Asian in a program that had a high representation of East Asian students, did not feel outcasted or isolated due to their ethnic or racial identity. Pan and Solomon, being White in engineering, also did not experience any personal discomfort related to their ethnic or racial identity. However, all participants were aware of the racial, ethnic, and gender discrepancies in their major including discrimination and oppression in historical, organizational, compositional, psychological, and behavioral dimensions of their engineering program (Hurtado et al., 2012; Spade, 2015).

## **Gender Dynamics**

All participants shared stories and perceptions about how engineering was dominated by White, heterosexual, cisgender men and unwelcoming towards women (LaCrosse et al., 2016; Robnett, 2016). As Pan stated, “people can be incredibly uncomfortable towards women, especially in STEM,” having experienced coworkers on their internship making a strained effort to retroactively include people they perceived to be women in conversations. Since engineering is dominated by men, people are more likely to associate engineering with men (Banchefsky et al., 2016; Shropshire, 2016), which can influence the way men interact with women or TGNC individuals in class or work. Rain, for instance, noticed men in their class and work would take the lead on group projects, dictating the conversation and group dynamics. Thus, witnessing the behavioral and psychological dimensions of their engineering program (Hurtado et al., 2012), Rain felt pressure to appear smart to be taken seriously by men. Mickey also recalled a time in high school where the men instructors in the lab were shocked they completed the assignment, as if they only expected men to have the competency to be academically successful. By speaking more confidently, Rain avoided men talking over them in class. They also observed men befriending and interacting with the women in class who presented feminine. Similarly, Mickey, when trying to be friendly with men during class projects would have to correct them when they thought Mickey was flirting with them, thus also influencing the ongoing oppression in the behavioral and psychological dimensions of engineering curricular contexts (Hurtado et al., 2012; Jones & Abes, 2013; Spade, 2015).

After experiencing the engineering climate, the participants all carried an assumption that most people in engineering were not welcoming of women and TGNC people (Cech & Waidzunus, 2011; LaCosse et al., 2016; Robnett, 2016). Knowing engineering majors were predominantly made up of men, Mickey, identifying as a woman at the time, entered college being concerned about the men in their major and intentionally sought supports for women to help navigate a field dominated by men, which was a helpful coping mechanism (Grossman & Porche, 2014). Solomon, despite identifying as a man, was also keenly aware of sexism towards women in his major. Considering behavioral and psychological dimensions within engineering contexts (Hurtado et al., 2012), he witnessed teachers make microaggressive comments and knew many women who were encouraged to leave the field. He shared,

Probably half the women I know who are also in my field have been advised at some point like, "Oh, why don't you just do astronomy or neuro or something? Not because you're not good. But because there will be other women there. And you will not find other women in this field." And they're like, "Well, I want to work on the [specialty area]. So, I guess I'll just be here."

Thus, while there were resources and supports for women in engineering in some departments, men in the departments with less gender diversity, such as Solomon's, directly and indirectly marginalized and discouraged women from pursuing their field (Leyva et al., 2020; Vaccaro et al., 2021).

During Pan's engineering professionalism class, the instructors divided the class into men and women to discuss gender in the workplace. Pan shared,

I think it's very easy for everyone to go, "There are fewer women in engineering," and it's very easy for us to go, "That's a problem." It's very easy for us to go, "There's, you know, there's something—" it's very easy to point out, "Oh, well, it's like a men's profession." But I think we don't put—it's interesting to see where the work is getting done and where it's not. And I'm not saying all men don't do the work. But I'm saying a lot of them don't.

Thus, despite being aware of systemic gender issues within engineering, Pan perceived the program to merely acknowledge it without taking necessary action to address those issues, and apathetically suggesting that is how it is in engineering, and it will not change (Cech & Waidzunas, 2011). In other words, engineering embodies Kimmel's (2008) concept of "guyland," rewarding and normalizing heteronormative masculinity, thus harming those who identify and act outside of the norm. By not acting against heteronormative masculinity in engineering, faculty and staff failed to uphold CTP principles demanding they actively resist and transform oppressive systems (Spade, 2015). Additionally, having an understanding that people in engineering were hostile towards women, participants had a heightened concern about faculty, staff, students, and co-workers holding "bigoted views about trans people," especially when their interactions with most people in engineering were impersonal and intentionally avoided sociocultural topics (Cech, 2013; Haverkamp et al., 2019).

### **Impersonal Depoliticization**

Pan described having "two halves of [their] lives" that "aren't very well married." They had the engineering part that was professional and impersonal, and the personal life where they could be themselves more openly or authentically (Friedensen et al., 2021; Jones & Abes, 2013). This bifurcation and depoliticization (Cech, 2013) of separating the social and political from the technical work within engineering resonated in all participant narratives. Rain and Mickey found the professional and personal divide to be counterintuitive in engineering when the field incorporates theoretical concepts that requires engineers to "[look] at [problems from] all the different angles" and "[think] outside the box." "We study theory on like fluid mechanics and mathematics," Jake



shared, “but we’re not really taking the time to read about social constructs and gender and class and color and how those affect our existence.” However, as soon as that topic changes to social identity engineers become uncomfortable and uncertain. As Pan shared,

A lot of the times we want to be really black and white about engineering, right? Which isn’t realistic, especially in my field, because ...the work we do directly affects civilians... but a lot of it is, a lot of times it is like, we don’t want to think about this aspect. Because that’s a messy thing to think about. And we can’t quantify that... we can barely qualify it.

Engineering involves improving processes and designing things to help people, yet when participants wanted to address how certain practices and work impacted social inequality, they were often met with apathy and resistance by professors and classmates. Thus, apathetic engineering faculty and students maintained the “pervasive prejudicial cultural norms” (Cech & Waidzunas, 2011, p.1). By ignoring sociopolitical influences and the relationship between engineering and neoliberalism, which upholds oppression, engineering faculty and students contributed to tensions among LGBTQ+, TGNC, cisgender women, and students of color by hindering opportunities to challenge, resist, and transform existing oppressive systems (Friedensen et al., 2021; Spade, 2015). By witnessing neoliberal depoliticization and bifurcation practices (Cech, 2013), Pan and other participants were concerned about acknowledging sociocultural impacts of engineering for fear of being met with resistance or being singled out for their identity in class, which became salient when discussing the impact of oppressive practices on their personal communities (Jones & Abes, 2013). Additionally, Solomon, Pan, Jake, and Rain discussed their interest in learning about social and critical theories but had to either learn them on their own or try and fit another class in their curriculum, which was difficult to do with a demanding engineering course load.

By not acknowledging sociocultural concerns, participants also perceived people in engineering to contradict CTP in their lack of understanding of the needs and experiences of women, people of color, TGNC, and LGBTQ+ individuals (Spade, 2015).

Rain shared,

And the indicators that you're interested in these ideas, especially when you're in an environment where you can do anything, literally anything, any idea. And the fact none of those ideas came up.

Thus, Rain was keenly aware ideas about queer or TGNC identities were rarely discussed in a creative environment. While there were some classmates that directly opposed or pushed back against sociocultural conversations, these tended to be the "loud minority" as Pan said. Participants, however, found most people within engineering were ignorant, disinterested, and indifferent to conversations about gender, sexuality, and identity, contributing to curricular and social bifurcation (Cech, 2013). Instructors and classmates did not care and intentionally avoided conversations that surpassed surface level engagement. Rain stated, "People always wanted to talk about work and schoolwork." Identity, outreach, and volunteer efforts to help disadvantaged communities, and anything about their personal life that was not related to engineering did not matter. "I think it's just this, like, air about it...It just felt like you had to be focused on your classes, your homework, and getting good grades. And like anything else wasn't as important," Mickey said. Participants noticed social identities were left out of class discussions, which made them feel more uncomfortable in curricular contexts (Friedensen et al., 2021), especially when they were aware of a salient identity that was excluded in their curricular context (Hurtado et al., 2012; Jones & Abes, 2013). "I felt very invisible sometimes," Mickey stated, "so, of course, like, there's heavy focus on women in

engineering, but there wasn't any focus on like, anything else. So, it was very impactful in the sense like, 'Oh, I guess these other identities aren't important.'"

Thus, the engineering climate honored an impersonal approach of developing surface level connections, if any, with professors and classmates in the department. Some participants, such as Rain, felt they did not "jive" with the engineering culture due to the tension of wanting to talk about their identity and personal matters with people (Cech, 2013; Friedensen et al., 2021). Thus, they intentionally distanced themselves from the program, preferring interacting with people in spaces where they could present their authentic self (Jones & Abes, 2013) and participate in mutual aid (Spade, 2020).

Participants were able to develop rapport with faculty and students in the program, but maintained a surface level relationship, only discussing professional and class matters. Mickey described a "pressure" to "act professional" and intentionally avoid personal topics. Connecting personally, as Pan mentioned, "That ability for me being like, "Okay, now I can treat you like another human being and not a robot, I can...open up about my life and what's happening in it to you," helped them open up with others. However, with an impersonal bifurcation and depoliticized climate, the possibility for a personal connection with engineering faculty and students was often lost, as was the opportunity to incorporate the rich diversity of human experiences of engineers and the communities they serve. As Rain shared, being in the engineering climate made it rewarding when they "found [their] identity in a space that doesn't encourage you to look for an identity." By finding non-engineering communities in which they could be their authentic self (Jones & Abes, 2013) and support and advocate for each other (Spade, 2015), Rain found reward

when they had the liberation, support, and confidence to be themselves in an oppressive engineering curricular, co-curricular, or community context (Hurtado et al., 2012)

### **Identity Negotiation**

Navigating the stress of a rigorous curriculum and an uncomfortable climate in engineering presented challenges for participants. When also having to negotiate their identity in unwelcoming engineering curricular, co-curricular, and community contexts where gender and sexuality were intentionally left out, participants encountered significant burdens and barriers. Thus, participants would selectively disclose their identity depending on how safe and comfortable they felt in certain contexts and situations (Vaccaro et al., 2021). In the following sections, I discuss the erasure, mental burdens, isolation, and support participants encountered in engineering curricular contexts. Additionally, I address the degrees of comfort participants felt in co-curricular contexts, co-curricular supports, and the ways several participants gave back to their respective communities through outreach and volunteer efforts. Lastly, I share the anxieties participants experienced and the ways they assessed their work environments when negotiating their identities in engineering community contexts.

### **Curricular Context**

When negotiating their identities in engineering curricular contexts, participants were almost always uncomfortable, preferring to hide their gender identity (Vaccaro et al., 2021) and, for Mickey and Jake, draw attention away from their racial and ethnic identities (Jourian & McCloud, 2020). While some students did not receive direct derogatory comments in the classroom, the mere absence of offensive comments was “above the bottom of the barrel,” as Solomon said. All participants acknowledged an

erasure of TGNC identities in curricular discussions and department actions.

Additionally, Jake, Mickey, Pan, Rain, and Solomon carried a variety of mental burdens in curricular contexts, having to navigate gender and racial stereotypes, gauge reactions of faculty and staff to determine their safety in class, adjust their identity presentation and expression around discriminatory individuals, and educate others on sociocultural and identity topics that were absent from the curriculum and class discussions.

### *Erasure*

In an engineering climate where administrators and faculty depoliticize the curriculum, participants expected faculty and students to be uncomfortable, if not hostile towards TGNC students and their needs. As Jake said, “People tend to, like, pretend that [TGNC people] don’t exist.” By denying TGNC existence and not centering TGNC perspectives, engineering faculty often excluded TGNC needs (Spade, 2015). One way this was evident was in the professional dress etiquette related to internships and careers. Mickey shared they felt they had to “dress nicely” and “more feminine” for their internships, having to be “pretty, but not too pretty.” Thus, Mickey felt pressured to dress and present their gender in a way that contradicted their gender identity (Jourian, 2015). During their career development course, Pan’s gender identity was salient as they also did not believe they fit the professional dress and behavior protocol as it was not queer and TGNC friendly. Thus, the dress code conflicted with their gender identity and authentic self (Jones & Abes, 2013), which can cause internal distress or external conflicts with faculty, staff, or students (Bilimoria & Stewart, 2009; Cech, 2013; Cech & Waidzunas, 2011; Nicolazzo, 2017c). While they felt comfortable talking to their instructor who was receptive to their concerns, Pan acknowledged the class “missed an entire part of [their]

interaction with the workplace,” thus failing to center TGNC perspectives, experiences, and needs (Spade, 2015).

In addition to not being considered in career development courses, faculty in other classes also excluded and erased TGNC identities. Solomon shared several instances of problematic gender discussions including one class where the professor stated, “Oh, let’s assume that, you know, for our distribution, x is a man, y is a woman,” assuming a gender binary (Jourian, 2015). By discussing gender in a binary way, faculty upheld normative notions of gender that excluded TGNC students (Spade, 2015), negatively influencing their sense of belonging, comfort, safety, and liberation in curricular contexts (Hurtado et al., 2012; Nicolazzo, 2017c). Solomon also experienced an instructor at a lecture who ranted about his belief that TGNC people should not be allowed to compete in the Olympics. The lecturer’s comments were surprising as social identities were rarely discussed in engineering curricular contexts. Furthermore, the comments were unrelated to the engineering topic on which the presentation was focused and were directly oppressive towards TGNC students.

Pan also encountered disapproval of their identity when requesting an excused absence from their instructor when they missed class due to attending a LGBTQ+ conference. Their other instructors approved the excused absence, but since this one did not, Pan assumed they were homophobic and transphobic, which led to them never going to class again out of fear. While the exact reason of the instructor not excusing their absence is unknown, Pan perceived their instructor to be unsafe, unsupportive, and exclusionary based on the way he handled their absence for a LGBTQ+ conference

(Linley et al., 2016). Thus, Pan did not hide their authentic identity (Jones & Abes, 2013), but instead resisted the discriminatory instructor altogether by not attending class.

Beyond the interpersonal interaction with their instructor, Pan commented that the diversity center, which provided funding for diverse and underrepresented students in engineering, failed to “get any money for its trans and queer kids.” Thus, the diversity center potentially did not recognize TGNC students as people who needed support, further preventing them from accessing resources (Spade, 2015; Stryker, 2017). “They have trouble putting their money where their mouth is,” Pan shared. Thus, Pan experienced erasure and a lack of validation of their identity at both departmental and interpersonal levels through depoliticization and the subsequent oppression of TGNC students who did not align with engineering norms (Cech, 2013; Jones & Abes, 2013; Spade, 2015). Having to navigate stressful coursework, departments that excluded TGNC identities, and people who held anti-TGNC perspectives and behaviors influenced participants’ mental well-being and the added mental burden they carried while in their programs (Linley & Nguyen, 2015).

### ***Mental Burden***

Jake, Mickey, Pan, Rain, and Solomon experienced mental burdens when negotiating their identities in engineering curricular contexts. Solomon described a “social drain” due to his experiences with his identity in engineering, especially as someone who has autism and had to advocate for TGNC inclusive curricular accommodations and supports during his medical procedures. The only “life giving” aspect of his experience in engineering was his interest in the subject. The following subsections address the mental burden participants endured while navigating stereotypes,

gauging reactions of others, adjusting their identity, and educating others about their identity and sociocultural issues.

**Navigating Stereotypes.** Solomon and Pan, identifying as White, did not endure negative stereotypes or systems of oppression associated with their racial identity in engineering (Jones & Abes, 2013). Rain's program had a large population of students who were also East Asian. Since many students in their department shared Rain's racial and ethnic identities, Rain claimed they did not experience discrimination based on their racial or ethnic identity, however, they encountered a model minority stereotype when people were not surprised they were in engineering (Shropshire, 2021), thus they still encountered racial oppression (Yu, 2006). However, students who others perceived as women were often met with surprise when people learned they were in engineering. Mickey, for example, felt they had to challenge the stereotype (Grossman & Porche, 2014) of women not being smart by "[working] like 110% harder than other people" in their class. They also "tried to make it less obvious" about their Latinx and woman identities, at the time, as Mickey did not want faculty and students to tokenize them. Thus, the only time they discussed their ethnicity and gender identities in engineering contexts were during diversity panels and outreach efforts, where their identities were validated and celebrated rather than directly oppressed (Jones & Abes, 2013, Spade, 2015). Jake, identifying as nonbinary and "Brown and queer" in engineering, also experienced tokenization by classmates insinuating they were only in engineering due to a scholarship, not merit. Not having much compositional representation from other people in the department that shared their identity (Hurtado et al., 2012), Jake felt they were alone and had to "stand up for [themselves]." Thus, the lack of representation of



people with their identities influenced Mickey and Jake's feelings of marginalization and discriminatory tokenization in engineering (Leyva et al., 2020)

Beyond stereotypes about cisgender women and underrepresented racial and ethnic identities, participants also encountered transphobic and homophobic tropes about queer and TGNC people. Pan described this as the “loud” or “problematic queer person” or “loud liberal” who “won’t shut up about their queer issues.” However, since engineering does not incorporate sociocultural issues (Cech, 2013), Pan observed a discomfort or “fear of... pushing [their] queerness on STEM,” thus they found “outlets” outside of engineering contexts where they could engage in sociocultural and political topics (Hurtado et al., 2012). During one class, Pan learned one of their classmates identified as queer, however they did not know for a while because that person did not want to be “perceived as this loud, obnoxious person who only has one thing on their mind” in class. As Cech (2013) found, LGBTQ+ students in engineering can have difficulty finding one another due to a hesitation to disclose their identity in engineering contexts. Pan heard several other queer students share the same sentiment. As Pan described, it was a balance of being passionate about queer and TGNC topics while also not wanting to be “loud” and “bring it up” in class. Thus, Pan and other participants had to negotiate their salient identities while determining their safety in relation to various systems of oppression that affected them (Jones & Abes, 2013).

Jake also conveyed a TGNC stereotype of people believing trans people “[put] too much emphasis on our genders and on our expression” or being too “sensitive” or “snowflakes.” However, Jake viewed TGNC sensitivity as a strength in being able to be compassionate towards others, which was often lacking in engineering contexts. Their

sensitivity was a form of resilience in a hostile engineering environment (Kersey & Voigt, 2020). Similar to the aforementioned stereotypes, Solomon was aware of a perception that trans people do not understand science as well as an “angry trans activist stereotype,” where others perceived TGNC individuals to be “unreasonable” when fighting for gender inclusivity. Solomon then faced the decision to act in a way that stood up for TGNC people, or “dial back [his] behavior” for his own safety, compartmentalizing (Cech et al., 2017) his salient and authentic identity (Jones & Abes, 2013). This also led to him feeling “pressure” to represent the trans community in a way where engineering faculty, staff, and students would be more comfortable with TGNC identities, highlighting how the engineering program failed to include, support, and liberate TGNC identities (Spade, 2015).

**Gauging Reactions.** In addition to navigating stereotypes, all participants experienced situations where they had to gauge their professor and classmates’ reactions to certain comments, behaviors, and events to determine how to safely negotiate their identity (Jones & Abes, 2013; Linley et al., 2016). Participants, such as Rain, heard stories from other students about professors not respecting pronouns. Jake and Mickey discussed several instances of classmates and instructors, especially older professors, being visibly uncomfortable when students shared their pronouns. Mickey would “get looks” when disclosing their pronouns and Jake noticed professors and classmates would “get like, a little shifty” and be “fidgety,” “side [eyeing]” and doing “doubletakes” when they disclosed their pronouns. Jake also described, “it can be a little scary” with presenting their pronouns and not knowing how people will react, thus having to

carefully negotiate their identity while assessing systems of oppression that could harm them (Jones & Abes, 2013).

While being concerned for their own well-being, some participants also fixated on making others comfortable. Rain, for example, intentionally did not bring up their identities while in class for fear their instructor and classmates would be uncomfortable. Mickey shared, “it’s hard to gauge, like, where people’s thoughts are, even if they’re, like, a little bit more open about things, like, how open are they?” Intentionally trying to make others comfortable while trying to be comfortable himself, Solomon felt an added stress in not speaking up for himself and being less outspoken about his identity in engineering curricular spaces, feeling a need to advocate for TGNC inclusion (Spade, 2015). Having to navigate various personal and academic stressors, he made a conscious effort to not wear himself out, keeping to himself to make others comfortable (Linley & Nguyen, 2015). “I’m trying to feel comfortable myself,” Solomon shared, “so it’s like, ‘Okay, well, I could bring this up, and then make things awkward for everybody and wear myself out with something that they won’t really accommodate anyway, or I could just find better friends.’” When trying to work with his instructors for accommodations, he believed they were judgmental towards his surgery as it was taking away his focus from his coursework. “It can almost come across sometimes like you’re not as committed, I guess, or people don’t expect you to be in engineering if you have other sorts of things going on with your life,” Solomon said. Thus, he had to advocate for himself while encountering issues with health complications, perceived and potential transphobia in the classroom, and expending extra energy to be his authentic self (Joens & Abes, 2013), questioning whether he “pushed a little bit too far” with a feminine outfit

or if he created a negative impression with a professor or classmate. Thus, Solomon had to carefully navigate his identity and life stressors within the engineering microsystem (Linley & Nguyen, 2015), without appropriate support and inclusion of his identity (Spade, 2015). By not having support and understanding from his professor, Solomon had the added mental burden of monitoring what he shared and how he expressed his gender after gauging systems of oppression at play through the responses from faculty and students (Jones & Abes, 2013). He also felt pressured to make a good impression with his faculty members as they “[were] who [were] going to be writing [his] recommendations, and referring [him] for jobs,” thus the power dynamic between he and his instructors also affected what he would disclose and how he would express himself.

Jake also experienced concerns with power dynamics after a classmate told them “Y’all need to get saved.” While they shared what happened in their final group feedback with their instructor, Jake felt judged and uncomfortable for the remainder of their project while also being concerned the classmates in their group held power over their grades through peer evaluations, which affected their final grade. Thus, the engineering curricular context created a power dynamic and system that disadvantaged TGNC students as their needs and experiences were not incorporated into the class (Spade, 2015).

After examining how men interacted with women in class, participants had a heightened concern about how they would treat them as a TGNC person. A classmate of Rain’s, for instance, would only engage with feminine women in class and would not interact with Rain. After having a negative encounter with a TA, Rain also reflected on whether the TA would have responded differently to their work if they were a man. “You

just assume I was stupid or something?” Rain thought. While Rain did not feel the need to alter their gender identity and presentation, they were aware of the ways their identity interacted with systems of oppression and others’ identities in class (Jones & Abes, 2013).

Participants who lacked evidence a classmate or professor would be supportive made assumptions on what others’ reactions to their identity might be based on the engineering climate (Linley et al., 2016) and subsequent systems of oppression (Jones & Abes, 2013). Thus, participants often assumed people in engineering would not accept their TGNC identity. Solomon, who endured a harassment issue at his previous graduate institution, was still “feeling it out” at his new graduate program but was anxious based on his prior negative experiences. When unsure of their department’s reactions to their identity, Mickey chose to compartmentalize their identity (Cech et al., 2017; Friedensen et al., 2021), and keep a professional demeanor around their professors and classmates, not presenting their full authentic self (Jones & Abes, 2013). They shared, “I don’t know...if they’ll treat me differently if they know that part of me.” Pan also engaged in “guesswork” in figuring out who were the people with “strong opinions,” choosing to limit and “dial back” their interactions with people in engineering when they heard concerning comments. Thus, depending on the interactions they had with others in their engineering department or micro and macroaggressive behaviors they witnessed, participants found themselves adjusting their identity to make others comfortable and to protect themselves (Jones & Abes, 2013; Linley et al., 2016).

**Adjusting Identity.** Having experienced an unwelcoming engineering climate, participants had to “figure out which spaces [they could] identify [themselves] correctly,” as

Jake said, which tended to be within non-engineering contexts (Hurtado et al., 2012). Participants felt they were unable to fully “show up” in their program and be their authentic self in curricular contexts (Jones & Abes, 2013). Jake, Mickey, Pan, Rain, and Solomon all hid or compartmentalized (Cech et al., 2017) aspects of their selves. Solomon and Jake, feeling more comfortable not sharing too much about their identity, adjusted their mannerisms around professors and classmates in curricular contexts (Hurtado et al., 2012). Solomon described his personal adjustments as code-switching, changing how femininely he dressed in certain spaces as well as pitching down his voice. While he was a “guy in all situations,” he came across as “effeminate or obviously gay,” which did not fit with the type of hegemonic masculinity present in engineering (Hughes, 2017; Seron et al., 2018). While his sexuality was not as present in curricular contexts, he believed people viewed “being a trans man” as “less valid somehow, if [he was] also gay,” thus he downplayed his effeminate qualities to appease heteromascuine norms (Hughes, 2017; Jones & Abes, 2013).

Mickey and Pan expressed an appreciation in being able to dress masculinely or femininely depending on how they felt, reflecting Jourian’s (2015) dynamic model, however both adjusted their identity differently. Pan pushed back against social and departmental norms, dressing how they wanted and not caring about what made others comfortable (Bilimoria & Stewart, 2009; Cech, 2013; Cech & Waidzunas, 2011; Nicolazzo, 2017c). However, they did not often openly discuss their identity or share their preferred name with professors and classmates due to the climate in engineering curricular contexts (Hurtado et al., 2012). Mickey also avoided disclosing their identity with faculty, compartmentalizing their identity (Cech et al., 2017) and choosing to “act

more like a woman in front of them,” concerned they would not understand their identity (Freeman, 2020; Jones & Abes, 2013). While participants chose to educate engineers about social identities and issues at times, educating also created a mental burden and stress, disadvantaging TGNC individuals, leading some participants to avoid educating others depending on the situation (Spade, 2015).

**Educating Others.** Since engineering coursework did not incorporate sociocultural topics, participants were sometimes put in positions where they had to educate others about their gender identities. For example, when Solomon’s Zoom screen with his pronouns was highlighted during an online class, a classmate ranted about pronouns not being important, claiming TGNC people do not exist. After being put on the spot and not hearing anyone else address his classmate, Solomon came out to his class saying, “No, I’m transgender. I actually really appreciate it when people do the pronouns thing. Just FYI.” Incidents such as those were uncomfortable as no one else supported him in that moment, thus he perceived the environment to be uncomfortable and unsupportive (Linley et al., 2016). He felt more comfortable when there were other TGNC individuals or allies through a LGBTQ+ community or TGNC kinship (Nicolazzo, 2016b) to help call people out since he did not always feel he could “bat for [himself]” (Spade, 2015; 2020). Jake too would sometimes “speak up,” but they “used to have a lot more energy,” feeling more drained when educating others to think differently. Mickey also educated classmates on gender identity, pronouns, and sexual orientation. Both Mickey and Rain, who use she/they pronouns, encountered confusion from classmates when using they/them pronouns, noticing people would use she pronouns more often. By not having appropriate supportive policies and practices built into

engineering contexts, participants had to fight for their own inclusion, bearing the weight of educating others (Spade, 2015).

Participants also took it upon themselves to find and learn social theories such as gender and queer theory because they were absent from the engineering curriculum; this required participants to explore those topics on their own time. Whether it was through a formal non-engineering class, such as Rain learning critical theory in an art class, or researching on their own, like Solomon and Jake, participants appreciated having a space to engage with social theories. When reflecting on learning queer theory compared to STEM theories, Solomon shared, “I find that I’m more inclined to combine ideas and have hands in different disciplines and mix and match my knowledge than my peers are necessarily. It influences just how I think about problems.” While this gave Solomon and other participants extra knowledge to share when they wanted to address social inequalities related to an engineering topic, those conversations were often not welcomed in engineering classes due to the depoliticization and bifurcation in engineering (Cech, 2013). Additionally, participants, such as Jake and Solomon, did not always feel they had the mental capacity to educate others on sociocultural topics after experiencing the many oppressions and mental burdens of being TGNC in engineering curricular contexts (Hurtado et al., 2012; Spade, 2015).

### ***Isolation***

Participants felt isolated in curricular contexts in a variety of ways. All participants were one of a few TGNC individuals in their department, if not the only one, which reflected the poor compositional diversity in engineering (Forbes, 2020; Hurtado et al., 2012). Jake and Mickey also experienced isolation due to the lack of representation of



Brown and South Asian, and Latinx students and faculty in their respective programs. Having different identities also made it difficult for participants to connect with their classmates (Butterfield et al., 2018; Cech, 2013). Jake, for instance, felt aware of their gender identity when around heterosexual, cisgender men due to having different experiences as a nonbinary person (Jones & Abes, 2013). Solomon, identifying as a trans man, discussed feeling distanced due to his gender presentation and classmates, especially cisgender men, being unable to connect or understand his identity and experiences. Even after a friend directly confronted the cisgender men who excluded him from social events, they continued to do so. Thus, since TGNC identities were systemically excluded in engineering, TGNC students felt excluded, disadvantaging their academic and social connection to faculty and students in their departments (Spade, 2015).

Rain felt academically and socially disconnected from the men in their program who often took the lead, worked ahead too quickly, and treated them differently than their feminine women classmates. While there were some queer students in their program, Rain, who did not identify with their engineering major (Freeman, 2020), also felt unable to connect with them because the individuals they encountered were more passionate and engaged with their program. Engineering was the “wrong place” for Rain, believing their gender “contributed to [them] distancing [themselves] from the program.” When they attempted to connect with faculty, staff, and classmates in curricular contexts, they felt the relationships were “surface level.” Additionally, Rain felt they did not belong in either binary gender group (Hackimer et al., 2021) since they expressed their gender differently, combatting transnormativity and cisnormativity (Johnson, 2016). Thus, Rain

intentionally tried to socialize with people one-on-one, but never could relate to their classmates (Butterfield et al., 2018; Cech, 2013), nor did they feel a sense of “community” or “connection” in engineering (Freeman, 2020). The only connections they maintained were classmates who could assist them with coursework as they progressed through the program together.

Pan also did not connect with engineering students. Describing engineering curricular contexts as “scary,” Pan elected to spend their time in non-engineering and LGBTQ+ spaces where they were accepted, validated, celebrated, and liberated (Haverkamp et al., 2019; Hurtado et al., 2012; Nicolazzo, 2017c; Spade, 2015). After their instructor would not approve their absence from class due to attending an LGBTQ+ conference, Pan thought, “Okay, this is not a safe space, I will not be interacting with it anymore.” The interaction with their instructor “shut [them] down a little bit. So [they] took the L on the quiz, and [they] never went to class again.” While they avoided that professor and class, it also created concern in attending office hours with other engineering faculty and mentioning their queer and nonbinary identities to others in engineering for fear of a similar reaction (Cech & Waidzunus, 2011; Freeman, 2020; Kersey & Voigt, 2020; Riley, 2008). Thus, the discriminatory behaviors of one engineering faculty member hindered Pan’s curricular engagement with not only his class, but with other engineering faculty (Hurtado et al., 2012).

Whether participants felt uncomfortable in engineering curricular contexts due to being the only one that looked or identified like them in the class, or they had a direct hostile experience with a professor or classmate, they felt they could not be themselves (Cech et al., 2017; Freeman, 2020; Friedensen et al., 2021; Haverkamp et al., 2019; Jones

& Abes, 2013). Mickey, for example, felt uncomfortable in the large introductory STEM courses they took that were dominated by men, reflecting the compositional gender dimension within engineering (Hurtado et al., 2012). When feeling isolated and uncomfortable, Pan and Jake also were less likely to ask questions in class or office hours, which affected the way they learned the class material, placing those who identified as queer and TGNC at an academic disadvantage (Spade, 2015).

Since Solomon transferred into the engineering program at his school and thus did not follow the typical sequencing of classes, he experienced an additional layer of isolation by missing the socialization in his department that occurred at the start of the program. Instructors would tell him to connect with his classmates, but as a transfer student, he did not get the same opportunity to develop study groups with everyone else who started before him. Thus, Solomon supported and accommodated himself as he transitioned into his engineering major. Rain and Mickey also encountered unsupportive faculty who encouraged them to essentially figure problems out on their own, which was isolating. They also found TAs and cisgender women faculty to be more willing to help guide students and provide moral encouragement compared to cisgender men instructors who provided no assistance and told them to ‘figure it out.’

Solomon also felt isolated in his program at his first graduate institution, which added additional stress to another rigorous program. However, he also had a classmate who was actively harassing him and received little to no support. Solomon shared,

It’s always my classmates. And I would assume in, especially in other environments, it’s usually people my age who are, you know, generally my allies in these kinds of situations, but in academic settings, for whatever reason, it’s reversed. And it’s really stressful because those are the people that I rely on for social support usually.

Thus, having classmates harass him was especially concerning, isolating, and added stress while also reducing social support in the program (Rostosky et al., 2021). When he transferred to engineering within his undergraduate institution, Solomon had already built a support system. Had he not had a core group of LGBTQ+ friends and TGNC kinship (Haverkamp et al., 2019; Nicolazzo, 2017c) in co-curricular contexts (Hurtado et al., 2012) prior to transferring into engineering, he “would have been pretty lonely.” Being at a new institution for graduate school in a city that was less welcoming of TGNC individuals while also navigating a harassment situation was exceptionally isolating. However, it made his decision to transfer to another institution and find support elsewhere clear.

### *Support*

While participants primarily engaged in surface level relationships and interactions with people in engineering, some individuals developed more meaningful connections with faculty and classmates. Students found support from faculty members who were active allies, engaging in LGBTQ+ activities and communities as well as others who were inclusive in their actions with students, but perhaps were not as involved in the LGBTQ+ community as the active allies.

**Active Allyship.** Participants felt most comfortable around faculty members who were actively engaged with LGBTQ+ students and organizations compared to individuals who merely labeled themselves as allies without subsequent action (Haverkamp et al., 2019). Mickey viewed their advisor as open and accepting of the LGBTQ+ individuals based on conversations they had with her and knowing she was involved with an

LGBTQ+ organization on campus. They also felt more at ease with engineering faculty members who were actively engaged in diversity initiatives such as serving on panels.

Similarly, Solomon became close with a non-engineering STEM post-doctorate instructor. They served as an “informal advisor” who Solomon described as “cool” and “fantastic” as they helped with the diversity center. Thus, viewing the instructor’s active engagement with diversity initiatives and having open conversations about identity and diversity led to Solomon’s informal advisor being the only instructor with whom they developed a close relationship. By being an ally, Solomon and other participants felt they could present their authentic self with reduced risk compared to oppressive systems and behaviors present in most engineering curricular contexts (Jones & Abes, 2013). Having interpersonal supports such as Solomon’s instructor can impact a student’s sense of belonging (Apriceno et al., 2020) as their TGNC identities, experiences, and needs are acknowledged and validated (Spade, 2015). For example, the instructor served as a mentor, providing Solomon with academic, professional, and personal support, something he was unable to find with other engineering faculty.

While most of the participants discussed active allies who were cisgender women, Pan shared a meaningful moment with an engineering professor who they described as a “70-year-old White cis man,” which surprised Pan. The faculty member, after seeing Pan at a LGBTQ+ campus event, contacted Pan to reach out and check to make sure they felt supported. The professor asked, “I want to check in with you, are you okay? Do your parents know that you’re queer? Are you comfortable at home? Is there anything I can do to support you?” While participants appreciated supportive and engaged faculty members (Haverkamp et al., 2019), Pan’s interaction with their professor seemed to be the most

meaningful because it was with a person who held privilege and power within engineering. In other words, the faculty member who was an older, White, cisgender man in engineering was not someone Pan would have expected to attend an LGBTQ+ event or directly reach out to check in and show their support. They felt most professors saw them “as a number,” but that instructor saw them “as a person,” validating their authentic self (Jones & Abes, 2013).

**Inclusive Actions.** Beyond observing individuals who were actively engaged in the LGBTQ+ community and diversity initiatives, Jake, Mickey, Pan, Rain, and Solomon searched for supportive faculty and classmates in curricular contexts through smaller scale inclusive actions. Jake looked for a “signal” from instructors to determine if they would be accepting of their nonbinary identity such as use of non-gendered language, pronouns, and correct names (Linley et al., 2016; Nicolazzo, 2017c), while Mickey looked for faculty members who had safe space stickers. When introducing themselves using she/they pronouns, Rain took note of who used they/them pronouns, but most of their student peers tended to default to she/her.

Pan heard about instances of professors not using students’ correct names and pronouns, so they were appreciative when they interacted with an instructor who used their name and pronouns correctly. Their professionalism professor, for example, knew them by name, used Pan’s correct pronouns, and was open to listening to their concerns about being professional and nonbinary when navigating binary gender expectations. Thus, the instructor strived to include Pan on an individual level while working within a field that systemically oppressed and excluded TGNC identities, experiences, and needs (Jones & Abes, 2013; Spade, 2015). While Pan used they/them pronouns, they did not

experience gender dysphoria if someone used she/her pronouns, thus they viewed correct pronoun usage as “brownie points.” Having professors be open to conversations about gender and classmates who were also willing to engage in those conversations was more important to Pan than correct pronoun usage.

When transferring to his new graduate program, Solomon appreciated his faculty advisor’s support and effort to make him feel welcomed despite her over explanation of the ways she was an ally to the TGNC community. Whether a student was navigating a transition to a new institution, asking for guidance academically or professionally, or having a conversation that involved a supportive and open approach to diverse identities, participants felt comfort and support in faculty, staff, and students who made an effort to be inclusive of their authentic self (Haverkamp et al., 2019; Jones & Abes, 2013). By having supportive signals and performing inclusive actions, students would have a reduced burden in having to gauge faculty level of openness and support towards TGNC people.

### **Co-Curricular Context**

Participants experienced varying degrees of comfort negotiating their identity depending on the specific co-curricular context. While students encountered tensions in engineering co-curricular contexts, they also found supports by developing camaraderie with classmates who would validate their identities (Haverkamp et al., 2019; Nicolazzo, 2017c). Additionally, after experiencing unwelcoming environments, some participants engaged in outreach and volunteer efforts to help pay it forward to future generations of underrepresented students in engineering, doing their part to disrupt existing oppressive systems towards TGNC and other underrepresented people in engineering (Spade, 2015).

### *Degrees of Comfort*

Participants felt the most comfortable being their authentic self around other queer or TGNC students and allies, which most often occurred in non-engineering co-curricular contexts (Haverkamp et al., 2019; Jones & Abes, 2013; Nicolazzo, 2017c). Rain felt a mutual understanding and trust with queer and TGNC students where they could comfortably be themselves and discuss personal matters as well as sociocultural topics on identity and politics (Goldberg & Kuvalanka, 2018; Hetzel & Mann, 2021; Nicolazzo et al., 2017). “Once you both know you’re queer, it’s kind of like, flood gates open,” Rain shared. They talked about whatever they wanted with queer and TGNC peers. However, Rain was unable to connect with queer engineering students because they had a stronger passion for engineering than Rain, which overshadowed their ability to relate on a personal level (Freeman, 2020). Thus, Rain connected more with queer and TGNC students through their non-engineering co-curricular activities.

Solomon found and connected with some queer students in his major, finding it easier to engage with them one-on-one instead of in formal departmental curricular or co-curricular contexts. Mickey felt more comfortable in engineering co-curricular spaces compared to the classroom, but it also depended on whether they had close friends in the student organization. If their friends were there, Mickey felt less of a need to gauge people’s reactions knowing they had allies and a support system present if needed (Linley et al., 2016). However, Mickey was most comfortable in social environments outside of engineering as engineering classmates would adopt a professional, non-personal façade, making it difficult to connect while others would say or do discriminatory things such as arguing about pronouns in front of everyone (Cech & Waidzunus, 2011; Freeman, 2020).



Thus, one-on-one interpersonal connections helped participants relate to others who shared their identity while not having to navigate oppressive people and systems within engineering curricular and co-curricular contexts (Hurtado et al., 2012; Jones & Abes, 2013).

Jake was also most comfortable in non-engineering co-curricular environments and discussed how even in social spaces, non-TGNC allies were not always sure how to be or act around them. For example, a student ally was unsure whether it was appropriate to laugh at a nonbinary joke that Jake made. Thus, Jake had to take on the added work of explaining their identity and the context of the joke to their peer. Comparatively, when Jake was with their queer and TGNC friends in non-engineering contexts, they could be their authentic self without explanation (Jones & Abes, 2013), knowing they shared a mutual understanding with one another and had a reliable support system (Haverkamp, 2021; Haverkamp et al., 2019; Nicolazzo, 2016b; Nicolazzo et al., 2017; Spade, 2015).

### ***Support***

While participants struggled to find support in curricular contexts, they had a slightly easier time finding different types of support in co-curricular contexts (Hurtado et al., 2012). Jake, for instance, shared how they and their classmates were tied together through their major. “People like me do exist,” they stated, appreciating being around people with “similar mindsets” in class and in engineering co-curricular activities. Other participants also found support by developing a camaraderie, or kinship (Haverkamp et al., 2019; Nicolazzo et al., 2017) with queer and TGNC classmates in engineering. Through these connections, they were able to center and obtain validation of their identities and experiences (Spade, 2015).

**Queer and TGNC Camaraderie.** Some participants found camaraderie with other students through engineering student organizations. Mickey, for example, joined a student organization for women in engineering when they started college, valuing having a community where they shared identities, at the time, and experiences with classmates. Through the group, Mickey always had peers and staff checking in “making sure that [they] were okay.” They developed friendships with one another and other women in their department finding it easier to connect and identify with women in their program who faced similar types of oppression in engineering (Jones & Abes, 2013).

While there was no formal LGBTQ+ student organization for engineering students, Pan found camaraderie with other queer people (Haverkamp et al., 2019). “There’s an amount of understanding about the issues that we’re both facing” in engineering, Pan shared. Without a formal group to connect with and identify other queer people in class, Pan would look for queer pins or flags on students’ bags (Cech, 2013). Once they found others who were queer, they were able to share concerns about being queer in engineering due to the “horror stories” they heard from other queer students when negotiating their identity in oppressive systems (Jones & Abes, 2013; Spade, 2015). “Just knowing that there was someone else in that space, who might possibly understand what I was going through, you know, why there was this additional stress on me was, that meant a lot,” Pan said. In graduate school, Mickey met a TGNC person through their co-curricular involvement who connected Mickey with other TGNC students in their program. Like Pan, Mickey found camaraderie through informal relationships, though Mickey had added assistance through graduate students who already connected with one another (Haverkamp et al., 2019).

Rain's program did not have a formal LGBTQ+ student organization for engineering students when they started the program but mentioned they now have an Out in Science, Technology, Engineering, and Mathematics (oSTEM) organization. While they individually found support in and outside of engineering contexts (Hurtado et al., 2012), Rain believes the presence of oSTEM will help future students more easily connect and build community and resources with people who can relate to their experiences (Spade, 2015). Regardless of the ways participants formed relationships with students who shared their identities, having support also helped them find liberation with people who could validate their identities and experiences in engineering (Haverkamp et al., 2019).

**Validation.** Classmates with whom participants developed a camaraderie were often able to validate their experiences in engineering (Haverkamp et al., 2019). Mickey formed a friendship and study group with two women in the program. At the time, they all identified as women and had different backgrounds, identities, and experiences. They not only bonded over their shared identities, but they validated and supported one another, discussing personal life matters they were experiencing beyond their coursework. Together, they developed personal connections in a major that was impersonal (Cech, 2013). While Rain distanced themselves from engineering, they found community support and validation by connecting with art peers, receiving validation for their identity as an artist.

While many participants struggled to find strong connections with faculty, staff, and classmates in engineering, some participants discussed support and validation they received from services on campus. Jake, for instance, only disclosed their identity to their

advisor in their initial engineering major. They described her as kind, accepting, and someone who listened and cared. Pan also felt comfortable disclosing their identity with their academic advisor who recommended the Out for University (O4U) conference and helped them navigate the costs of attending. Thus, their advisor centered their identity, acknowledging oppressive systems that influenced their experiences, and assisted them in getting the appropriate resources (Jones & Abes, 2013; Spade, 2015).

When needing to take a hiatus from school to tend to their mental health, Jake had positive experiences working with the dean of students, counseling center, and their academic advisor. Together with support from their doctors and family, Jake navigated a challenging situation with support and advocacy from university staff who validated and listened to them. When encountering a scam through the career center job portal, Jake also worked closely with the career center staff, who Jake recalled as being helpful and knowledgeable about the situation as well as welcoming of their identity. The staff took the time to listen to Jake's concerns and validate their experiences while making them feel welcomed and understood as a TGNC student by using their appropriate name and pronouns. Thus, Jake felt they were able to present themselves authentically around staff who validated their identity (Jones & Abes, 2013).

### ***Paying it Forward***

After experiencing isolation, discrimination, and hostile environments, participants such as Mickey and Pan actively engaged in outreach efforts to help encourage other underrepresented populations to pursue engineering, thus hoping to transform the organizational and compositional aspects of engineering (Hurtado et al., 2012; Spade, 2013). While Mickey claimed to not receive any direct discrimination as a

Latinx student, they were aware of not having a counterspace (Ong et al., 2018) in which they could relate to others or have others with whom they could discuss and celebrate their heritage. As a Latinx, queer, nonbinary person, Mickey participated in diversity panels, student organizations, and outreach initiatives. While they enjoyed serving as a role model for LGBTQ+, TGNC, and Latinx individuals, participating in these activities on top of a stressful curriculum and negotiating their identities in hostile engineering contexts led to them becoming a “harder worker” while also “[burning] out faster” due to excess emotional labor (Jaekel & Nicolazzo, 2020).

When reflecting on their gender journey and sharing their appreciation for their sunglasses as they related to their gender presentation, Pan also discussed their involvement in an engineering summer camp. Wearing their rainbow sunglasses, Pan hoped they would be a positive representation for queer kids that participated. They shared,

I realized that I was the only queer person on staff or the only out queer person on staff. And they were STEM summer camps at [university]. So I gave my, I was like, “I can either be in the closet, and I can just get through the summer, or I can be out and I can be proud and I can be myself. And I can, and that’s gonna mean a lot to the one, one or two, queer kids I see also.”

By simply being themselves in engineering contexts, Mickey and Pan hoped to convey to students with underrepresented identities that people like them are in the field and they too can become an engineer despite oppressive systems that suggest otherwise (Jones & Abes, 2013; Spade, 2015).

### **Community Context**

While there are overlapping characteristics and hostilities towards TGNC people in engineering curricular, co-curricular, and community contexts, participants

experienced differences in negotiating their identity in community contexts compared to curricular and co-curricular contexts (Yoder & Mattheis, 2016). As Solomon stated, “there’s a divide between how gender identity is accepted in academic settings versus in industry settings.” Similar to gauging others’ reactions and proceeding with identity disclosure and gender presentation with caution in engineering curricular contexts (Jones & Abes, 2013; Linley et al., 2016), participants conveyed an anxious anticipation when searching and interviewing for engineering internships, many continuing to have anxiety about the environments they would encounter in their future career. Participants also took steps to assess their work environment to determine allies, safety, and potential concerns when negotiating their identity at work (Jones & Abes, 2013; Minei et al., 2020).

### ***Anxious Anticipation***

Jake shared, “I have to be able to be me where I work, even if it doesn’t have to be loud.” Like Jake, all other participants wanted to be comfortable with their gender identity and presentation at work, knowing they likely would not be able to be completely open as TGNC depending on the geographic location, company, and co-workers (Jones & Abes, 2013; Minei et al., 2020; Sawyer et al., 2016). Solomon, who had multiple internships, was particularly anxious before starting an internship for a department that dealt with national interests, reflecting sociohistorical and policy contexts that usually are not supportive of TGNC people (Hurtado et al., 2012). Fortunately, he was paired with a team of other queer people in the internship and developed a camaraderie with them. After getting to know his queer co-workers, he learned they were also anxious to meet him. Without knowing anything about him, they were concerned that an intern who was closeminded would join the team, something Solomon learned was a common anxiety for

queer and TGNC individuals in industry (Minei et al., 2020). One of Solomon's first internships was with students who were involved in leadership and had diverse identities. During his internship, he met other trans engineers for the first time, finding relief in meeting others who shared his identities and were accepting in an engineering work context. Thus, he was able to be his authentic self around the other interns, being able to share in experiences with similar oppressive systems towards TGNC and people with other underrepresented identities in engineering (Jones & Abes, 2013; Spade, 2015).

Rain also expressed a preference for not being "the only person who looks like [them] when in the workplace," wishing to have a support system with whom they could navigate stereotypes and discrimination at work. While Rain experienced similar frustrations with gender dynamics at work as they did in the classroom, they noted future jobs could be "1000 times worse" than experiences they had at their university.

Companies, for example, may have oppressive policies and practices with employees who openly harass TGNC people (Williamson, 2020). As Solomon stated, "there's a lot of uncertainty, I guess, just kind of who I'm going to be working with," which adds to anxiety in being able to be his authentic self at work without having control over the work environment (Jones & Abes, 2013). Pan also shared a concern with telling anyone in engineering about their identity when considering future employers. However, at the time of the interview, Pan was assessing prospective jobs to determine if they would be comfortable as a TGNC person at the company (Minei et al., 2020).

### ***Assessing Work Environment***

During internships, participants assessed their work environment by directly asking the recruiter questions about being a queer and TGNC person working at the

company (Williamson, 2020), observing co-worker interactions, or, as Solomon did, “[sneaking]” in topics by “asking kind of small inconsequential questions” to gauge people’s opinions and reactions towards TGNC people (Minei et al., 2020). When interviewing, Jake and Pan noticed and appreciated when the interviewer intentionally used gender neutral, “unassuming” language. Pan also discussed their LGBTQ+ student leadership position and other LGBTQ+ and TGNC topics during interviews, “planting a seed” to see how the interviewers would react. One interviewer aggressively asked the relevance of their LGBTQ+ leadership experience, which made Pan perceive the interviewer, and perhaps the company, as not valuing or centering LGBTQ+ individuals and their needs (Spade, 2015).

Solomon shared he and other TGNC individuals could be more direct in industry, “they just want you to tell them exactly what you want.” Pan used this direct approach, asking employers about their company culture, assessing the degree to which interviewers interacted with the topic and validated their identity. Some companies said, “We don’t care,” as in they accepted LGBTQ+ and TGNC individuals, however they would not validate Pan’s question or identity beyond that. Pan wanted the company to care about them, not just tolerate them. “There are people who are going to be shitty to me, there are people who have been shitty to me,” Pan stated, “I need you to be a little loyal to me as well.” When interviewing with a company in a “conservative” state, Pan directly addressed their concern about being queer in that location. The employer was well prepared with information, providing details about company policies, available supports, even providing her personal cell phone number for Pan to call if they experienced any issue. Observing a company that recognized and integrated LGBTQ+



needs helped Pan determine whether they could be their authentic self (Jones & Abes, 2013) at the company as well as the company culture towards LGBTQ+ and TGNC individuals. While the company did not center TGNC experiences, for example, they at least provided resources and supports that incorporated their identities and needs (Spade, 2015). During another internship at an engineering lab on campus, Pan's boss had seen them at an LGBTQ+ event, acknowledging their preferred name and pronouns. After learning Pan's name and pronouns, their boss and co-workers began using them while working in the lab. Both the effort and actions of their boss and co-workers made Pan feel comfortable being their authentic self while working in the lab (Jones & Abes, 2013; Minei et al., 2020). In other spaces, however, Pan used "snap judgment" based on employer and employee interactions to assess their acceptance of LGBTQ+ and TGNC people.

Solomon also monitored co-worker interactions to assess company culture. During one internship, he observed some "sketchy opinions" from his co-workers who posted negative comments about TGNC people through the company's Slack channel. Not only did Solomon notice the perspectives people shared, but he noticed that no one addressed or removed the offensive and discriminatory comments. While he did not have to directly interact with the people posting the comments given the size of the company, he was aware people held those perspectives at his work (Minei et al., 2020). Thus, Solomon found support through his cohort of interns rather than the other company employees, many whom were "older."

Jake similarly "had to keep [their] head down" when around most people at their internship company but found support interpersonally with some co-workers. When

talking with their classmates who had internships at other companies, they heard about similar experiences not being able to be their full self while at work (Jones & Abes, 2013). Rain did not experience as many company-wide concerns since the “older employees kind of treated all [the interns] the same,” but encountered similar problematic gender dynamics as they did while in class. They “[buted] heads” with a cisgender man who kept taking the lead on projects, not providing space for Rain to share their own ideas. Thus, Rain felt their experience was related to being perceived as a woman more than an issue with their co-worker treating them differently as a LGBTQ+ and TGNC person. Pan also addressed gender dynamic concerns in the workforce stating, “I feel like being a woman in engineering is almost harder than being nonbinary,” due to their coworkers correcting themselves, offensively indicating “lady” instead of “guys.” Therefore, despite how participants identified, sometimes the way their employers or company perceived them affected their experience even when they did not disclose their identity (Jones & Abes, 2013).

Mickey participated in an internship abroad but did not disclose their identity or personal struggles to their peers despite becoming relatively close to them while they all navigated a new country. While Mickey was not fully exploring their gender identity, they were actively questioning their sexual orientation, but did not feel comfortable sharing their identity exploration with other interns. Rain, during their third internship, which was remote due to the COVID-19 pandemic, was also able to keep their identity to themselves. “The screen removes a lot of this consideration of what identity is,” Rain said, making it easier to avoid the subject altogether.

## **Strengths**

While engineering contexts were fraught with oppression and hostility towards TGNC students (Spade, 2015), Jake, Mickey, Pan, and Solomon found strength to persist in their majors through their passion for the subject matter and personal, academic, and professional accomplishments while in their program. When considering common strategies and experiences, participants integrated their strengths through self-preservation and compassion towards others. Participants also highlighted the importance of building a community of support, or kinship (Haverkamp et al., 2019; Nicolazzo, 2016b, 2017c) in which they could decompress with peers and find liberation through validation in their identity and experiences.

### **Self-Preservation**

Self-preservation was a key strategy for participants when navigating the academic stressors in engineering as well as negative experiences they had as TGNC individuals in engineering contexts, campus, and society (Hurtado et al., 2012). Pan stated the importance of ensuring they had time to be with friends, acknowledging “mental health is worth more than your program.” Jake similarly discussed spoon theory (Miserandino, 2003), describing how everyone has a limited amount of energy per day, requiring people to use each morsel of energy, or spoon, wisely to not deplete themselves.

Participants, such as Mickey and Jake, focused on the importance of being their authentic selves (Jones & Abes, 2013). Mickey reflected, “not hiding myself has really been more of a way to overcome” negative stereotypes, while Jake took comfort in “knowing that [they] have power in [their] identity, and [they] can bring about change for the better” through resistance (Spade, 2015). However, participants were not always able

to present their authentic self and had to care for their well-being when negotiating their identity in engineering contexts (Hurtado et al., 2012; Jones & Abes, 2013). Solomon had to find an appropriate balance of sticking up for himself while also preserving his well-being, not wanting to put extra effort towards making connections with people in engineering just for them to end up being a “transphobe.” Sometimes, he needed to separate himself and let others handle problematic comments and actions to avoid personal burnout, though most others would not actually address the issues. Thus, Solomon and other participants developed strength in tending to their own needs (Stolzenberg & Hughes, 2017) to promote their own well-being and success when facing social and academic challenges (Robinson, 2019). Pan also appreciated their ability to read people quickly to take care of their own needs, and “[exist] out of spite,” acknowledging oppression and people who held discriminatory views towards TGNC individuals out of “sheer stupidity” in their perspectives.

Similarly, Jake, who used to be more vocal about trans rights and advocacy, had to let others step up so they could tend to their own well-being. After experiencing many threats, Jake learned to be protective of themselves, prioritizing self-preservation. Thus, when needed, they would ignore those who did not agree with TGNC needs and rights, hide parts of themselves to feel safe, or present a quieter version of themselves, “not loud about who [they were],” when they could not fully “show up” how they wanted in engineering (Jones & Abes, 2013). Sometimes Jake avoided using their pronouns if they did not trust people around them, wanting to prevent people from weaponizing their pronouns against them. While it was painful for Jake to not be their authentic self in certain spaces, and they sometimes had to block unpleasant memories, Jake learned to be

gentle with themselves, taking steps to reduce stress, such as changing their name legally, and learning when to step back to preserve their well-being. Thus, participants experienced strength in active resistance to social expectations (Duran & Nicolazzo, 2017) and gender norms (Nicolazzo, 2016b; Spade, 2015) while discerning occasions for self-preservation.

### **Compassion**

In addition to caring for their own well-being some participants highlighted their strengths in wanting to help others. Jake and Mickey, for example, discussed their interest in improving others' lives through engineering. They and other participants developed a sense of compassion and empathy towards people based on their own experiences and adversities. Jake, for example, had experiences growing up poor and found joy in volunteering at a food pantry. By experiencing people being "unkind" to them as a nonbinary person, they also developed a strength in being more aware and compassionate towards other queer and TGNC people with whom they work, wanting to provide support and change to queer, TGNC, and other disadvantaged populations (Spade, 2015). Jake also discussed a stereotype of TGNC individuals being too sensitive, which Jake viewed as a strength because it helps individuals be compassionate towards others, which is often absent in engineering. Being sensitive and compassionate helped Jake be resilient in oppressive engineering contexts (Kersey & Voigt, 2020).

While participants were able to empathize and show compassion towards other TGNC individuals who experienced challenges in engineering contexts, campus, or society (Hurtado et al., 2012), they also appreciated being a guide or support for a friend. Having their own support systems through community and TGNC kinship (Haverkamp et

al., 2019; Nicolazzo, 2016b), participants offered assistance through interpersonal relationships and larger-scale activism (Nicolazzo, 2017a; Spade, 2015). Whether they were advocating for inclusive policies and practices, such as Solomon, Jake, and Pan working with administrators on name change policies, gender neutral restrooms, and TGNC inclusive forms, or simply helping a friend navigate an academic or personal problem, participants were compassionate and empathetic supports for other students. Pan and Solomon reflected positively on their emotional intelligence development through their leadership experiences while Jake described enjoying being able to “lift up a fellow engineer” by validating, listening, and problem solving with a friend. Mickey also valued being a “person that people came to with their problems,” acknowledging their strength as a team builder who understood and helped others.

### **Building Community Support**

While participants formed some connections in their programs, they developed their strongest support systems outside of engineering, primarily in campus LGBTQ+ and TGNC communities (Haverkamp et al., 2019; Hurtado et al., 2012; Nicolazzo, 2016b, 2017c). Feeling they did not fit in with engineering students (Freeman, 2020), Rain valued the community they developed in the arts. Solomon, as a transfer student in his department, also felt disconnected from classmates. While he gained self-reliance and independence through his experience, Solomon attributed his ability to not have to rely on people in his program to having developed a core group of queer and TGNC friends prior to transferring into engineering. Beyond the friends he made through his LGBTQ+ student organization leadership experience, Solomon also found community by participating in community choirs. He shared, “queer people do exist,” encouraging

others to find community “over settling for mediocre or bigoted people in your department.”

In addition to developing a community of LGBTQ+ or TGNC individuals who could relate to their experiences with their identities (Jones & Abes, 2013), participants also acknowledged the importance of asking for help more broadly. Rain reflected on having to work on being able to ask for help but recognized the importance in being able to do so. Jake and Mickey, for example, had to reach out to support systems and services when experiencing severe mental health concerns during their undergraduate career. Many participants used therapy, finding it helpful when navigating the various stressors that emerged in college and life. As Pan said,

Use those resources... If you're too afraid...you can take people with you, you can grab a friend, you can, if you have a resource center on your campus, you can talk to the director, and they will probably be more than willing to help you figure out what you're gonna say, who you're gonna say it to. These people are resources for a reason.

Two specific ways participants leaned on their support systems were by decompressing with LGBTQ+ and TGNC friends and finding spaces in which they were liberated and validated by peers and themselves (Goldberg & Kuvalanka, 2018; Hetzel & Mann, 2021; Nicolazzo et al., 2017).

### ***Decompression***

After experiencing a negative incident or challenging situation, participants found it helpful to decompress with fellow TGNC individuals or their support system. When encountering TGNC oppression, Solomon took solace in having TGNC peers with whom he could debrief the situation. He shared, “Decompressing with other trans folks, like, “Do you believe that these people think?”...I love it when I can do that.” By talking with

TGNC peers, Solomon had a TGNC kinship network (Haverkamp et al., 2019; Nicolazzo, 2016b) with whom he could relate and understand what he was feeling, offering support and empathy (Golberg & Kovalanka, 2018; Hetzel & Mann, 2021). Solomon also felt relief in processing his emotions through singing with his choir.

Being able to “talk to people about the things that are, you know, the things that are bothering [them],” discussing issues and concerns when they arise, was helpful for Pan as well. Rain also conveyed how helpful it was to have support to “help you through that moment” when encountering an obstacle. After becoming aware of their mental health and struggling with a challenging curriculum and panic attacks, Mickey developed support by opening up with their friends, mother, and therapist. Having people they could decompress with helped them relate with others who had similar experiences with oppression or could validate their experiences by providing a safe, comfortable, and liberating space to discuss their concerns (Haverkamp et al., 2019; Nicolazzo, 2016b; Spade, 2015).

### ***Identity Validation***

In addition to decompressing and processing difficult situations, participants also appreciated having people in their support systems who could validate their identity and related experiences (Golberg & Kovalanka, 2018; Hetzel & Mann, 2021; Spade, 2015). Jake described their support system as “friends who are allies.” Having a lot of queer friends, Jake could lean on their peers when going through a difficult time mentally or when wanting to decompress a certain incident that occurred. Pan found comfort in having a support system in which they could discuss queer and gender issues at a personal and social level (Haverkamp et al., 2019; Nicolazzo, 2016b).



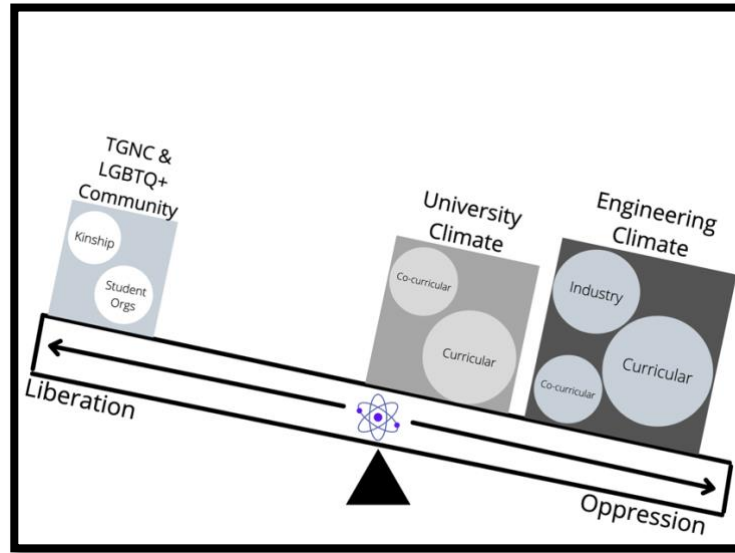
While having support systems was an integral part of participants' journeys and experiences, they were also able to find liberation and validation within themselves. Pan and Rain, for example, felt comfort and validation in their authentic gender presentation (Jones & Abes, 2013). Pan appreciated their sunglasses, hair style, and clothing, being confident as a nonbinary person and an engineer, while Rain also found confidence in their presentation, valuing the belt they purchased and tweaked to their comfort. Whether participants found support, validation, and liberation from their community or in themselves, Jake, Mickey, Pan, Rain, and Solomon all valued finding spaces in which they could be their true selves (Jones & Abes, 2013; Spade, 2015).

### **Findings Through a Liberation/Oppression Lens**

I created a graphic representation to situate the findings from this study in a liberation and oppression framework. Figure 5 shows an illustration of a seesaw that has liberation labeled on the left and oppression on the right end. In the center of the seesaw, an atom reflects participants' core self with their multiple identities. Instead of the atom being housed within rings of oppression as they are in the I-MMDI (Jones & Abes, 2013), the atom oscillates through the seesaw as participants experience both liberation and oppression. As the atom, representing the participant, moves through different contexts and experiences with liberation and oppression, their strengths remain present as they negotiate their identities.

**Figure 5**

*Liberation–Oppression Seesaw*



Three boxes rest on the seesaw indicating the weight they contribute to oppression or liberation by their color and size. Engineering climate is the largest box with the darkest grey color, indicating it is the context in which participants experienced the most oppression. Within the box, the curricular circle is the largest followed by industry, and co-curricular contexts. Out of the three contexts, participants felt most comfortable in co-curricular environments, especially if their friends were present or involved, compared to industry where they hid their identity or found support from queer or TGNC coworkers. The curricular context within the engineering climate is weighted the most, indicating the context's weight through TGNC oppression including erasure, isolation, and mental burdens as participants had to gauge faculty, staff, and student actions and negotiate their identities accordingly.

The university climate box, which is a lighter shade of grey and smaller size than the engineering climate, illustrates the oppression participants experienced in non-

engineering curricular and co-curricular contexts. While participants felt non-engineering environments were more welcoming of TGNC students compared to engineering, they were not always able to be their authentic self in the same way they were in TGNC and LGBTQ+ communities. The administrative violence (Spade, 2015) present in university policies and practice contributes to the university climate box weight towards oppression. The curricular and co-curricular circles within the university climate are intentionally smaller than the respective circles in the engineering climate, indicating participants' perceptions of non-engineering contexts being more inclusive of their identities compared to engineering.

The smallest, lightest grey box on the seesaw represents the TGNC and LGBTQ+ community. The box is placed at the far end of the liberation side illustrating how participants were able to be their authentic self with TGNC and LGBTQ+ partners, friends, student peers, and community members on and off campus. While they navigated oppression at their university and within engineering, participants found liberation through interpersonal relationships with TGNC and LGBTQ+ communities. Specifically, participants found liberation in oppressive contexts by connecting with people with whom they could explore or share their identity and experiences. For example, Solomon hid his identity during his internships, but connected with other queer interns and presented their authentic self with them outside of work. Pan struggled to be able to discuss sociocultural issues in the engineering classroom but found queer and TGNC peers with whom they could discuss politics and sociocultural topics more freely than with engineering classmates. Thus, this model and findings show how participants only experienced liberation through interpersonal relationships. University and engineering

culture remained the same, upholding administrative violence (Spade, 2015) through oppressive policies and practices. While participants found some supports within the oppressive contexts, participants avoided the contexts, taking actions to find liberation elsewhere. However, while TGNC and LGBTQ+ communities were a central part of participants' liberation, the communities did not relieve the realities of oppression they encountered at their universities and in engineering. University and engineering administrators, faculty, staff, and students upheld institutional and departmental oppression, requiring participants to seek liberation through interpersonal relationships in TGNC and LGBTQ+ communities.

### **Summary**

In this chapter, I discussed the themes that emerged across the narratives of Jake, Mickey, Pan, Rain, and Solomon. Beginning with experiences in the university climate and campus involvement, participants encountered TGNC oppression in the campus community as well as through institutional policies and practices, highlighting the DLE model contexts (Hurtado et al., 2012) in which administrative violence and other forms of oppression occurred, harming and disadvantaging TGNC students (Spade, 2015). Through their involvement on campus, participants built a community of LGBTQ+ and TGNC friends, which provided a supportive network with whom participants could explore their gender identity, especially when they often had to hide or adjust their authentic self in engineering contexts (Jones & Abes, 2013). In addition to their LGBTQ+ and TGNC community, or TGNC kinship (Haverkamp et al., 2019; Nicolazzo, 2016b), participants also observed and engaged in non-engineering environments, determining that people in non-engineering curricular and co-curricular contexts were

more accepting towards TGNC students, matching findings from previous research (Bilimoria & Stewart, 2009; Cech & Waidzunus, 2011; Cooper & Brownell, 2016; Forbes, 2020; Kersey & Voigt, 2020; Linley et al., 2018).

When navigating the engineering climate, participants encountered “a world of its own.” Characterized by a rigid and stressful curriculum, participants described challenges they had with mental health as they progressed through their program. Participants were also aware of underrepresented gender, racial, and ethnic identities in engineering, looking for ways to connect with others who shared their identities in an environment that tended to exclude them (Jones & Abes, 2013). Participants also navigated gender dynamics in engineering as White, heterosexual, cisgender men dominated the field, creating hostile and oppressive environments for anyone who identified differently. Considering CTP, the engineering climate centered identities and experiences of those with dominant identities, thus failing to give power, liberation, inclusion, or consideration to TGNC students or anyone with an underrepresented identity in engineering (Spade, 2015). People within the engineering climate also tended to be impersonal, maintaining a surface level, professional façade, hindering the participants from being able to form meaningful connections with faculty, staff, students, and co-workers. Additionally, the engineering climate maintained depoliticization, failing to provide space for sociocultural topics even when they directly applied to class discussion and problem solving. Thus, participants often hid their authentic self in engineering contexts (Hurtado et al., 2012; Jones & Abes, 2013).

Jake, Mickey, Pan, Rain, and Solomon also shared experiences negotiating their identities in engineering curricular, co-curricular, and community contexts (Hurtado et

al., 2012). In curricular contexts, TGNC identities and concerns were erased in curricular discussions and departmental consideration for diversity needs. Not only were TGNC identities not centered, many engineering faculty and students completely excluded and ignored them (Spade, 2015). Participants carried several mental burdens when negotiating their identity including having to navigate gender and racial stereotypes, gauge reactions of others to determine safety and acceptance, adjust their identity based on perceived safety and threats with oppression, and educate others about their needs, identities, and other social issues (Jones & Abes, 2013). By the nature of the engineering climate, participants also experienced isolation, having difficulty connecting with classmates and finding support from faculty. While professors and classmates were generally unwelcoming towards TGNC individuals, participants identified supportive individuals by noticing people who were actively engaged as LGBTQ+ and TGNC allies and people who advocated for LGBTQ+ and TGNC students and made intentional efforts to be inclusive by using students' correct names and pronouns. While these actions did not disrupt or transform engineering contexts to center TGNC needs, it was a way for TGNC participants to be acknowledged in a space that tended to erase them (Spade, 2015).

Engineering co-curricular contexts were generally more comfortable spaces for TGNC students compared to curricular contexts, however, participants did not feel they were able to be their authentic self compared to co-curricular contexts with their LGBTQ+ and TGNC communities (Jones & Abes, 2013). While participants also encountered TGNC discrimination with classmates, they found support through LGBTQ+ and TGNC camaraderie, if available, as well as co-curricular and campus

support staff who validated their identity and experiences. After encountering oppression, isolation, and discomfort in engineering, some participants engaged in volunteer and outreach efforts to help future generations of students with underrepresented identities feel they belong in engineering, attempting to resist norms and transform engineering by doing their part to recruit and connect with students with underrepresented identities (Spade, 2015).

Similar to curricular contexts, participants carefully gauged others' reactions and assessed the environment when in community contexts for their internships. Whether they were preparing for an interview or starting a new job, participants experienced anxiety about whether their company and co-workers would be safe and accepting. Participants also carefully observed and questioned interviewers and co-workers to determine the extent to which they had to hide or adjust their authentic self during their internships (Jones & Abes, 2013).

I also discussed the strengths and coping skills participants developed and used during their engineering programs. While each participant had their own strengths, several participants expressed the importance of self-preservation academically and personally, needing to tend to their mental health when navigating a stressful program as well as burnout when negotiating their identity in oppressive engineering contexts (Hurtado et al., 2012; Jones & Abes, 2013). Participants valued their ability to be compassionate, empathetic, and help other TGNC individuals and engineers, as well as the community support they built to help them process challenging situations and find liberation by validating their identity and centering their needs (Spade, 2015).

Lastly, I reviewed a graphic representation of the findings in relation to TGNC liberation and oppression. The figure illustrates differences in oppression between the engineering climate, university climate, and TGNC and LGBTQ+ community, with participants experiencing liberation through TGNC and LGBTQ+ communities and the most oppression through engineering climates. The graphic highlights how participants had to find liberation through interpersonal connections, which did not relieve them from the realities of oppression maintained by the university, engineering departments, and engineering companies.

In Chapter 6, I use the findings from this study to provide implications for research, higher education and student affairs policy and practice, engineering departments, engineering companies, and opportunities for engineering students.



## CHAPTER 6: IMPLICATIONS AND OPPORTUNITIES

Jake, Mickey, Pan, Rain, and Solomon's narratives illuminate how higher education professionals and researchers, engineering educators, employers, and students can challenge existing oppressive systems. By understanding the participants' experiences and strategies for success as they negotiated their identity in their engineering major, those who work with TGNC engineering students can examine their respective environments and consider ways to include and center TGNC identities in their work and interrupt systems of oppression (Spade, 2015). In this final chapter, I discuss the implications of this study on higher education and student affairs (HESA) research, HESA policy and practice, engineering curricular and co-curricular contexts, and engineering industry, as well as opportunities for current and prospective TGNC engineering students. I conclude with an extensive summary of this dissertation study.

### **Implications for Higher Education and Student Affairs Research**

This study reflected previous findings from research about trans\* kinship (Haverkamp et al., 2019; Nicolazzo, 2016b, 2017c), bifurcation and depoliticization within engineering climates (Cech, 2013), problematic binary practices in higher education (Bilodeau, 2009; Grice, 2020; Nicolazzo, 2016b, 2017c), and underrepresentation in hostile engineering environments (Cech & Waidzunus, 2011; Grossman & Porche, 2014; LaCosse et al., 2016; Robnett, 2016; Seron et al., 2018). Considering the specific design and findings from this dissertation, I propose several implications for HESA research. First, given the limitations of my sample, I encourage

researchers to examine the experiences of TGNC students who do not engage with curricular and co-curricular opportunities on campus and do not persist in engineering. Second, I suggest how to expand Hurtado et al.'s (2012) DLE model to capture more complex curricular and co-curricular systems. I also suggest further research address TGNC student experiences across STEM disciplines, comparing engineering to biology, math, physics, and other STEM majors to determine challenges that may be specific to each discipline. I propose future researchers incorporate a CTP approach to continue challenging oppressive systems, centering TGNC perspectives, and involving students with underrepresented identities (Spade, 2015). Research focusing on specific intersecting identities of TGNC students in engineering and intersecting systems of oppressions they face (Jones & Abes, 2013) can provide added depth to understanding the identity negotiation of TGNC students with multiple marginalized identities in the field. Lastly, I challenge professional HESA and engineering organizations and professionals to consider ways existing policies and practices for sharing research opportunities may hinder TGNC students' ability to share their experiences and needs.

### **Research Students Who Do Not Engage or Persist in Engineering**

This study focused on TGNC students who graduated or persisted through their engineering program. Jake and Pan were nearing the end of their undergraduate engineering programs while Mickey, Rain, and Solomon were graduate students at the time of the interviews. Thus, their experiences did not reflect those of students who left engineering. Additionally, all participants were actively engaged in student organizations, several whom held formal leadership positions and advocated for TGNC resources and supports on campus. Therefore, examining the narratives of students who were less

connected to co-curricular opportunities and support systems on campus may elucidate different challenges and strategies compared to Jake, Mickey, Pan, Rain, and Solomon. Examining the experiences of TGNC student who were not involved or engaged on campus may illuminate dynamics that impede their success in their engineering major and capture diverse experiences within curricular, co-curricular, and community engineering contexts.

### **The DLE Model and Various STEM Disciplines**

Hurtado et al.'s (2012) DLE model served as a helpful framework to contextualize the socio-historical, policy, and institutional contexts that influenced TGNC student experiences. However, participant narratives highlighted ways the model falls short. Specifically, curricular contexts could be split between engineering and non-engineering environments, comparing students' experiences in arts and humanities (Hughes, 2017) or social sciences (Forbes, 2020) to engineering, for example. Assessing differences in TGNC experiences across STEM fields (Perez-Felkner, 2019), comparing TGNC student experiences in non-engineering STEM majors to engineering majors, could provide insight into specific challenges and oppressive systems within each discipline. Further, researchers can use a strengths-based perspective to explore how TGNC students can strengthen engineering and other STEM fields through interdisciplinary and intersecting epistemologies.

Additionally, the DLE model co-curricular contexts can be broken down into multiple types: co-curricular opportunities associated with engineering, co-curricular organizations or activities tied to non-engineering majors, and co-curricular contexts with identity-based organizations on campus. While some participants engaged in engineering

student organizations, they experienced less hostility when negotiating their identity within non-engineering co-curricular contexts, especially through LGBTQ+ and TGNC leadership, student organizations, and activism. Participants experienced liberation when they could be their authentic self (Jones & Abes, 2013) or explore their gender identity (Goldberg & Kuvalanka, 2018; Hetzel & Mann, 2021; Nicolazzo et al., 2017) and find support with individuals who shared their identity or were open to diverse identities and experiences.

### **CTP and Intersecting Identities**

Higher education and student affairs scholars, such as Nicolazzo (2017c), used CTP as a critical framework for research on TGNC students. I encourage researchers to continue using CTP and other critical frameworks to center and empower TGNC students in their scholarship. These critical perspectives can provide an important lens through which researchers can examine the lived experiences of TGNC students and all students with marginalized identities in higher education including students with multiple marginalized identities such as TGNC students of color or with disabilities.

Three participants in this study identified as nonbinary, one as trans/nonbinary, and one as a transgender man. Thus, I recommend future researchers continue collecting and sharing the narratives of TGNC individuals, perhaps aiming for a broader and larger TGNC sample that puts intentional emphasis on the voices of transwomen and those with multiple marginalized identities (Jones & Abes, 2013). It is important to continue understanding the diversity of TGNC experiences, not disaggregating specific TGNC identities, but understanding the complexity of identities and subsequent experiences with intersecting systems of oppression. All participants discussed their queer identities as

well as their TGNC identity. Mickey, Jake, and Rain shared their experiences as students of color in engineering, and Solomon described his experiences as someone with a disability in engineering. While their narratives highlighted their unique experiences and multiple, intersecting systems of oppression they had to navigate, future research that focuses specifically on students of color, students with disabilities, and other subpopulations would provide helpful insights on similar and divergent needs of TGNC students when considering all their identities. Using Jones and Abes' (2013) I-MMDI or considering other critical frameworks that incorporate intersectionality may be helpful in furthering TGNC research.

### **Organizational Gatekeeping**

When advertising my study, I encountered numerous barriers from professional organizations, LGBTQ+ centers, and student organization advisors. In line with CTP, my goal was to provide TGNC students the opportunity to share their experiences and center their narratives (Spade, 2015). When contacting leaders of professional organizations, I commonly received no response or was directed to outdated information that was impossible to navigate without further assistance. Some organizations required a research committee to review the request to share the study with members. While this is understandable as not every study can or should be widely shared, the responses commonly missed the intention of my study, expressing concern about harming or overwhelming TGNC students. Some LGBTQ+ centers also claimed they could only share studies their institution's IRB reviewed. Additionally, some professional organizations and student organization advisors decided to not share the study with their students for fear it would burden them or require them to out themselves to faculty or

staff who shared the opportunity with them. However, by not providing TGNC students the voluntary option to participate, practitioners and organizations are contributing to administrative violence and systemic trends of excluding TGNC perspectives (Manire & Nicolazzo, 2014; Spade, 2015; Stone, 2009; Stryker, 2017). Advisors could, for example, share the opportunity with the student organization and let the student leaders decide if it is appropriate to share with members. Faculty and staff can also share opportunities with all students through a general listserv to avoid students feeling singled out or pressured to participate due to receiving information from a specific faculty or staff member.

Whomever is sharing the research opportunities can also emphasize their participation is voluntary. Additionally, sharing with all students also better ensures students who are not engaged with student organizations can also participate. I encourage organizations and those who can advertise calls for participation to involve TGNC individuals in decision-making when assessing current policies and practices on disseminating research opportunities and determine if there are unnecessary restrictions in place that are harming TGNC students' abilities to tell their stories.

### **Implications for Higher Education and Student Affairs Policies and Practice**

This study highlights ways administrators and practitioners can address administrative violence (Spade, 2015) and improve TGNC policies and practices. While HESA administrators may not have as much direct interaction with TGNC students as professors and student affairs staff, they can have a significant influence on the institutional support for student populations by way of resources, policies, and college or university initiatives. In this section, I review ways HESA administrators and

practitioners can restructure policies, practices, and resources to center TGNC perspectives, experiences, and needs.

### **TGNC Policies**

Current policies and practices that oppress TGNC students must be undone and recreated to better incorporate TGNC needs and experiences (Spade, 2015). TGNC students should have the same access to resources and services as students with privileged identities. Solomon, for example, encountered issues with his campus' housing policies (Wagner et al., 2018) and name change system (Lieberth, 2020). As a student leader, he advocated for more inclusive systems, however the advocacy burden fell on TGNC students. Pan and Jake advocated for similar concerns as well as inclusive forms in the counseling center and gender-neutral restrooms on campus. While campus administrators and marketers may tout diversity and inclusion efforts, HESA administrators and practitioners must go beyond mere "lip service" policies and ensure TGNC students have full protections and supports in the implementation and practice of written policies.

One of the more concerning issues that arose in participant narratives was Solomon's experience with a classmate who harassed him. Given the problematic history of Title IX excluding TGNC students (Curtis, 2016; Kimmel, 2016; Kirkland, 2006), Solomon was hesitant to pursue formal Title IX reporting opportunities, and the resources he received failed to assist him in navigating his curricular contexts. Thus, again, Solomon had to advocate for himself, enduring the burden of working with faculty to reduce his interactions with the harasser while also undergoing the inherent stress of being harassed and transferring to another institution.

HESA policy makers and administrators should assess current policies to ensure they center TGNC students and avoid administrative violence (Spade, 2015). Directly involving TGNC students in decisions around policy and practice reforms will center TGNC voices, helping policy makers and administrators understand the ways existing policies harm TGNC people. By incorporating the TGNC community, those who create and implement policies can address the specific needs of the community, reducing the risk of creating policies that uphold administrative violence and hinder the liberation of TGNC students (Spade, 2015).

### **Resources and Support**

Previous studies indicated a need for action addressing victimization, microaggressions, and discrimination towards TGNC students (Seelman et al., 2017a) as well as related mental health concerns on campus (Woodford et al., 2018a). However, considering CTP, it is important to include TGNC individuals when determining the specific needs and degree of importance of initiatives based on their identities and experiences (Kean, 2020; Spade, 2015). Just as it is important to assess existing policies, practitioners should review practices to determine if TGNC and all students with marginalized identities are included in the development and implementation of practices. Jake, for example, suggested the counseling center include more gender identity options on their intake forms to help TGNC students share their authentic identity with the center. However, to avoid students, like Solomon, having to take on the burden of advocating for inclusive practices, HESA personnel can do their part to proactively review practices to incorporate TGNC needs and experiences. To do this, practitioners must include TGNC



individuals instead of assuming they are fully aware of the resources or accommodations that TGNC students need (Spade, 2015).

### **Implications for Engineering Curricular and Co-Curricular Contexts**

In a field dominated by White, heterosexual, cisgender men, there are systems in place that benefit engineering faculty, staff, and students who fall into the majority category. Those who are marginalized are disadvantaged and oppressed by a system that was not built for them and continues to fail to incorporate them (Cech & Waidzunas, 2011; Cech et al., 2017; LaCosse et al., 2016; Linley et al., 2018). By continuing the administrative violence through policies and practices present in oppressive systems in engineering (Spade, 2015), departments are exacerbating social problems and inequities (Spade, 2020). To undo existing oppressive systems in engineering and create TGNC inclusive curricular and co-curricular contexts, engineering administrators, educators, and practitioners can incorporate a CTP framework to center TGNC needs when improving the engineering climate (Spade, 2015).

All participants echoed previous research claiming engineering climates are hostile towards TGNC people compared to non-engineering majors (Bilimoria & Stewart, 2009; Cech & Waidzunas, 2011; Cooper & Brownell, 2016; Forbes, 2020; Kersey & Voigt, 2020). CTP calls for the centering of TGNC and other marginalized community identities, experiences, and needs as well as an examination of the ways systems of oppression impact trans people (Spade, 2015). Thus, to center and liberate TGNC people, engineering administrators and educators must systemically change the engineering climate by addressing problematic gender dynamics; diversifying their faculty, staff, and

students; incorporating social and interdisciplinary discourse; and encouraging meaningful personal connections beyond surface level interactions.

### **Gender Dynamics**

Jake, Mickey, Pan, Rain, and Solomon were aware women and TGNC people were underrepresented in engineering before and during their program. While engineering administrators and educators tend to have an awareness of the underrepresentation of women (LaCosse et al., 2016; Robnett, 2016), they disregard or ignore TGNC identities. However, the participants dedicated careful attention to the ways faculty and classmates treated women or someone who had an androgynous gender presentation, noticing men who upheld a toxic hegemonic masculinity (Hughes, 2017; Kimmel, 2008; Seron et al., 2018). Rain, for example, noticed the men in their class interacted more with feminine women classmates and tended to take the lead and dominate group projects. Pan expressed a discomfort that people had with women in STEM, while Solomon heard his women classmates disclose how they had men instructors encourage them to change majors to a discipline that had higher representation of women. Additionally, considering heteronormative masculinity, Solomon felt he was viewed as “less valid” due to his “effeminate or obviously gay” gender expression and presentation.

Having an awareness of the implications of women and TGNC student experiences as underrepresented individuals in engineering can help administrators and educators better incorporate TGNC people into curricular contexts and reduce barriers in the curriculum and in interpersonal interactions between faculty and students (Hurtado et al., 2012; Jones & Abes, 2013). Administrators and educators can learn about women

developing an engineering identity (Meyers et al., 2012), their experiences having an underrepresented identity (Foor et al., 2007; Settles, 2004; Tonso, 2007) and psychological experiences related to their perceived competence and ability, and navigating stereotype threat (Grossman & Porche, 2014; LaCosee et al., 2016; Robnett, 2016; Steele, 2010). In addition to understanding individual experiences, administrators and educators should also review and interrupt systems of oppression that students experience such as racism, sexism, and TGNC oppression (Jones & Abes, 2013; Spade, 2015).

Similarly, by considering student narratives and experiences, such as those captured in this dissertation, educators can identify ways their curriculum excludes and oppresses TGNC people. For instance, using an example in class that only includes men and women erases TGNC identities, as Solomon's instructor did when using binary gender options for an x and y-axis example. Instructors can also reflect on how they talk to students, identifying ways they uphold heteromasculine norms (Hughes, 2017) when rewarding behaviors or maintaining ideals and structures. If groups are working in class, perhaps the instructor or TAs can move around the room to monitor whether women and TGNC individuals are being mistreated by the men in their groups. Or, perhaps the instructor provides an opportunity for group members to check in with them. Doing so, for example, would have allowed Jake to disclose their concerns about their classmate telling them, "Y'all need to get saved" earlier than the end-of-semester peer evaluations. Additionally, instructors can emphasize ways students can report harassment or discrimination in and outside of the classroom.

However, for students to disclose their identity or concerns, they need to perceive the instructor as supportive and welcoming of TGNC students (Kilgo et al., 2019). Otherwise, students may actively avoid interacting with instructors who they perceive as unsupportive or unsafe (Vaccaro et al., 2021), as Pan experienced with their instructor who denied them an excused absence when attending an LGBTQ+ conference. After experiencing multiple systems of oppression in engineering, the participants in this study started with a base assumption that people in engineering were not welcoming of women and TGNC people (Cech & Waidzunas, 2011; LaCosse et al., 2016; Robnett, 2016). Thus, educators should directly and proactively indicate their support of the TGNC community instead of placing the onus on TGNC students to determine if they are an ally and disrupt systems of oppression that harm TGNC and all marginalized communities in engineering.

### **Faculty, Staff, and Student Diversity**

In a field dominated by White, cisgender men, it is critical that TGNC students and individuals with underrepresented identities have mentors and people with whom they can identify. Or, at the very least, students need to be able to identify faculty, staff, or students who are supportive allies (Haverkamp et al., 2019). Jake, for example, did not see any faculty that shared their identity, but was aware of people of color in faculty positions, making them feel they could “thrive and not just survive.” Thus, the few faculty of color served as evidence that students of color could find success in a White dominated field. Having diversity within faculty, staff, and the student body, and providing mentorship opportunities can influence students’ sense of belonging in engineering (Apriceno et al., 2020). Also, as Hurtado et al. (2012) illustrated in the DLE

model, the identity of faculty and staff members can influence the student experience in curricular and co-curricular contexts.

Beyond mere representation, having diverse faculty, staff, and students gives students the opportunity to connect with each other, forming counterspaces in which they can find liberation by sharing their experiences, providing and receiving support, and potentially presenting their authentic self more compared to contexts in which they are the only one who is TGNC, LGBTQ+, or a person of color (Jones & Abes, 2013; Ong et al., 2018). Participants found support and freedom to explore and celebrate their identities within TGNC kinship networks (Haverkamp et al., 2019; Nicolazzo, 2017c), however most participants had to find or develop TGNC counterspaces or kinship networks through LGBTQ+ centers and student organizations. By providing opportunities for TGNC engineering students to create a liberatory space in which they can connect with other TGNC individuals, engineering administrators, faculty, and staff can help students find others who share their identity within their department.

However, since students often perceive the engineering climate as hostile towards TGNC individuals (Cech & Waidzunas, 2011; Forbes, 2020), administrators, faculty, and staff should ensure spaces and opportunities available to students are safe. If an engineering school creates a TGNC student organization, but there are no supports or resources for students if other students harass them, then this could cause greater harm to TGNC students. As Pan and other participants shared, some queer and TGNC individuals intentionally did not out themselves to others in their engineering department for fear of being targeted for harassment and discrimination. Thus, administrators, faculty, and staff should implement appropriate protections and, like the active allies that participants

described, attend LGBTQ+ and TGNC events and use inclusive actions in curricular and co-curricular contexts to further indicate TGNC support.

Additionally, people with multiple marginalized identities in engineering encounter intersecting layers of oppression in harsher ways than individuals negotiating a singular marginalized identity in engineering (Jones & Abes, 2013; Spade, 2015), thus having counterspaces, mentors, and identity-based student organizations can provide support systems when facing oppression or seeking to challenge or undo oppressive systems. However, engineering administrators and educators must also do their part and go beyond being allies and incorporating inclusive policies and practices by personally challenging and undoing administrative violence and the systems that bring harm to TGNC and other marginalized populations (Spade, 2015), striving to create an inclusive climate for diversity (Hurtado et al., 2012).

### **Social and Interdisciplinary Discourse**

Another way to systemically alter the engineering climate is through course content and educational practices. Participants' stories illustrated their experiences as TGNC students in engineering curricular contexts, highlighting the mental burden they endured when negotiating their identity (Jones & Abes, 2013) in a field that erases their identity (Cech, 2013). By incorporating social identities, specifically centering TGNC experiences and needs in engineering contexts, educators can better adjust their content and educational practices (Butterfield et al., 2018; Linley & Nguyen, 2015). However, in addition to mere inclusion, faculty must directly address the field's focus on technical aspects (depoliticization) and students' skill and performance (meritocracy) without

incorporating social identities or acknowledging systemic barriers and oppression that affect TGNC students' experiences (Cech, 2013).

Engineering educators can also revamp curriculum to include and support TGNC identities and experiences. Using Kean's (2020) application of a critical trans framework for K-12 education, the first approach would be to acknowledge the individual, institutional, and sociocultural influences on gender in engineering curricular contexts. Similar to how the DLE model situates curricular environments in the institutional context and climate for diversity, policy context, and socio-historical context (Hurtado et al., 2012), engineering administrators and faculty must acknowledge the factors that influence student experiences with gender in the classroom. Doing so creates a more inclusive space for TGNC students while normalizing and valuing TGNC identities and experiences for all students. Additionally, engineering educators can connect class content to sociocultural concerns of marginalized communities.

The second principle Kean (2020) applied to K-12 education is an intentional effort to consider the ways genderism interacts with systems of oppression, considering the relationships to racism, sexism, classism, and ableism. Carefully reflecting on the ways oppression impacts students in the classroom, and thus the eventual work they will do in the field of engineering, helps to undo existing oppressive content and practices in engineering. Lastly, applying a critical trans framework to engineering curricular contexts requires centering TGNC knowledge, experiences, and expertise. Thus, when re-designing engineering curricula, TGNC people and all people with marginalized identities need to be at the forefront of the curricular discussions and renovations.

To maintain a CTP lens in engineering curricula, engineering educators must participate in constant reflection, incorporating diverse identities and perspectives, to continuously assess and adjust curricular contexts to center the needs of oppressed and marginalized communities (Spade, 2015). The goal is to consider multiple perspectives and avoid trying to identify and implement a final, one-size-fits-all solution to a problem or curriculum. Just as the engineering course content changes to incorporate new technologies and approaches, departments must also update their curricula to address the changing needs and perspectives of TGNC and all marginalized communities. Integrating an interdisciplinary approach empowers engineers to adapt sophisticated perspectives to solve complex problems, which helps the field of engineering as well as the communities it serves. By not incorporating perspectives that allow engineers to share their authentic selves and consider the experiences of marginalized communities, engineering educators actively harm students, the field, and the communities engineers strive to serve.

### **Personal Connections and Support**

TGNC students, including the participants for this study, described engineering as separate from TGNC culture (Haverkamp et al., 2019). Since the engineering climate tends to adopt a bifurcation and depoliticization perspective (Cech, 2013), it dismisses any consideration of social identities and experiences. While there are places to encourage professionalism, identities and personal experiences do not need to be isolated from interpersonal connections between classmates, staff, faculty, or co-workers. Being able to relate to one another, as Pan mentioned, makes someone be more “human” and less of a “robot.” While participants found the most open and supportive connection with



LGBTQ+ students and TGNC kinship networks (Nicolazzo, 2017c), they were also able to open-up personally to classmates in non-engineering classes and majors.

By encouraging all students to make connections with each other, and perhaps assisting with that process through formal study groups or engineering teams, faculty and staff can help TGNC students be less isolated from other students in their program. This can also benefit students who transfer into engineering, like Solomon who did not form peer study groups or connections when most of their class did. Faculty and staff can also provide mentorship opportunities as TGNC students may struggle to identify a mentor due to the underrepresentation of people who share their identity in engineering (Dugan et al., 2012). Providing mentors and connecting TGNC students to classmates and co-curricular or professional opportunities can assist with the students' development and connection in their major (Kilgo et al., 2019).

TGNC students also need appropriate support from faculty and staff. Spade (2015) discussed administrative violence that prevents TGNC people from accessing necessary resources and inclusion. Without appropriate support, TGNC students can be isolated, having to take on a larger mental burden to persist through their program that does not recognize and validate their existence. To reduce TGNC students having to constantly seek their own accommodations or hide their identity, engineering administrators and educators can, for example, advocate for specific support groups and mentorship opportunities for TGNC students or be more intentional about being a supportive and visible ally (Butterfield et al., 2018; Linley et al., 2016). Or an educator might want to begin using gender inclusive language and asking all students what name they wish to be called to alleviate the burden of TGNC student disclosure (Bartels, 2020).

Considering the tenets of CTP, educators might also be more intentional about centering the experiences and identities of TGNC students while also being mindful of their interpersonal interactions with students in curricular and co-curricular contexts (Faulkner et al., 2020).

### **Implications for Engineering Industry**

While companies are separated from the climate for diversity within Hurtado et al.'s (2012) institutional context and climate for diversity, they are inevitably affected by socio-historical contexts, policy contexts, and their own company culture. Companies too will have historical, organizational, compositional, psychological, and behavioral dimensions in their own climate for diversity that warrant review in determining how to make their company inclusive of TGNC employees. Adopting a CTP framework can also be useful in engineering industry to consider ways employers perpetuate administrative violence and oppression of TGNC and marginalized people through company policies and practices (Spade, 2015). By reflecting and incorporating diverse identities and perspectives, employers can improve their TGNC inclusion efforts. Specifically, companies can review and revamp their policies and culture, also being transparent in their policies, practices, and values when hiring people. Employers must also provide on-going support for their employees, avoiding touting inclusive practices as a recruiting tactic without TGNC inclusive values coming to fruition in the actual workplace.

### **Transparency in Company Policies and Culture**

Like higher education, companies should assess current policies and practices to ensure TGNC individuals are protected and have the same access to opportunities and resources as non-TGNC employees. Incorporating TGNC individuals within the

development of policies and practices will help center TGNC voices and experiences (Spade, 2015). Similar to the systemic changes in engineering curricular and co-curricular contexts, employers in community contexts can implement strategies and policies to reduce prejudice, support diverse identities, and normalize sociocultural dialogues in the company (Freeman, 2020; Riley 2008; Yoder & Mattheis, 2016).

Companies should also provide transparency with their policies and culture. Jake, Mickey, Pan, Rain, and Solomon all had to inquire with potential employers about company culture and policies for LGBTQ+ and TGNC individuals or ask “inconsequential questions” to co-workers to gauge their perspectives towards LGBTQ+ and TGNC individuals. By providing transparency, employers can take the burden off TGNC employees in having to assess whether they will be safe or comfortable being their authentic self at the company (Jones & Abes, 2013).

### **Ongoing Support**

Beyond advertising inclusive TGNC policies and practices to prospective employees, companies need to follow through and provide ongoing support. While protective policies against harassment, for example, are crucial, companies can provide other ways of supporting TGNC people. Integrating employee or business resource groups is one way to promote people with marginalized identities and assist in creating inclusive and supportive environments to aid employee success (Vander Kaaden et al., 2020). These resource groups can serve as a similar community to the TGNC kinship networks (Nicolazzo, 2017c) and LGBTQ+ student organizations Jake, Mickey, Pan, Rain, and Solomon participated in while on campus, providing a group in which people

with shared identities can come together to share experiences, support one another, and advocate for inclusion and change (Spade, 2015).

Companies, in line with CTP, should also engage in ongoing reflection and assessment with their TGNC employees, to continually ensure TGNC experiences are centered and incorporated within the company (Spade, 2015). Employers, like engineering departments, should understand existing norms and barriers within engineering that oppress TGNC individuals and other underrepresented identities (Williamson, 2020). Whether employers revamp policies to center TGNC identities, create resource groups for TGNC individuals, implement trainings to educate employees on diverse identities and experiences, employers must work alongside TGNC and other underrepresented employees to create inclusive workplaces that directly address community needs (Spade, 2015).

### **Opportunities for TGNC Engineering Students**

Jake, Mickey, Pan, Rain, and Solomon all persisted through an engineering program in which there were few, if any, other TGNC individuals. Their narratives illustrated that despite being in a field dominated by White cisgender men, Participants were able to navigate historically oppressive systems using their strengths and coping strategies to find their own success and challenge a system that was not built for them. While the engineering environments were not welcoming or comfortable to TGNC individuals, the participants belonged there because they wanted to be engineers. Most participants were driven by a passion for engineering that provided a “life-giving” element to their experiences in their program and found ways to tend to their own needs

and build community when they needed TGNC support and liberation that was not present in engineering.

### **Self-Preservation**

Current and prospective TGNC engineering students can develop self-preservation strategies to assist with the challenging engineering curriculum as well as TGNC oppression they may encounter in their program. Whether students familiarize themselves with campus resources or find their own support systems and strategies through peer groups or communities online or in the town or city around campus, students can develop helpful tactics to persist and succeed in engineering. Jake and Mickey learned it was necessary to take time for themselves and tend to their mental health after encountering the stress of engineering coursework and oppression. They were able to work with their academic advisors, counseling centers, and dean of students office to find appropriate supports and accommodations.

Pan and Jake also discussed balancing their time and energy, Jake referring specifically to spoon theory (Miserandino, 2003), acknowledging the importance of socializing with friends, taking breaks to tend to self-care while not spending all of one's time studying. Aside from spending time with student organizations and friends, participants enjoyed fun activities such as archery, yoga, choir, and art, allowing them to decompress and take a break from engineering. Participants also discussed a need to intentionally step away from TGNC activism and advocacy efforts when it became too painful or draining to take the lead on challenging oppressive systems. Jake, who used to participate in protests and other activism efforts, became burned out and decided to let others in the community take the lead while they took a break. Solomon, when feeling the

need to speak up for personal and community TGNC rights and inclusion when no one else in their class would, also identified needing to choose his battles to avoid mental and emotional burnout. Through coping strategies and finding supports in communities, participants implemented self-care and participated in mutual aid (Spade, 2020) through their campus and off-campus communities.

### **Build Community**

Spade (2020) described mutual aid as the “collective collaboration to meet each other’s needs, usually from an awareness that the systems we have in place are not going to meet them” (p. 7). Participants highlighted their LGBTQ+ and TGNC communities as being important factors in their success, developing a support system to participate in mutual aid and liberation when exploring and celebrating their identities, challenging oppressive policies and practices in engineering contexts and higher education, and sharing experiences. Whether students formed or joined communities on campus, such as LGBTQ+ or TGNC student organizations, or found a supportive community through an online or city community, such as Science Twitter or a gay men’s chorus, finding people who could support the identities they hid or suppressed in engineering contexts was invaluable for participants.

Jake also found it helpful to connect with students in their major, appreciating a like-mindedness with people who were just as passionate as they were about their major. Mickey formed a study group with students who shared their identity at the time, which provided a space to support one another academically and personally. If students are unable or unwilling to connect with other students in their program, like Rain experienced, participating in LGBTQ+ or TGNC communities can help provide

camaraderie or kinship (Haverkamp et al., 2019; Nicolazzo, 2017c) when encountering challenges in engineering, college, family structures, or general society. Additionally, having a community of people who share an identity can offer necessary support and validation when exploring their identity or simply needing a space to be their authentic self.

### **Summary**

In this chapter, I provided the implications for HESA research, policy, and practice; engineering curricular, co-curricular, and community contexts; as well as opportunities for TGNC engineering students. First, participants in this study persisted through their engineering majors and were actively involved in campus student organizations. I propose future research examine the lived experiences of TGNC students who pursued but did not persist in engineering and of TGNC students who were not engaged in campus communities or activism. Considering the differences in engineering and non-engineering curricular, and engineering, non-engineering, and LGBTQ+ or TGNC co-curricular contexts, I also recommend future researchers examine student experiences across disciplines, expanding on the DLE model's (Hurtado et al., 2012) single curricular and co-curricular contexts.

Considering the diverse identities, perspectives, and experiences with intersecting systems of oppression that can be captured in the I-MMDI (Jones & Abes, 2013), I encourage researchers to explore the experiences of TGNC students and people of all underrepresented identities in engineering in greater detail. For example, research could focus on Black transwomen in engineering, an identity that was absent from this study, or TGNC students with disabilities in engineering. I also call for professional engineering

and HESA organizations as well as faculty and staff who work with TGNC students to reflect on current protocols for sharing research. Considering ways research opportunities can be shared with TGNC individuals can help liberate TGNC people by centering their needs in engineering and HESA policy, education, research, and practice.

HESA administrators, faculty, and staff should also examine existing policies and practices, and restructure them in a way that center TGNC needs and experiences to ensure appropriate protections and inclusion of TGNC students (Spade, 2015).

Administrative violence (Spade, 2015), such as the harassment policies Solomon encountered, are vital areas HESA personnel must address. Administrators, faculty, and staff must consult TGNC individuals and assess existing policies, resources, and supports to determine if the available resources are meeting TGNC student needs. If resources and supports are oppressive towards TGNC students, HESA personnel should undo practices and supports to restructure them around the needs and experiences of TGNC and all marginalized student communities.

Implications for engineering curricular and co-curricular contexts include understanding and challenging gender dynamics to create welcoming and inclusive spaces and opportunities for all gender identities in engineering. Addressing faculty, staff, and student diversity can also assist with representation, mentorship opportunities, and sense of belonging for students with underrepresented identities in engineering. Since engineering contexts adopt bifurcation perspectives and depoliticization (Cech, 2013), engineering faculty and staff can challenge existing curricular and co-curricular structures to incorporate social identities and personal connections between engineering faculty,



staff, and students. Otherwise, TGNC and other underrepresented identities will continue to be erased from engineering curricula and contexts.

Similar to engineering contexts in higher education, industry employers must also assess current policies and practices in their company, doing their part to undo existing oppressive structures to center TGNC needs. Employers should also be transparent about these policies and practices when recruiting TGNC interns and employees to take the burden off individuals having to determine if a company is inclusive and safe. Once TGNC individuals work at the company, employers should continue to provide appropriate resources and support to TGNC employees, creating opportunities to voice concerns and connect with other TGNC employees.

Lastly, I provided opportunities for current and future TGNC engineering students. While plenty of obstacles still exist in engineering for cisgender women, LGBTQ+ and TGNC individuals, and people of color in engineering, TGNC students belong in engineering if that is the path they wish to take. By implementing personal strengths and coping strategies, TGNC students can follow their chosen academic and career path through self-preservation tactics and building communities that provide validation, liberation, and support when processing challenging experiences or exploring and celebrating their identities and authentic selves.

### **Dissertation Conclusion**

Engineering is a field dominated by White, heterosexual, cisgender men (NSB, 2019), often providing unwelcoming and exclusionary environments for cisgender women, LGBTQ+ and TGNC students, as well as students of color (Cech & Waidzunas, 2011; Cech et al., 2017; LaCosse et al., 2016; Linley et al., 2018). While ample literature

exists on the experiences and oppression of TGNC people in society and higher education, as well as cisgender women and students of color in engineering, there are minimal studies on the experiences of TGNC students in engineering. To address this gap in the literature, this study examined the lived experiences of TGNC students in engineering programs. My goal was to center and amplify TGNC students' personal narratives to understand the ways they negotiated their identities in engineering curricular, co-curricular, and community contexts, considering the influence of oppressive systems on their experiences. Thus, I posed the following research questions:

- What are the lived experiences of TGNC students in engineering programs?
- In what ways do TGNC students negotiate their identities when their gender identity becomes salient in curricular, co-curricular, and community contexts?
- In what ways do systems of oppression influence TGNC student experiences in engineering programs?
- What skills and strategies do TGNC students use to empower themselves to persist in their engineering programs?

Using CTP (Spade, 2015) as my primary theoretical framework in tandem with Hurtado et al.'s (2012) DLE model and Jones & Abes (2013) I-MMDI as my conceptual frameworks, and critical constructivism as my philosophical framework, I conducted a qualitative study using two 60-minute interviews per participant to collect narratives from five TGNC engineering students. Each participant identified as TGNC, were current undergraduate engineering students in at least their third year or graduated from an

undergraduate engineering program in the U.S. within the last four years. Participants also completed at least one internship or cooperative educational experience. Interviews took place over Zoom and consisted of in-depth, semi-structured questions to elicit detailed stories about their experiences in engineering.

I analyzed data in two ways. First, I created narratives for each participant, following a thematic analysis (Braun & Clarke, 2006). Then, I cross-analyzed codes and themes, examining commonalities and differences across student narratives. When analyzing transcripts, I used a mix of In Vivo, values, and concept coding during the first phase of analysis, then integrated pattern codes and matrices when analyzing categories, themes, concepts, and relationships across narratives during my second cycle of coding (Miles et al., 2020). Throughout data collection and analysis, I incorporated reflection through journaling, data triangulation, member checking, and debriefing with my advisor and committee members to address data validation. I also followed Clandinin and Caine's (2013) 12 criteria to produce quality narrative research.

Findings across narratives included participant experiences with TGNC oppression in interpersonal interactions within the campus community and when encountering administrative violence (Spade, 2015) through institutional policies and practices at their university. In addition to their experiences with the university climate, participants built LGBTQ+ and TGNC communities on campus, whether it was through student organizations, leadership opportunities, activism, or other supportive communities in which they found liberation and could explore their identity. Students also shared their experiences in non-engineering environments, matching previous findings that depicted engineering contexts as hostile climates towards LGBTQ+ and

TGNC individuals (Bilimoria & Stewart, 2009; Cech & Waidzunus, 2011; Cooper & Brownell, 2016; Forbes, 2020; Kersey & Voigt, 2020; Linley et al., 2018).

When describing the engineering climate, participants highlighted the stress of the curriculum and lack of flexibility within the program structure when they encountered personal issues or mental health concerns. The underrepresentation of TGNC and LGBTQ+ identities and people of color in engineering was also noticeable and problematic for participants. Whether they personally experienced or observed oppressive gender dynamics in engineering contexts, participants were cognizant of the heteronormative (Kimmel, 2008) and hegemonic masculine (Seron et al., 2018) behaviors and values in engineering. Additionally, participants were keenly aware of the impersonal depoliticization nature of many people in engineering as they struggled to connect with faculty, staff, and students in engineering who only engaged in surface level interactions, disregarding social identities and experiences (Cech, 2013).

In curricular contexts, participants experienced erasure of their TGNC identities through binary discussions of gender, an absence of discussion about identity, and direct discriminatory comments invalidating the existence of TGNC people. Participants also endured an added mental burden compared to non-TGNC students by navigating stereotypes; gauging people's reactions to them or sociopolitical conversations to determine if faculty, staff, and students were safe and supportive; adjusting their identity to draw less attention to themselves, especially if they perceived others to be discriminatory towards TGNC people; and educating others about their identity or important sociocultural topics related to engineering work. Due to the exclusion of social identities and the impersonal and hostile climate towards TGNC students, participants

also experienced isolation in their engineering program. While many participants struggled to find support in engineering curricular contexts, they were able to identify a few individuals who were active allies or incorporated inclusive actions when working with students, such as using correct names, pronouns, and gender-neutral language.

Jake, Mickey, Pan, Rain, and Solomon expressed various degrees of comfort when comparing their experiences in engineering contexts, non-engineering contexts, and LGBTQ+ and TGNC communities. Participants were most uncomfortable in engineering curricular contexts, some feeling more comfortable in co-curricular contexts depending on whether they had allies or friends present with them. However, participants experienced most comfort and liberation in being their authentic selves in LGBTQ+ and TGNC co-curricular contexts. Participants developed a camaraderie with other queer and TGNC people in co-curricular contexts, providing them with identity validation and support when they encountered challenges in their engineering program. Mickey and Pan engaged in outreach initiatives to pay it forward to future generations of underrepresented students in engineering, serving as the representation they did not have when they were prospective engineering students.

Participants experienced barriers in community contexts. Many described an anxious anticipation when interviewing for companies or starting a new job when they were unsure if the employer and employees would be supportive and inclusive of their identities and needs. Jake, Mickey, Pan, Rain, and Solomon took steps to assess their work environment, gauging others' reactions to sociocultural topics and specific discriminatory comments. Just as participants noticed faculty and staff members who incorporated inclusive behaviors in curricular and co-curricular contexts, participants

appreciated when employers and co-workers acknowledged their identity, provided support, and used their correct name and pronouns.

Participants also shared their strengths and coping skills that helped them persist in their engineering programs. First, they acknowledged the importance of self-care, incorporating self-preservation into their time in the program to tend to their mental health when they were stressed with their coursework, personal matters, or the hostile environment towards TGNC students. Jake and other participants also highlighted the strength in the TGNC community to be compassionate and empathetic towards others, especially those with underrepresented identities. However, students repeatedly cited building a community of support as a key component to their resilience and success throughout their engineering journey. Whether students connected with classmates who could relate to their frustrations with engineering, or LGBTQ+ and TGNC friends, partners, and communities who validated their identity, participants valued having people with whom they found liberation and had a camaraderie or kinship (Nicolazzo, 2017c).

### **Summary of Implications for Research**

The findings from this study provide numerous implications for HESA research. Specifically, I suggest future research examine TGNC students who do not persist in their engineering program or are not as engaged in campus or department activities; explore TGNC experiences across disciplines and contexts, considering the ways the DLE model (Hurtado et al., 2012) can be expanded to incorporate multiple curricular and co-curricular contexts; integrate CTP; and address TGNC student experiences who must also battle oppressive systems tied to another underrepresented identity in engineering such as race, ethnicity, sexual orientation, or disability. Additionally, I encourage professional

organizations, engineering faculty and staff, and HESA practitioners to be mindful of gatekeeping protocols that oppress TGNC individuals by denying them the opportunity to participate in studies that can help them share their experiences.

### **Summary of Implications for Practice**

After learning about the experiences of Jake, Mickey, Pan, Rain, and Solomon, HESA administrators and practitioners should integrate a CTP approach to assess and revamp policies to center TGNC and all underrepresented student experiences and needs (Spade, 2015). Solomon's experience with harassment as well as historic administrative violence (Spade, 2015) through policy issues with Title IX and TGNC individuals in higher education were of particular concern (Curtis, 2016; Kimmel, 2016; Kirkland, 2006). Similarly, HESA administrators and practitioners should review existing resources and supports to ensure TGNC students' needs are met on their campus.

Professionals in engineering curricular and co-curricular contexts can also incorporate CTP and lessons learned from participant narratives. First, engineering educators can address problematic gender dynamics by centering the needs of cisgender women and TGNC students. Administrators, faculty, and staff should also address underrepresentation of TGNC people and people with other marginalized identities, considering the impact the lack of representation has on students. By integrating social and interdisciplinary discourse into the engineering curriculum, educators can also acknowledge the importance of social identities and experiences in engineering, validate the existence of those identities, and empower engineers to adopt a sophisticated lens through which they can center the needs of the communities the field of engineering serves. Incorporating TGNC identities can help students have a sense of belonging and

also reduce the burden on students having to negotiate their identity when their identity is erased or dismissed. Incorporating sociocultural conversations can also help students develop personal and meaningful connections with faculty, staff, and students, which can help TGNC students find support in their program.

Engineering employers can also integrate CTP, examining existing policies and practices, making appropriate adjustments to incorporate TGNC employees' needs and address administrative violence (Spade, 2015). Employers can then share their policies and practices with prospective TGNC student interns or employees, removing the barrier of TGNC individuals having to ask or search for company values and perspectives towards them. Companies must also ensure they continue to provide appropriate supports and resources to TGNC employees after recruitment, perhaps offering employee resource groups or other ways for TGNC peers to connect with people who share their identity or are allies.

### **“Power in Identity”: TGNC Strengths**

Finally, Jake, Mickey, Pan, Rain, and Solomons' stories provided concrete ways TGNC students can use their strengths and coping skills to persist through engineering programs. By identifying formal campus resources, students can proactively locate support should they need it. Students can also be mindful of their commitments, ensuring they tend to their mental health, time with support systems, and other self-care activities along with their coursework. Lastly, students can build TGNC kinship networks (Haverkamp et al., 2019; Nicolazzo, 2017c) and other supportive communities in which they can find liberation and engage in mutual aid (Spade, 2020). By having a supportive community of people who can validate their authentic identity, share common



experiences, and advocate for each other, TGNC students can celebrate their identities and achieve their goals in a field that, hopefully one day, will better center and incorporate their experiences, thus liberating TGNC individuals and enriching engineering and humanity.

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## APPENDIX A

### Interview Questions

#### Pre questions:

- Please describe how you identify and what that means to you about your gender.
- What does authentic self or whole self mean to you?

#### **Part I. [How TGNC students negotiate their identities at institution in curricular, co-curricular and community contexts.] The first set of questions will address your experiences at your college/university and your pursuit of engineering.**

- How did you come to choose your college or university?
- In what ways, if any, did your gender factor into your choice of college/university?
- Tell me about who you would describe as your friend group on campus.
- Can you tell me a bit about your gender journey and when you began to feel comfortable expressing your gender while at your college/university?
- Tell me about a time you felt comfortable expressing your gender identity while in your program.
  - (Year, context?).
  - What contributed to your comfort in expressing your gender identity? Were there other times you felt comfortable prior to (or after) that example?
- Tell me about any experiences you had when you felt uncomfortable expressing your gender identity while in college.
  - (Year, context?).
  - What contributed to you not feeling comfortable in expressing your gender identity? Were there other times you felt uncomfortable prior to (or after) that example?

#### **Part II. [The lived experiences of TGNC students in an engineering program]. The second set of questions will focus on specific contexts within your engineering program and experiences as a TGNC person in those contexts.**

- Tell me about your interest in pursuing engineering. What influenced/contributed to your decision to do so?
- Tell me about a meaningful moment you experienced during your engineering program.

- How does that experience compare to others you've had in the classroom, co-curricular activities, or during your internship?
- Tell me about your experience during your first year of your engineering program.
  - ...second, third, fourth+ year.
  - Internship
- Can you think of any relationships that have had a particular influence on you while in college or engineering? Tell me a story about a meaningful relationship you've had with someone in your program.
  - Any faculty or staff? How did that compare to your relationships with peers?
- Do you present a different gendered self depending on the group you are with? (Professors, staff, co-workers, peers)?
  - How do you present yourself with these people and in these settings?
  - What aspects of your identity aren't in those spaces and why?
- Do you think your gender influences the relationships that you have with different groups of people? Tell me a story about when this happened.
- Tell me about a time when you disclosed your gender identity to a faculty, staff, or peer in engineering.
  - ...about a time you disclosed your identity and received a different response (compared to above) in engineering.
  - If applicable, how does that compare to an experience you've had disclosing your identity to someone outside of engineering?
- Do you feel like you are able to be or present your authentic self while in the classroom?
  - Co-curricular settings? Work/internship? Tell me more.
- Tell me about a time during your program where you were most aware of your gender identity.
- Do you feel like your gender identity has influenced your work or experiences? If so, how?
- What words would you use to describe your overall experience during your program?
  - Tell me more...
- Artifact:
  - Describe the artifact you selected.
  - Tell me about the artifact you selected and how it reflects your identity and experiences in your engineering program.
  - In what ways, if any, does this relate to your accomplishments or challenges during the program?

**Part III. [The institutional and systemic challenges for TGNC students in at college].  
The third set of questions focus on how your identities in engineering have influenced your experiences.**

- Tell me a story about a time when you encountered a challenge as a TGNC person.

- Are there ways in which your other social identities (sexual orientation, race, social class, ethnicity) influenced your experiences?
- In your opinion or experience, how do people at your college/university perceive TGNC people?
  - How would you describe the perceptions/opinions within engineering?
  - Could you give me any examples about those perceptions and experiences?
  - Are there other aspects of your identity that you believe influence how others perceive you in engineering? Tell me more.
- How do your experiences within engineering compare to experiences you've had outside of engineering settings?

In your opinion, what makes your experiences in engineering and non-engineering settings different?

**Part IV. [TGNC students' skills and strategies to empower selves and persist in engineering programs]. The last set of questions address skills and strategies you used/use to persist in your engineering program.**

- What strengths do you bring to your engineering major/field? Share a story about a time when you used those strengths during your engineering program.
- Tell me about a difficult situation you encountered while in your engineering program. How did you handle the situation?
  - What support or resources did you use? What was helpful about those supports/resources?
- Tell me about the strategies you used to continue through (or graduate from) your engineering program.
- Have you encountered any negative stereotypes about your identity within engineering? How have those influenced your experiences, if at all?

What has helped you persevere after encountering negative stereotypes or discrimination? Provide an example.

APPENDIX B

Structured Ethical Reflection Grid

<b>Inclusiveness</b>	<b>Empathy</b>	<b>Basic Values</b>
Use inclusive language & behavior when building rapport with participants.	Understand unique needs, identities, perspectives, & experiences of participants.	<b>Developing Research Partnerships</b>
Frame research questions in a way that is inclusive of diverse identities & experiences.	Consider participants' perceptions of research questions as well as possible discomfort & benefit to participants.	<b>Constructing Research Questions</b>
Find sources that are inclusive of population being studied. Incorporate a variety of views & perspectives by way of data sources.	Understand positive & negative impact that data can have on participants.	<b>Identifying Sources of Data</b>
Gather data that includes diverse identities & experiences, providing appropriate structure and flexibility (e.g., open-ended questions, options for interview time & date) for participants.	Actively check in with participants throughout data collection process & acknowledge how the process might affect them.	<b>Gathering Data</b>
Include participants in analysis as co-creators of knowledge & verify accuracy of way I presented their narratives.	Member check throughout analysis to inform participants of emerging themes & see if it matches their experiences.	<b>Analyzing Data</b>
Invite participants to join in action (e.g., recommendations & advocacy) & verify their voices are accurately represented if/when utilized moving forward.	Use results to empower participant populations & highlight strengths while advocating for change.	<b>Taking Action</b>
Inform participants of dissemination plans & ask where they would like findings to be shared.	Share data with various stakeholders, considering divergent needs & goals.	<b>Disseminating Knowledge</b>
Inquire if participants want updates on related future research. Consider their identities & experiences for future projects & action.	Integrate different perspectives & experiences in practice with population as well as future research.	<b>Moving On</b>

<b>Open-mindedness</b>	<b>Kindness</b>
Be reflective of own desires & preconceived notions, ensuring they don't cloud participants' ideas & opportunities.	Express gratitude & reciprocity to participants.
Accept research questions might evolve with input from participants or others. Actively seek feedback that challenges assumptions.	Appropriately frame research questions in an open, honest, & transparent way. Be mindful of potential effect on participants.
Challenge preconceived notions of sources of data & data itself. Seek new sources.	Provide appropriate acknowledgement, respect, & gratitude toward participants.
Investigate various options for gathering data, making sure to not simply take the easiest or most common route.	Show kindness throughout data collection process—beginning, during, and after—through verbal & written thank yous.
Consider multiple lenses of analysis, avoiding predetermined thinking of possible themes.	Thank participants, mentors, & colleagues who provide feedback on data analysis.
Consistently reflect on ways to act, challenging immediate or easy actions by considering other impactful methods or practices.	Take action, in a kind way, to challenge perspectives & educate others about participants' experiences.
Examine common, uncommon, & creative ways of sharing information.	Thank outlets that accept data from study. Share information in a constructive & kind way, honoring participants' experiences & identities.
Keep an open mind when reflecting on findings, considering future research, practice, & action related to this study & population.	Use findings, action, & overall experience to continue to show kindness to current and future participants. Incorporate kindness shown by all in future work.

<p style="text-align: center;"><b>Conscientiousness</b></p>
<p>Be mindful of time commitment &amp; investment when participating in the study.</p>
<p>Carefully craft questions that address the goals of the study &amp; can benefit the participants.</p>
<p>Seek data from all angles, including those that might not be as obvious.</p>
<p>Be aware of critical steps involved in collecting data, both in terms of methodology and effect on constituents.</p>
<p>Ensure a thorough process when transcribing, member checking, coding, &amp; analyzing.</p>
<p>Carefully consider possible action steps, being mindful of the impact actions could have on participants and other constituents.</p>
<p>Assess efficient, effective, &amp; thorough ways to share findings.</p>
<p>Take notes on what went well throughout the study &amp; incorporate those practices &amp; information into future action &amp; research.</p>

## CURRICULUM VITA

Natalie Oliner

nsoliner@gmail.com

### EDUCATION

- |   |                                  |
|---|----------------------------------|
| University of Louisville<br><i>Doctor of Philosophy</i> in Counseling & Personnel Services<br>Specialization: College Student Personnel | Louisville, KY<br>May 2022       |
| University of Michigan<br><i>Master of Arts</i> in Higher Education<br>Concentration: Student Access and Success                        | Ann Arbor, MI<br>December 2013   |
| Bowling Green State University<br>United Kingdom Higher Education and Student Affairs Study Tour  | England and Scotland<br>May 2013 |
| Indiana University<br><i>Bachelor of Arts</i> in Religious Studies<br><i>Bachelor of Arts</i> in Sociology<br>Minor: Philosophy         | Bloomington, IN<br>May 2012      |

### HIGHER EDUCATION EXPERIENCE

- |   |  |
|---|--|
| Speed School Office of Student Success, University of Louisville<br><i>Assistant Director of Retention and Assessment</i>   | Louisville, KY<br>March 2020 - Present |
| <ul style="list-style-type: none"><li>• Manage advising technology and student data to identify target populations for academic outreach and intervention</li><li>• Research, develop, implement, and oversee academic and student success interventions designed to support students</li><li>• Design, administer, analyze, and report on assessments for engineering academy and living learning community</li><li>• Liaise with assessment, educational research, and technology units to identify opportunities for collaboration to improve student retention and success</li><li>• Coordinate enrollment outreach initiatives and track enrollment data each semester</li><li>• Advise and counsel 175 undergraduate and graduate students, evaluating needs and suggesting resources for success</li></ul> |  |
| <i>Academic Affairs Coordinator</i>   | April 2018 – February 2020             |
| <ul style="list-style-type: none"><li>• Foster student learning and development through holistic advising, programming, and campus collaborations</li><li>• Advise and counsel 225 undergraduate and graduate students, evaluating needs and suggesting resources for success</li></ul>   |  |



- Oversee the degree audit process, coordinating timelines and communication between advisors and departments
- Train new academic counselors on policies, procedures, advising technology, and best practices
- Lead assessment initiatives for student attrition and underrepresented student populations in engineering
- Liaise with Flight Planner and CardSmart software team to streamline communication process with coding issues
- Develop and maintain policy manual and advising syllabus for Office of Student Success

*Academic Counselor Senior*

June 2016 – March 2018

- Advised and counseled approximately 300 undergraduate and graduate students
- Monitored cohorts' enrollment and retention status and maintained detailed records on progress towards degree
- Managed training, timeline, and process for fall and spring student advising campaigns
- Prepared reports and disseminated data for purpose of at-risk student outreach
- Mentored Speed Spectrum LGBTQ+ and Ally members in personal matters, event planning, and academic success, advocating for needs such as trans\* inclusive bathrooms, appropriate pronoun usage, and Safe Zone trainings
- Created and managed e-mail outreach templates for advisors to efficiently streamline messaging to students and better ensure sensitivity when discussing enrollment, academic standing, grades, and other academic matters

*Academic Counselor*

April 2014 – May 2016

- Advised and counseled approximately 300 undergraduate students
- Supervised 4-6 work scholarship students and 2 peer mentors within Office of Student Success
- Presented university and Speed School information during orientation and advised incoming first-year students
- Served as lead trainer and technology support for office's implementation of Symplicity and EAB software
- Developed and coordinated programming for Engineering Living Learning Community

Women in Science and Engineering Residence Program, Univ. of Michigan      Ann Arbor, MI

*Graduate Assistant*

August 2013 – March 2014

- Advised seven sophomore students who serve as the living learning community's program board
- Assessed viability of students' proposed programs based on content, resources, logistics, and liability concerns
- Collaborated with staff to facilitate training for resident advisors, returning student leaders, and recruitment team
- Managed the program board expenditures within the general living learning community's budget
- Interviewed, hired, and supervised 8 first- and second-year students on the residence program's recruitment team
- Organized and facilitated a sophomore class consisting of 4 professional development workshops for 20 students

Academic Success Program, Dept. of Athletics, Univ. of Michigan                      Ann Arbor, MI  
*Academic Mentor, Mentor Program Assistant*    August 2013 – March 2014

- Mentored three first-year student athletes to promote student success skills such as organization, reading, and writing
- Developed academic plans with students during each session to determine daily, weekly, and semester goals
- Provided positive learning environment for students during sessions to ensure they complete their assignments
- Applied student development theory to assess the students' stage(s) of development throughout each semester
- Participated in staff meetings to share experiences and advice for working with athletes
- Supervised and evaluated mentors' performance and progress with their assigned students during the semester

Center for Study of Higher and Postsecondary Ed., Univ. of Michigan                      Ann Arbor, MI  
*Graduate Intern*    August 2012 – August 2013

- Corresponded with prospective doctoral students about the post-graduate programs offered within the Center
- Scheduled and coordinated campus visits for prospective doctoral students
- Collaborated with staff to organize Campus Visit Day by matching prospective master's and doctoral students with a host in addition to coordinating and supervising student volunteers
- Developed a peer mentor program for second-year students to mentor newly matriculated master's students
- Organized, formatted, and distributed weekly announcements to students, faculty, and staff
- Coordinated catering for alumni reception at an Association for the Study of Higher Education conference

Sociology Department, Indiana University    Bloomington, IN  
*Assistant Instructor*    January 2012 – May 2012

- Corresponded with 80 students in course regarding concerns about exams to ensure clarity and students' success
- Formatted and graded exams to evaluate student comprehension
- Reviewed readings, exams, and lectures with professor to improve future classes

## AWARDS

NACADA Outstanding Academic Advisor Certificate of Merit    2018  
University of Louisville Provost's Award for Exemplary Advising Winner    2018  
University of Louisville Registered Student Organization (RSO) Advisor of the Year Award    2017  
Speed School of Engineering Distinguished Diversity Enhancement Award    2016

## PROFESSIONAL ASSOCIATIONS

Global Community for Academic Advising (NACADA): Member    2013 – present

- *Commissions:* STEM, LGBTQA, Coaching, and Assessment
- Steering Committee for NACADA STEM Advising Community
- Pronoun Task Force Member
- Program Proposal Reviewer for NACADA National Conference

- American College Personnel Association (ACPA): Member 2013 – present
- *Commissions/Coalitions*: Academic Support; (Dis)Ability, Sexuality and Gender Identities
  - Awards Chair/Directorate Member for ACPA Coalition for (Dis)Ability
  - Program Proposal Reviewer for ACPA National Conference

## PRESENTATIONS

- Beckley, B. S., Clark, R., Mack, B., & Oliner, N. (2022, February). *Higher Education Leaders Forum*. Presented at Webb School of Knoxville, Virtual.
- Bedell, J. Y., Oliner, N., & Bush, K. (2022, February). *NACADA STEM Advising Community Learn & Grow Series: Proposals 101*. Presented at NACADA STEM Advising Community Webinar, Virtual.
- Oliner, N. (2020, October). *Queer students in STEM: Supporting, transforming, engaging, and mentoring underrepresented students in heteronormative fields*. Presented at National NACADA Conference, Virtual.
- Hirschy, A., Johnson, V., Longerbeam, S., McClendon, M., Oliner, N., Watson, A., & Wright, N. (2020, March). *Contribution of student affairs preparation programs to undergraduate student success*. Presented at National ACPA Conference, Nashville, TN.
- Oliner, N. McGill, C. (2019, October). *HOT TOPIC: Queering heteronormative disciplines: Challenges and strategies of LGBTQ students in STEM*. Presented at National NACADA Conference, Louisville, KY.
- Oliner, N. (2018, April). *Queer students and professionals in STEM: Supporting, transforming, engaging, and mentoring underrepresented identities in historically heteronormative fields*. Presented at Dialogue on Diversity, Louisville, KY.
- Oliner, N. (2018, March). *Using flight planner in advising practice*. Presented at University of Louisville Advisor In-Service, Louisville, KY.
- Oliner, N., Baxter, T., & Gamache, J. (2017, October). *Meet me in the middle: Advising STEM students when your background isn't STEM*. Presented at National NACADA Conference, St. Louis, MO.
- Zoller, J. & Oliner, N. (2016, April). *Beyond advising: A holistic approach to student success*. Presented at Regional NACADA Conference, Chattanooga, TN.

## PUBLICATIONS

- Longerbeam, S. D., Wright, N., Hirschy, A. H., Oliner, N., Johnson, V., Snow, A., & McClendon, M. (in press). Near peer racial microclimates in student affairs graduate preparation program environments. *Journal of College Student Development*.
- Oliner, N. S., (2021). Advising LGBTQA+ students at Christian-based institutions. In C. M. McGill & J. E. Joslin (Eds.), *Advising lesbian, gay, bisexual, transgender, and queer college students*. Sterling, VA: Stylus Publishing.

- Oliner, N. S., & McGill, C. (2021). Advising LGBTQA+ students in STEM majors. In C. M. McGill & J. E. Joslin (Eds.), *Advising lesbian, gay, bisexual, transgender, and queer college students*. Sterling, VA: Stylus Publishing.
- Self, C., & Oliner, N. S. (2021). Creating an LGBTQA+-inclusive campus. In C. M. McGill & J. E. Joslin (Eds.), *Advising lesbian, gay, bisexual, transgender, and queer college students*. Sterling, VA: Stylus Publishing.
- Buckley, J. & Oliner, N. (2020). Sociocultural conversations: Examining the influence of difficult dialogues on leadership development. *New Directions for Student Leadership*, 2020(168), 85-95.
- Oliner, N. (2016). Speed Spectrum: A LGBTQ and ally engineering student organization. *Intersections: A Publication of the ACPA Coalition for Lesbian, Gay, Bisexual, and Transgender Awareness*, 1(1).

## SERVICE

UofL Showing Up for Racial Justice	2021 – present
Provost’s Advising Task Force (appointed)	2019 – present
Instructional Effectiveness Advisory Collaborative Committee	2019 – present
Preparation Program Impact on Mentorship and Racial Climate Research Group	2018 – present
Speed School Student Affairs Committee	2018 – present
Speed School Diversity Committee Staff Representative (elected)	2017 – 2019
Student Leadership and Service Council	2016 – 2018
CardSmart Power Users	2016 – present
Undergraduate Advising Practice Train the Trainer Committee	2016 – 2017
Undergraduate Advising Practice Research Group	2016 – 2017
Symplicity Implementation Team Lead	2015 – 2016
Speed Spectrum Student Organization Staff Advisor and Founder	2014 – present
Majors Fair Committee	2014 – 2016

## CERTIFICATES & TRAINING

Our Whole Lives (OWL) Sexuality Education Facilitator Training	2018
Profiler Training Certification, Personality Hacker	2017
Mental Health First Aid USA Certification	2016
Safe Zone Training, University of Louisville	2014 – 2018
Master Advisor Certification, University of Louisville	2015
Autism Awareness Certification, Online Academies	2015
Disability Advocacy Certificate, University of Louisville	2014
Motivational Interviewing Workshop, University of Michigan	2014

## SKILLS

Languages: Proficient American Sign Language, Conversational French, Basic Hebrew.  
Software: Microsoft Office, SPSS, STATA, PeopleSoft, EAB, Symplicity, Blue. Social Media Marketing.