Queer Ties: A Work in Progress LGBTQ+ Graduate Student Mentorship Program

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The purpose of this work in progress paper is to share preliminary results and lessons learned from a pilot scale graduate student mentorship program being run in the spring of 2024. A wealth of research has demonstrated that LGBTQ+ individuals in engineering face a uniquely chilly environment rife with microaggressions, hypermasculine competitiveness, assumptions of heterosexuality, and overt homophobia. These experiences lead to a myriad of academic, health, and wellness issues for students and exert a pressure for all queer individuals to pass as cisgender and heterosexual to survive in the heteronormative environment of engineering. This is particularly salient for graduate students, who are in a key stage of professional development. As these students are socialized into the norms of their chosen field, they must contend with the ways these norms can be at odds with their LGBTQ+ identity.

To counter this negative climate, we turn to mentorship programs, which have been shown to be highly effective for supporting minoritized students in STEM. Despite the evidence in support of mentorship programs for minoritized students, there are few programs described that focus specifically on LGBTQ+ students, and those that are reported focus on undergraduate students.

To rectify this lack of programs, this paper serves as a scaffold for others to run similar mentorship programs at their home institution. We will discuss the logistics of running this program, the challenges and lessons learned, and ways in which a larger scale program can be approached. In this paper, we will also describe the impact this program had on both a student's identity as a research scientist, and their overall perception of the climate in the engineering school at a large southern research institution.

Introduction

This mentorship program aims to combat some of the troubling trends demonstrated among LGBTQ+ respondents on the recent Cockrell School of Engineering climate survey, administered in 2021[1]. The survey found that LGBTQ+ graduate students felt the engineering school was less accepting ($p < 0.05$), that they were rewarded less for their work ($p < 0.05$), and were less trusting of the engineering school administration ($p < 0.005$) than their straight counterpart. These responses suggest action is needed to both build trust in the administration and to make spaces that these students can feel accepted in.

This problem is not one isolated to the University of Texas at Austin. A wealth of research has demonstrated that LGBTQ+ individuals in engineering face a uniquely chilly environment rife with microaggressions [2], [3], harassment [4] hypermasculine competitiveness [5], assumptions of heterosexuality [2], and overt homophobia[5]. These experiences lead to a myriad of academic, health, and wellness issues for students [6] and exert a pressure for all queer individuals to pass as cisgender and heterosexual to survive in the heteronormative environment of STEM [3], [7].

Thus, we turn to mentoring programs, which have been shown to increase retention and persistence of minoritized students in STEM[8], [9], [10]. Additionally, first year mentorship programs have previously been implemented successfully in both the biomedical engineering and chemical engineering departments at UT [11], [12]. Peer mentorship programs, or programs that match students at different stages of the same degree, are shown to positively affect graduate students' academic, social, psychological, and career development [13]. Fostering this additional form of mentorship can act as a safety net for students with insufficient institutionalized mentorship (e.g. research advisor) which can reduce feelings of isolation. Developing a program

for peers, especially around the same identity, can form a sense of community, between mentorship pairs and across pairs [13]. A peer mentorship program for LGBTQ+ graduate students has potential to positively impact participating students.

Methods

This pilot scale mentorship program was conceptualized in Fall of 2023, as a proposal for a broadening participation in engineering seed grant program hosted by the broadening participation in engineering program. This program was motivated by the experiences of the two program leads, who both identify as queer graduate students in engineering. Having experienced feelings of isolation, and the chilly climate of engineering that has been previously described [14], we wanted to forge connections between queer identifying graduate students on campus. In addition to this main goal of developing social connections and providing systems of support, we wanted to better understand the ways mentorship programs can impact sense of belonging, and what activities would be most beneficial for a larger scale future program. Therefore, this work is guided by the following research questions:

Research Questions:

1. How does the connection to other LGBTQ+ identifying PhD students' impact queer graduate student's sense of belonging at UT and their confidence in their ability to succeed in engineering?
2. What types of activities (e.g. professional networking, community building, etc.) are seen as the most impactful to mentees?

Author Positionality

The authors of this work both identify as LGBTQ+ graduate students in engineering. Brandon identifies as a white, non-binary, queer man. Their research is on the experiences of queer engineering students and their work is rooted in the goal of creating meaningful change within engineering. Elisa identifies as a neurodivergent and Latine. Their research focuses on accessibility of STEM spaces and eliminating barriers to success for marginalized students. Both authors identify as part of the community that this program is serving, which informs their work.

Eligibility Criteria

Participation in the program was open to all graduate students within the college of engineering, although recruitment material emphasized the program goal of connecting LGBTQ+ students. In order to apply for a mentorship role, students had to be a third-year doctoral student or beyond. This cut off was chosen so that the mentors would have most likely completed their qualifying exams, have an established faculty advisor, and experience in their research area. Additionally, we hoped that students who had lived here for a few years would have some knowledge of LGBTQ+ resources and spaces both at the university and in the [city] area. The mentee eligibility was open to any first-year master's or PhD students.

Recruitment and Selection

Recruitment was carried out in late fall of 2023, with a virtual application distributed to the entire graduate student population via an email from the engineering college. This application was created using Qualtrics and asked for demographic information and three short responses application questions. We asked both mentor and mentee applicants to explain why they want to

participate in the program, what their goals were in the program, and how the program might contribute to their future career goals.

We had thirteen respondents, of which twelve were offered acceptance to the program in the hopes of making 6 mentor/mentee pairs. However, one potential mentee never responded to the program acceptance, and one potential mentee declined due to an internship opportunity. Therefore, the final program consists of 4 mentor/mentee pairs. Mentor/mentee pairs were matched first and foremost upon their academic department of origin. Those without a possible department match were then matched based on shared identities that were disclosed in the application.

The final participation pool was from four different engineering departments, represented multiple gender and sexual identities, disability statuses, and racial identities. Additionally, many of the students in the program were international students. Exact identities and participation demographic statistics have been withheld to protect participant anonymity.

Program Facilitation

The program itself was based on the success of other first year mentorship programs at the university [11]. The mentorship program officially began in January of 2024. The mentors were first invited to attend a one-hour onboarding and mentorship training, in which they were provided with program specifics, and we reflected on mentorship best practices, and topics related to inclusive mentoring. After this training, mentor/mentee introductions were made via email. For this program, mentors are asked to meet with their mentee at least once a week for one hour. This was deliberately left open ended so that mentor/mentee pairs could decide what activities and discussions would be the most productive for them. We encouraged them to pair up with other mentors/mentee pairs for activities and spent time in the initial mentorship training brainstorming potential activities with mentors. Although we initially planned to provide mentors with some level of compensation for their time, this ended up being very difficult to do with the existing grant requirements (see limitations sections for a deeper discussion of this).

In addition to the expected weekly meetings, we planned multiple group socials and happy hours to occur monthly. These happy hours were utilized to make sure all mentors and mentees were able to connect and get to know one another and consisted of a variety of activities such as a brewery happy hour and a board game night. In addition to these monthly happy hours, we scheduled brief monthly one-on-one meetings with the mentors to check in with them, answer any questions, and provide support if needed. Rather than have one-on-one meetings with the mentees, we have chosen to check in periodically via email to make sure they are being given the appropriate level of support. We have also attempted to scaffold other community building practices, such as a slack space and email list for participants to utilize.

Finally, partway through the program we plan on hosting a half day mentorship retreat. This half day retreat is planned for mid-March, and includes various team building activities, workshops on CV development and applying for fellowships, and a panel of established LGBTQ+ engineering PhDs to discuss different career paths and experiences. The goal of this retreat is to provide concrete professional development opportunities for students, as well as connect them with those who had “made it” as an LGBTQ+ identifying engineering PhD to provide potential

role models. The program is scheduled to run until the end of April, due to the funding timeline on the supporting grant.

Program Evaluation

To evaluate the impact the mentorship program has on participating students, we have chosen to conduct pre, middle, and post program surveys. The primary goal of these surveys is to identify student perceptions of the climate within engineering as well as their own sense of identity as a researcher to see if either metric is impacted over the course of the semester in the program. Participation in the research aspect of this program was entirely optional, and not required to participate as a mentor/mentee. To encourage participation, we included a $20 Amazon gift card to incentivize participation in the survey. For this, we utilized items from a climate survey conducted throughout the engineering college in 2021 [15] as well as a previously validated instrument for determining participant researcher identity [16].

For the mid and post program survey, we will include open ended questions in relation to the program, which activities were beneficial, and how experiences with their paired mentor/mentee have been. Depending on the results of the final survey, follow up focus groups with participants may be used to further elucidate the impact the mentorship program specifically has had on participants.

Pre-Program Survey Analysis

In the pre-program survey (Appendix I) Participants were asked to respond to items using a five-point Likert scale, from "Strongly Agree" to "Strongly Disagree". The survey had N = 7 student responses, 4 mentees and 3 mentors. The data was collected via Qualtrics, and the text-based Likert responses were recoded to numerical ones, from 1 ("Strongly Disagree") to 5 ("Strongly Agree"). As 17 of the 20 climate related items were identical to the ones administered previously [1], [15], and asked in an identical form, we used data from the previous climate survey as a baseline for comparison. We compared the data of all respondents to the mean responses of graduate students, breaking down the 2021 responses by LGBTQ+ identity. A Student's T test was performed for all the items using both the mean response of LGBTQ+ students and the mean response of non-LGBTQ+ students as the null hypothesis. This followed the methodology outlined in the 2022 climate survey analysis [15]. Any response with a p-value less than 0.05 was considered to be statistically significant. For other items, we parsed the data between mentors and mentees to see if there were any noticeable differences in responses. For these, no significance testing was done due to the small sample number and low likelihood of reliable results. Instead, these items will be further analyzed in the subsequent surveys to see if a change over time occurs.

Results and Discussion

Pre-Program Survey Results

The pre-program survey was designed to measure both climate experiences and research identity to provide a baseline for the program. Therefore, the majority of the program analysis will occur upon the program conclusion in May of 2024. When comparing the results of the survey (including N = 7 mentor and mentee responses) to the results obtained from graduate students in the 2021 climate survey conducted in the engineering college. 2021 climate survey data was broken down by LGBTQ+ identification for a more complete comparison. Figure 1 demonstrates the 4 items that were found to differ significantly between the mentor program responses and the

2021 climate survey. Notably, the mentorship program participants were significantly more likely to feel supported by their primary supervisor and to see diversity as imperative to the success of the engineering college when compared to both LGBTQ+ and non-LGBTQ+ graduate students. This disparity does make sense when considering for the inherent bias of respondents who are choosing to participate in a mentorship program - i.e. a student who feels diversity is important would choose to participate in a program with a mission centered around diversity. Mentorship program students were also significantly more likely to trust the engineering college administration to treat all students fairly when compared to their LGBTQ+ peers in the 2021 climate survey. Again, this could be a result of the survey sample,

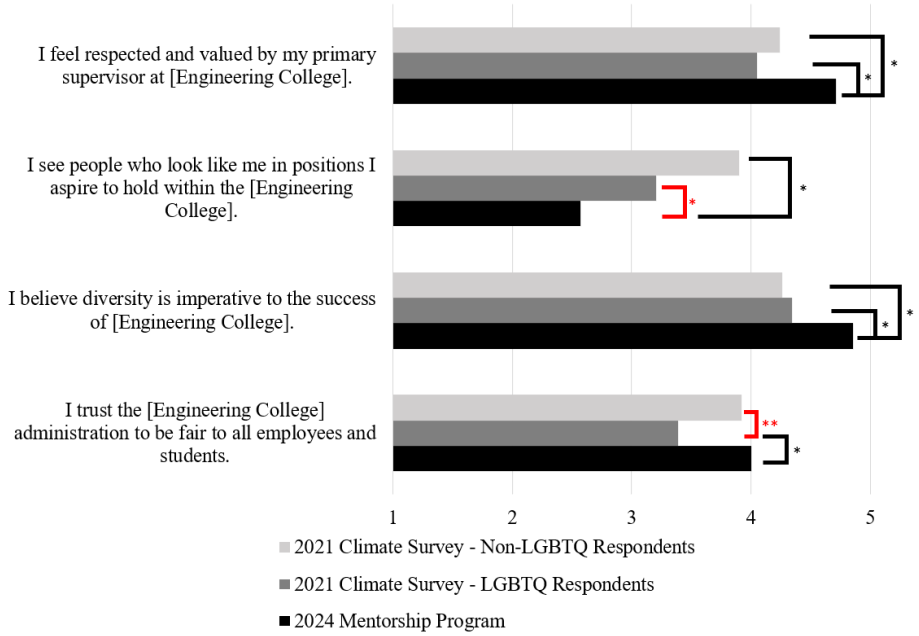

Figure 1: Chart showing the significant responses to climate survey items when comparing to 2021 survey data. Black bars indicate significance between the means of the mentorship program and the 2021 climate survey data and red bars demonstrate significance between LGBTQ+ and non-LGBTQ+ graduate student respondents in the 2021 climate survey. * = $p < 0.05$; ** = $p < 0.01$

While we did separate the mentor and mentee responses to the climate survey, no statistical analysis was conducted due to the very small sample size. The purpose of comparing mentor and mentee responses is to understand if there is a difference between first year queer graduate student experiences and the experiences of third, fourth, and fifth year queer graduate student responses. All the mentor and mentee responses seemed to be in line with one another, with only two survey items with more than a 0.5-point difference between mentors and mentee mean responses. The most notable difference occurred on an item asking if students felt they had the resources they needed. Unsurprisingly the mean mentor response was over 2.5 points higher than the mentees. This is likely due to advanced students having a better grasp of the resources available to them to, and because those that self-select to mentor other students would feel confident with the resources they currently have. The research identity scale results paint a similar picture with mentors in general ranking all items higher (Figure 2). Furthermore, the biggest disparity is observed when

asked if respondents feel connected to others in their field. Unsurprisingly the mentors felt more connected to others in their field.

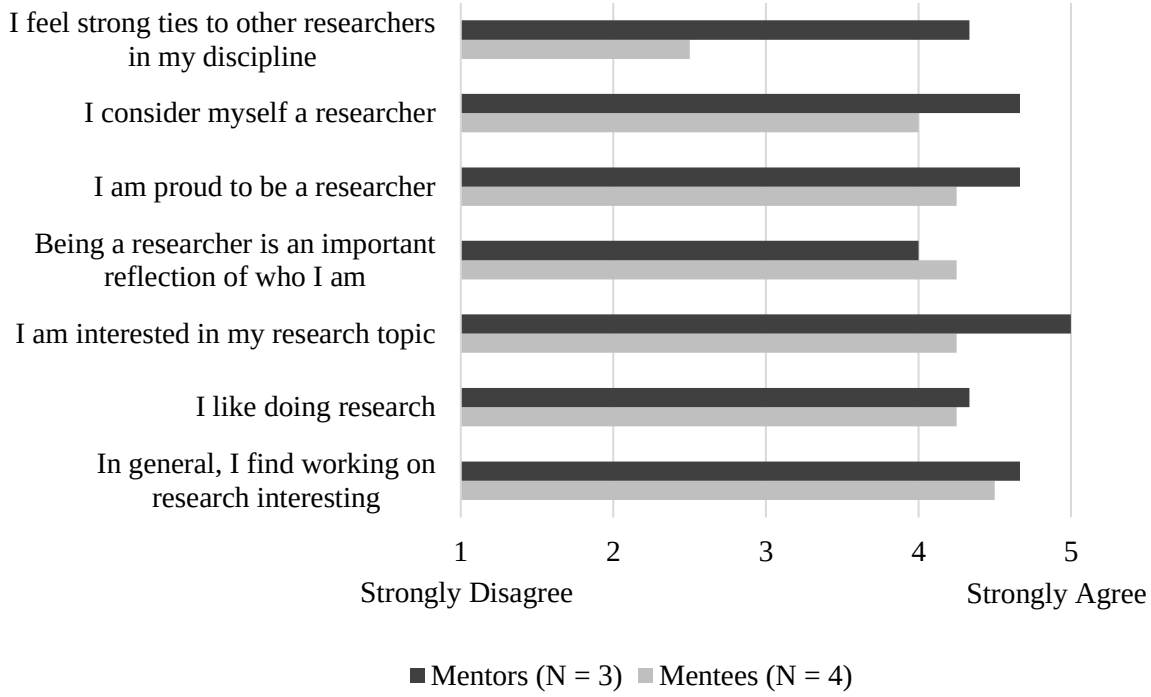

Figure 2: Chart demonstrating the responses to the researcher identity scale, broken down by mentor/mentee status

Limitations and Lessons Learned

Although the program has been largely going well, there are a few areas of improvement and lessons learned. The biggest roadblock encountered has been issues with funding mentorship events. We initially envisioned providing gift cards or other forms of compensation to the mentors to offset potential costs of meeting with mentees and to ensure they were paid for their knowledge. However, this mechanism of funding was not permitted under the grant being used. In response to this, we adjusted our plan to instead provide the mentors with a small salary for the time they spend working on this program. However, as this requires the students to receive an hourly appointment, which was not feasible for all students, particularly international students and those with external grant funding. Ultimately, this severely limited the ability to compensate mentors for their time and for outings with their mentee. Additionally, we explored using grant funding to host events, but encountered similar limiting and strict requirements Notably, all mentors were very willing to participate without any form of compensation, even after we had advertised the compensation of the recruitment materials. To remedy this issue, we recommend having a strong understanding of the funding mechanisms and what you can and cannot spend funding on. Additionally, in the future we will seek funding from a different mechanism that is designed to accommodate such a program.

Another issue encountered was the relatively small number of respondents on the application survey. We initially assumed that due to the lack of any programming for LGBTQ+ graduate students, there would be high demand to participate in this program. However, we had

very few responses, even after extensive advertising and extending the program deadline. There are many potential reasons for this, such as the existence of other first year mentorship programs, the timing of the program (occurring in the spring rather than the fall),

One key limitation of this program is that it excludes second year students from participating. We decided to restrict mentor participation to third year students and beyond, because we wanted to select for mentors that were established in their role as graduate students and ensure mentors would have some knowledge of the university and surrounding metropolitan area. Upon reflection, this is inherently flawed thinking as time in graduate school would not inherently translate to knowledge and confidence in these areas. In the future we will open the applications to second year students, trusting the students to self-select if they feel ready to take on a mentorship role. Additionally, we want to offer secondary activities, such as open happy hours, for students that would like to build community but do not feel ready or have the time to commit to a full mentorship relationship.

Finally, the small sample size of this pilot study inherently limits the generalizability of the results. Many specific racial identities, gender and sexual identities, and technical backgrounds are not represented in the program. Therefore, it is unknown what other needs these populations might have in a program like this. Additionally, since we are conducting this work at one institution, in a state that is openly hostile to Diversity, Equity, and Inclusion initiatives [17], the specific climate of this university will certainly influence the final results.

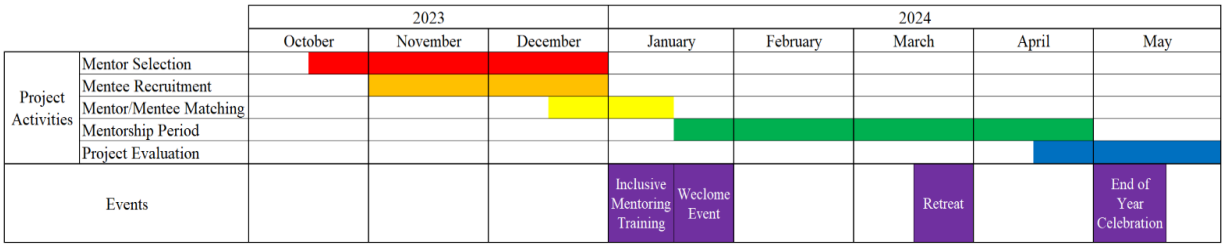

Figure 3: Timeline of steps to create a similar program for a semester starting in mid-January

Conclusion

This LGBTQ+ graduate student mentorship program running in the spring of 2024 hopes to serve as a pilot for larger scale mentorship programs, and to provide a blueprint for similar programs at other institutions. Figure 3 shows the timeline of steps to create a similar program for a semester starting in mid-January. Traditionally, LGBTQ+ populations are highly marginalized in engineering, with the chilly climate persisting even as individuals move up the academic ladder. To this end, LGBTQ+ student populations are often underserved, and must grapple with a climate that often explicitly devalues them while having very few role models or blueprints of success as am LGBTQ+ engineer. This program is to counter that expectation for student, and provide them with connections to other LGBTQ+ graduate students on campus that can help them navigate their transition and let first year students see that it is possible to succeed in graduate school. Our hopes for this program is that it fosters a greater community of LGBTQ+ graduate students, which is severely lacking on our campus, and can improve the climate experiences for these students. We hope that you look to create a similar program on your campus and can use this model as a starting point. Next steps for this program evaluation include collecting qualitative data by interviewing

participants as well as recruiting students for future semesters to increase the reliability of the quantitative results.

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Appendix I: Program Evaluation Survey

Section 1: Climate Assessment (Adapted from [15])

Please Rate your agreement with the following statements:

1. I trust the Cockrell School of Engineering administration to be fair to all employees and students.
2. At the Cockrell School of Engineering, I have opportunities to work or learn successfully in settings with diverse individuals.
3. The culture of the Cockrell School of Engineering is accepting of people with different ideas.
4. The culture of the Cockrell School of Engineering is accepting of people from all backgrounds.
5. I believe diversity is imperative to the success of the Cockrell School of Engineering.
6. I see people who look like me in positions I aspire to hold within the Cockrell School of Engineering.
7. I feel respected and valued by my primary supervisor at the Cockrell School of Engineering.
8. There is someone in the Cockrell School of Engineering who encourages my academic success.
9. The resources I need to do my work effectively are readily available.
10. My growth and development has been supported through opportunities within the Cockrell School of Engineering.
11. I receive recognition and praise for my good work similar to my peers.
12. There is someone in the Cockrell School of Engineering who encourages my professional development.
13. I feel like I belong at the Cockrell School of Engineering.
14. I feel respected and valued by faculty in the Cockrell School of Engineering.
15. I feel respected and valued by students in the Cockrell School of Engineering.
16. When I speak up in my daily interactions within the Cockrell School of Engineering community, my opinion is valued.
17. I feel that my work or studies contribute to the excellence of the Cockrell School of Engineering.
18. I am treated with respect in the Cockrell School of Engineering
19. I feel valued as an individual within the Cockrell School of Engineering
20. I have considered leaving the Cockrell School of Engineering because I felt isolated or unwelcome

Section 2: Engineering/Research Identity Assessment (Adapted from [16])

Please rate your agreement with the following statements:

1. In general, I find working on research interesting
2. I like doing research
3. I am interested in my research topic
4. Being a researcher is an important reflection of who I a
5. I am proud to be a researcher
6. I consider myself a researcher
7. I feel strong ties to other researchers in my discipline
8. I consider myself an engineer

9. I am proud to be an engineer
10. I feel strong ties to other engineers in my discipline
11. I like doing engineering