The Wallace H. Coulter Department of Biomedical Engineering

Climate Study Report (2021)

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Executive Summary

Background and Charge

The purpose of this study is to understand how our students (undergraduate, graduate, and postdoctoral fellows) experience being a member of the department with respect to their sense of belonging and inclusion. The department is particularly interested in:

- exploring students' peer-to-peer interactions,
- student-faculty interactions in classrooms and research laboratories,
- investigating if students with traditionally excluded identities (e.g., women, underrepresented minorities [URM], LGBT, persons with disabilities) feel included and valued.

Climate Study Goals

This study focuses on the following two aspects of climate: the 1) **psychological climate**, including students' sense of belonging, perceptions of discrimination, and perceptions of support, and the 2) **behavioral climate**, including opportunities to participate in educational experiences and social interactions (i.e., peer-to-peer and student-to-faculty) inside and outside of the classroom.

Methodology

The department's Executive Director of Learning and Training, in consultation with the Community, Diversity, and Inclusion committee's Data action team, developed an online survey for undergraduate, graduate and postdoctoral fellows. This survey was administered via Qualtrics during the 2021 spring semester. The quantitative data were analyzed, using independent samples T-tests, for differences within groups for undergraduate and PhD students. Groups explored for all students included gender, race, ethnicity, sexual orientation, and disabilities. In addition, we looked for differences based on first generation and transfer status among undergraduates, and based on citizenship among PhD students.

The qualitative data consisted of student responses to one open-ended survey question: "Do you have any comments you would like to add regarding your feelings of fairness and belonging in BME at Georgia Tech?" The responses to this question were sorted by category of respondent (Undergraduate, Masters, PhD, and Postdoctoral fellow) and by the overall valence (negative, neutral, or positive) of the response with respect to department climate. These comments provide important context for understanding the quantitative data.

We used a concurrent mixed method approach. We gave primacy to the quantitative method, to describe the BME climate with respect to diversity. Qualitative data were collected primarily through open-ended survey items.

Key Findings (Quantitative Data)

1. Undergraduates who identify with traditionally excluded identities (TEI) report more negative experiences in BME than those who do not. The most significant differences between undergraduate TEI and non-TEI are:
    a. the experiencing of insensitive remarks
    b. perceptions of Tech's commitment to diversity
    c. perceptions of BME's climate
2. Most or all groups of undergraduates:
    a. Reported significant negative impacts of COVID-19, with the most negative impacts reported by East Asian, LGBT, Disabled students, and Transfer students.
    b. Had low self-concept fit, a trend that was especially pronounced with Black and LGBT students.
    c. Exhibited relatively low levels of well-being in several groups, most prominently among Black, LatinX students, and Transfer students.
3. The statistical analysis of the Masters student MS responses, due to the low number of respondents (10), is not provided to protect their confidentiality. Although limited in number, the reponses did indicate the students did not feel a sense of belonging to the BME community, and were dissatisfied with the university's commitment to diversity.
4. Some PhD students who identify with TEI have a more negative experience in BME than those who do not. Specifically:
    a. Female PhD students' perception of Tech's commitment to diversity and of the BME climate are lower than Male students'.
    b. Black PhD students experience more insensitive remarks than do White students.
    c. Asian PhD students experience more insensitive remarks than do students who do not identify as Asian.
5. In addition, most or all groups of PhD students:
    a. Reported significant negative impacts of COVID-19, with the most negative impacts reported by Disabled students.
    b. Had low self-concept fit.
    c. Exhibited low social-fit, with this trend most significant among Black and LGBT students.
    d. Perceived the BME climate as not sufficiently favorable, especially for women, Black, LGBT, and Disabled students.
6. The statistical analysis for postdoctoral associates, due to low numbers of respondents (11), is not provided to protect their confidentiality. However, some trends were evident:
    a. There is dissatisfaction with the BME climate.
    b. Some postdoctoral associates are not comfortable with their advisor.
    c. Some postdoctoral associates indicate low scores on well-being and fit with the BME community.

Key Findings (Qualitative Data)

1. For undergraduate students, 4 themes emerged from responses to the open-ended question about feelings of fairness and belonging. These responses revealed that

students who have traditionally excluded identities (TEI) experience BME very differently than other students. The 4 themes are:
    a. Team projects and group work highlight inequities as ESL (English as a Second Language) students are excluded from leadership roles, active participation, and teaching assistant help.
    b. BME focuses on diversity, equity, and inclusion but is not perceived by some as being supportive or inclusive.
    c. BME can be competitive, stressful, and isolating, particularly for students with traditionally excluded identities.
    d. When peer, TA, and faculty microaggressions occur in classes and labs, students don't know how to report them and are fearful of repercussions.
2. For graduate students, 4 themes emerged from responses to the open-ended question about feelings of fairness and belonging. Analysis of the comments revealed that lab culture and PI experiences define the climate of BME, regardless of what is stated or intended. The 4 themes are:
    a. BME focuses on diversity, equity, and inclusion, but is not perceived by some as being supportive or inclusive.
    b. BME climate can be alienating and isolating, particularly for master's students and first-year students during the pandemic.
    c. Lab culture and PI largely define the graduate student experience of BME.
    d. TEI groups experienced (and did not report) both peer and faculty microaggressions.

Recommendations

Based on these results, we re-endorse the recommendations made in the 2017 climate study. In addition, we recommend centering those who are *most* marginalized. We recommend the department ask questions such as: 1) how does our curriculum and programming serve those who are *most* marginalized? 2) how can we shift from a model of service *for* to one of service *with* marginalized populations? and 3) how do we think about what is best across vulnerable populations, considering how initiatives or policies affect those with multiple/intersecting TEIs?

Specific recommendations:

- Prioritize improving the Black and LGBT undergraduate student experience.
- Conduct focus groups with undergraduate Black, LGBT, disabled, and transfer students to better understand their experiences in BME, particularly with respect to those that affect their well-being, sense of belonging, self-concept, social-fit, and goal-fit.
- Conduct focus groups with masters' students to gain an understanding of their experience in the Masters MBID programs.
- Conduct focus groups with PhD and postdoctoral students, especially Black, LGBT, and disabled students, to better understand their experiences in BME, particularly with respect to those that affect their well-being, sense of belonging, self-concept, social-fit, and goal-fit.

- Raise awareness and understanding of issues of diversity, equity, and inclusion by integrating these topics within the required curriculum. Some efforts in this regard are in progress; the impact of these efforts should be evaluated and publicly shared.
- More frequently feature diverse faces and voices in department print and social media, and in permanent visual representations in the department's physical spaces.
- Require periodic training / professional development for all students and faculty on microaggressions, upstander intervention, inclusive interpersonal interactions and pedagogies, Title IX, anti-racism approaches, and mental health.
- Establish a system for students to safely share their concerns, including conflicts with their advisor or instructors or unjust events they've observed, or been subject to, in BME spaces.
- Offer more social events and/or seminar series to build community, particularly among PhD and postdoctoral students
- Increase access and participation of undergraduate TEI students in research labs
- Consult and partner with external campus experts such as CEED to lead programming or assist in conceptualization and executing steps to promote inclusion of TEI
- Increase the representation of TEI in the faculty.
- Administer a survey of the climate on an annual basis in a way that minimizes the burden to respondents and keeps the database updated and relevant. Administering portions of the survey annually will increase the ability for the department to respond in a flexible and timely manner.
- Raise the BME community's awareness and understanding of the CD&I Committee; who they are, how to get involved, what actions they are taking.

A. Background and Context

The purpose of the study is to understand how our students (undergraduate, graduate, and postdoctoral fellows) experience being a member of the department with respect to their sense of belonging and inclusion. The department is particularly interested in exploring students' peer-to-peer interactions, student-faculty interactions in classrooms and research laboratories, and investigating if students with traditionally excluded identities (e.g., women, underrepresented minorities [URM], LGBT, persons with disabilities, and transfer students) feel included and valued.

A1. History of BME Climate Studies

The department has run three other studies to investigate the student experience. In 2015, and again in 2016, the Associate Chair for Undergraduate Studies, Dr. Joe Le Doux, ran a student needs and satisfaction (SNS) survey. In parallel, Dr. Le Doux and co-PIs submitted proposals to the NSF's RED (Revolutionizing Engineering Departments) program in 2014, 2015, and 2016, to seek greater resources to improve the BME student experience. The 2016 submission, entitled "Transforming for inclusion: fostering belonging and uniqueness in engineering education and practice" (Award # 1730262), was funded.

To follow up on the results from the SNS surveys, and to provide data needed to guide the NSF RED grant's work, the department commissioned a formal climate study to be run by an external team. To develop the call for proposals and to review the submissions, the department formed an ad hoc Diversity and Inclusion Committee in August 2016. The committee members were Dr. Julie Ancis (Associate Vice President of Institute Diversity, Equity and Inclusion), Paul Benkeser (Senior Associate Chair), Joe Le Doux (Associate Chair), Julia Babensee (Faculty), Ed Botchwey (Faculty), Kim Paige (Sr. Academic & Retention Advisor) and Shannon Sullivan (Graduate Program Manager).

The committee issued a call for proposals with the following rationale:

We want to understand how our students (undergraduate and graduate) experience being a student in the department with respect to their sense of belonging and inclusion. For example, are their backgrounds and perspectives respected and listened to, do students feel supported, or are they told they are not cut out to be engineers?, etc.

We realize that individuals have multiple identities, which can lead to each person having a unique set of experiences. We therefore believe our climate study should adopt an intersectional framework. Nevertheless, for simplicity and clarity, below we highlight specific demographic groups and identities we would like the climate study to focus on, although we remain cognizant of the fact that individual students will likely identify with several of these groups.

1. *We are interested in understanding students' peer-to-peer interactions in the classroom, in research labs, and in other settings where students regularly interact with other students. Based on various data sources, we suspect African Americans and LatinX/Latino students often do not feel a sense of belonging or inclusion.*
2. *We are also interested in understanding the experience of female students in the department - some report having issues when teamed with males, ranging from subtle biases that lead to them not being treated as equals and not being listened to, to more outright sexist comments and behaviors.*
3. *We are also interested in the climate of BME with respect to student-faculty interactions in the classroom, and student-advisor interactions in the research laboratories. We are interested in learning, for example, whether our courses and research labs are structured in ways that are slanted towards the perspective of white males and may not appeal to or interest or account for the perspectives and accomplishments of others.*
4. *Related to all of the above, we want to know if the accomplishments of all of our students are well-represented and celebrated.*
5. *Although under-represented minorities and women are our key interests, we aspire for everyone to feel welcome and included. Therefore, we are also interested in learning how students with other identities experience being a member of our department, including first generation students, students who have a disability, and students who identify as LGBT.*

Three proposals were received and reviewed and the winning proposal was awarded a contract to carry out a climate study of BME in early 2017. This study was led by Helen Neville (University of Illinois) and Lisa Spanierman (University of Arizona). The team carried out their work during the spring semester of 2017 and their final report was issued on July 31, 2017. The report made 20 recommendations in three domains: (a) department structure, policies, and practices; (b) department culture, and (c) class and lab culture. The department formed a permanent Community, Diversity and Inclusion committee (CD&I) in August 2017 to take action on these recommendations. The committee has been active since then. The 2017 climate study recommendations continue to guide their work.

A2. CD&I Committee Activities - A Brief Summary

Below we summarize a few of the key activities and accomplishments of the CD&I committee. For a complete report of all the committee's activities, please see the committee's annual reports, links to which are in the appendix.

2016

- Formed an ad hoc Diversity and Inclusion committee that commissioned a climate study of the BME department to better understand the undergraduate and graduate student experience

2017

- Formed a permanent Community, Diversity and Inclusion (CD&I) department committee

- Created and published, on August 31, 2017, an aspirational department diversity and inclusion statement:
    - *The WHC Department of Biomedical Engineering at Georgia Tech and Emory University affirms our institutions' efforts to increase equity, diversity, and inclusion on our campuses. We strive to create a welcoming, diverse and inclusive environment that values, celebrates, and respects the individual and communal differences that make us human, and aspire to cultivate global leaders in engineering and medicine who are champions of inclusive excellence.*
- Here is the current published diversity and inclusion statement:

2018

- Formed a faculty-driven lab culture team.
- Hired a consultant, Hardin Byers, to facilitate faculty discussion of lab culture at the fall 2018 faculty retreat
- Implemented new training for graduate students that focuses on lab culture
- Held an information session with students to share the results of the 2017 climate study
- Sponsored several "One Department" community initiatives

2019

- Ran a half-day workshop in spring 2019 for faculty to take a deeper dive into creating more inclusive research laboratory environments, including through the development of lab manuals in several labs.
- Analyzed the syllabi for required undergraduate courses for statements of inclusion or exclusion and to identify, and seek to meet, the basic syllabi needs of students.

2020

- Organized the resources based on the previous year's faculty workshop on creating inclusive research lab environments into a single document and compiled self-assessment questions from Hardin Byers and from the literature to develop a lab health survey.
- Compiled tips from graduate students and faculty to create a manual to help improve the undergraduate experience in research labs.
- Completed a rubric that helps faculty assess the inclusiveness of their course syllabi and provide examples of best practices.
- Held a COVID-specific mental health webinar that was hosted by James Dahlman (Georgia Tech) and Jordan Cattie (Emory University). The webinar was attended synchronously by a few dozen students, staff, and professors from the department.
- Hosted a panel session in which the stories of several students, who identify with traditionally excluded identities, were shared and discussed.

2021

- Established a department CD&I website to share information about DEI initiatives and activities in the department.

- Included links to resources in the CD&I website, including lab manual resources, student evaluation resources, and resources to promote racial healing and inclusion.
- Issued a new climate study survey in the spring 2021.
- Established a BME CD&I Distinguished Lecture series at GA Tech/ Emory. Several speakers from traditionally excluded identities presented their work. The series is ongoing.
- Provided a series of workshops, led by AskDan, in which several small groups of faculty met multiple times to learn about, and practice carrying out, difficult conversations about race and inclusion.

A3. Study Focus

The 2021 climate study focuses on the following two aspects of climate: the 1) **psychological climate**, including students' sense of belonging, perceptions of discrimination, and perceptions of support, and the 2) **behavioral climate**, including opportunities to participate in educational experiences and social interactions (i.e., peer-to-peer and student-to-faculty) inside and outside of the classroom.

B. Project Activities and Methods

B1. Research Methods

The department's Executive Director of Learning and Training, in consultation with the Community, Diversity, and Inclusion committee's Data action team, developed an online survey for undergraduate, graduate and postdoctoral fellows. This survey was administered via Qualtrics. The resulting quantitative and qualitative data were analyzed and the findings are summarized in this report.

Research methods for the 2021 Climate Survey were closely modeled on the original survey and study from 2017. Some items were eliminated to reduce the length of the survey and minimize the burden to students, while maintaining important data points for comparison. An item was added to address the negative and positive impacts of the COVID-19 pandemic on lifestyle and learning environment. New scales were added to address well-being and authenticity (self-concept fit, goal fit, and social fit). In 2017, all survey populations were included in one instrument. In 2021, postdoctoral fellows were surveyed separately. Links to documents that show the item scales and indices are provided in the Appendix.

T-tests were used to compare mean scores between independent samples from the same scales. For scales such as belonging and faculty support, mean scores were created by computing the means of all items (after reverse-scoring, if needed). Differences were considered significant when the p-value was less than 0.10, rather than the more traditional

p-value of 0.05, to heighten our sensitivity to differences among how groups experience the department.

Independent samples T-tests were used to explore differences within groups for undergraduate and PhD students. Groups explored for all students included gender, race, ethnicity, sexual orientation, and disabilities. In addition, we looked for differences based on first generation and transfer status among undergraduates, and based on citizenship among PhD students. Effect sizes for these comparisons were calculated using the pooled standard deviation (Cohen's d) to determine the magnitude of the experimental effects. We used a concurrent mixed method approach. We gave primacy to the quantitative method, to describe the BME climate with respect to diversity. Qualitative data were collected primarily through open-ended survey items.

One open-ended question was asked in the survey, which was "Do you have any comments you would like to add regarding your feelings of fairness and belonging in BME at Georgia Tech?". The responses to this question were sorted by category of respondent (Undergraduate, Masters, PhD, and Postdoctoral fellow) and by the overall valence (negative, neutral, or positive) of the response with respect to department climate. These comments provide important context for understanding the quantitative data.

B2. Participant Demographics

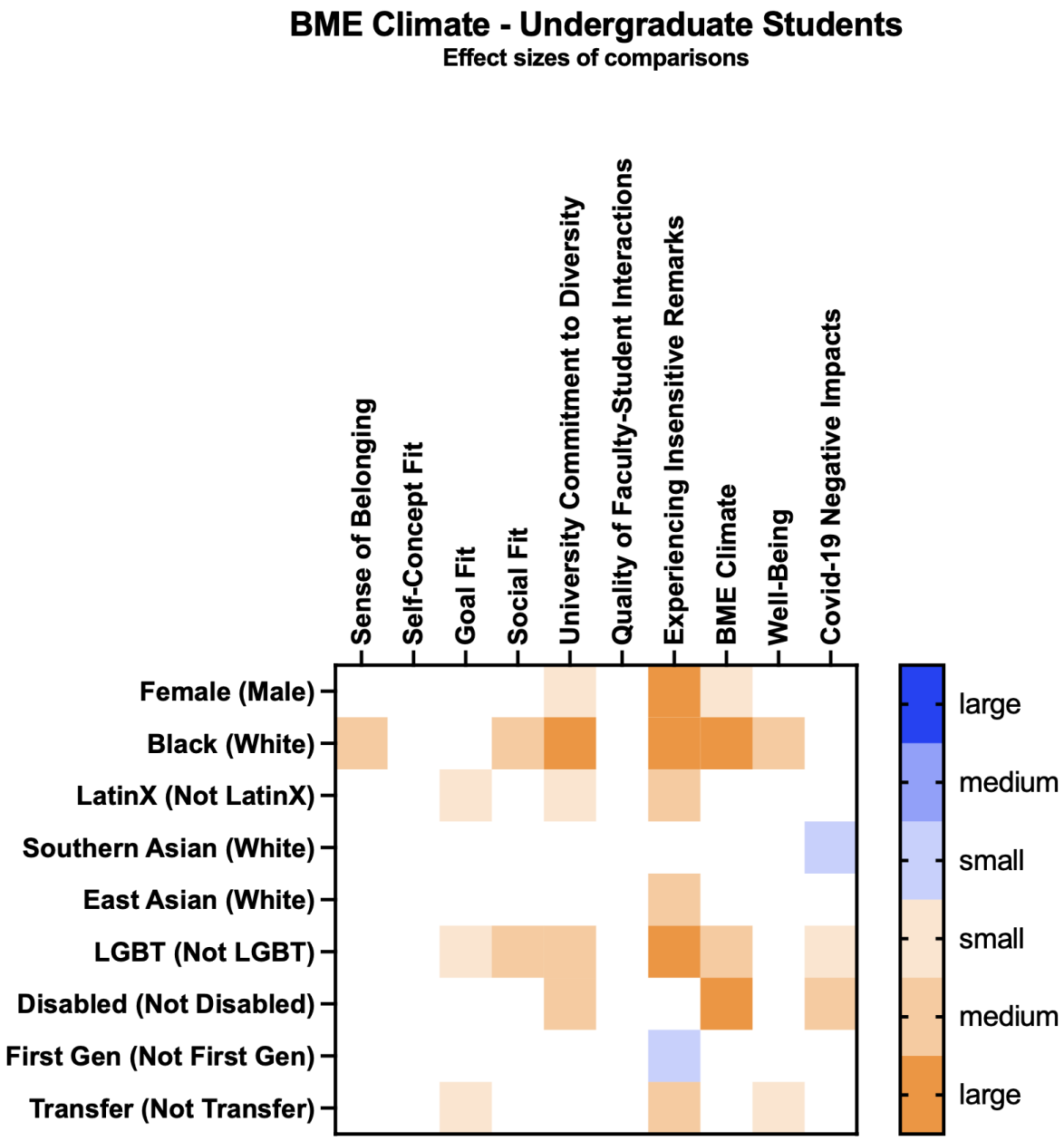
The following is a summary of the demographics of the survey respondents. See the section G2 of the appendix for the number of respondents and their demographics.

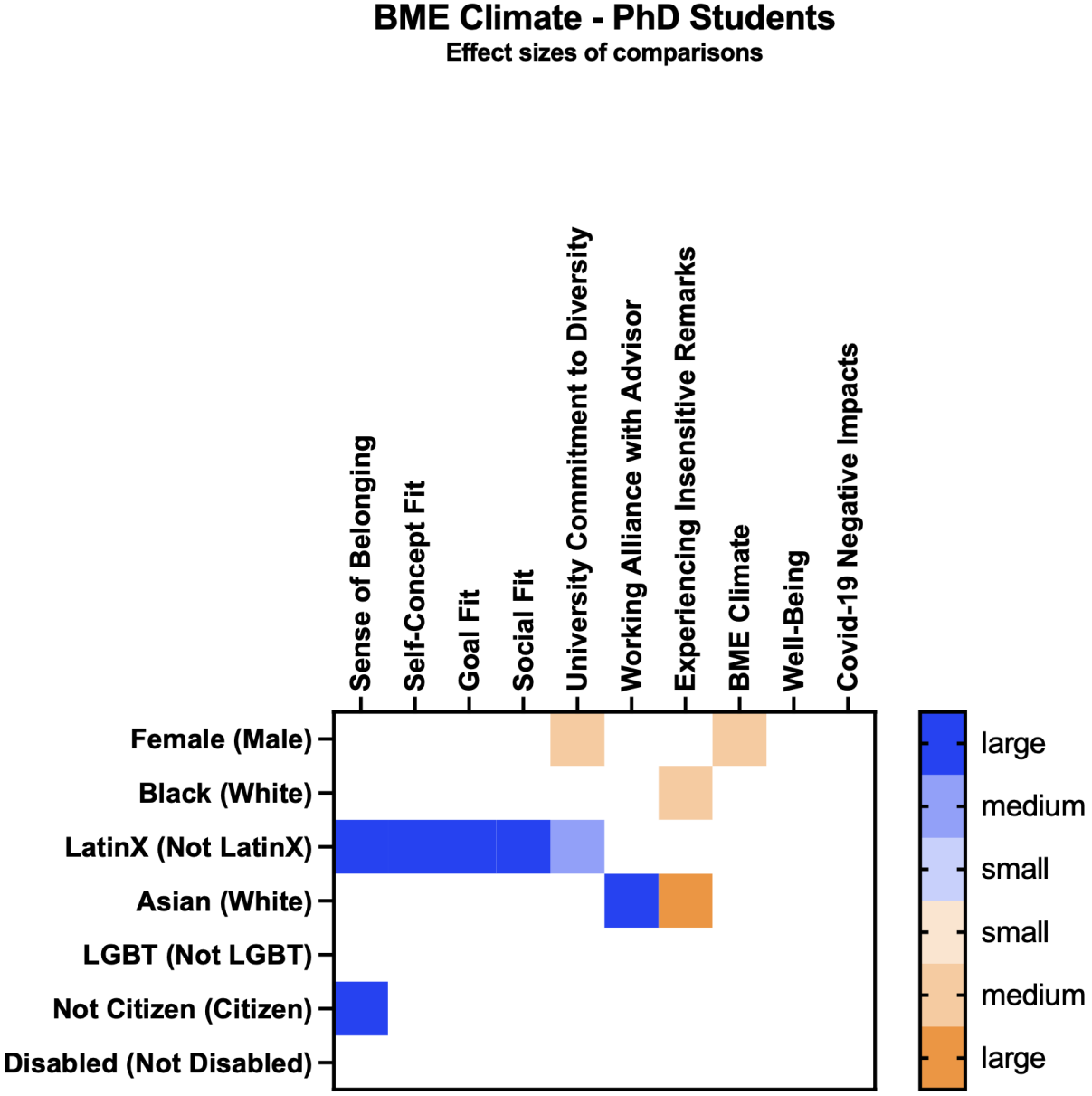
The undergraduate data is from 176 undergraduate students, 56% of whom were female. Approximately 43% of responses were from white students, 27% from Asian students, 6% from black students, 4% from middle Eastern students, and 20% from either the "other" or the "unknown" categories. About 7% reported Hispanic ethnicity and 8% of students reported disabilities.

The doctoral student data is from 65 doctoral students, 45% of whom were female. Approximately 42% of responses were from white students, 22% from Asian students, 8% from black students, 3% from middle Eastern students, and 26% from either the "other" or the "unknown" categories. About 14% reported Hispanic ethnicity and 9% of students reported disabilities.

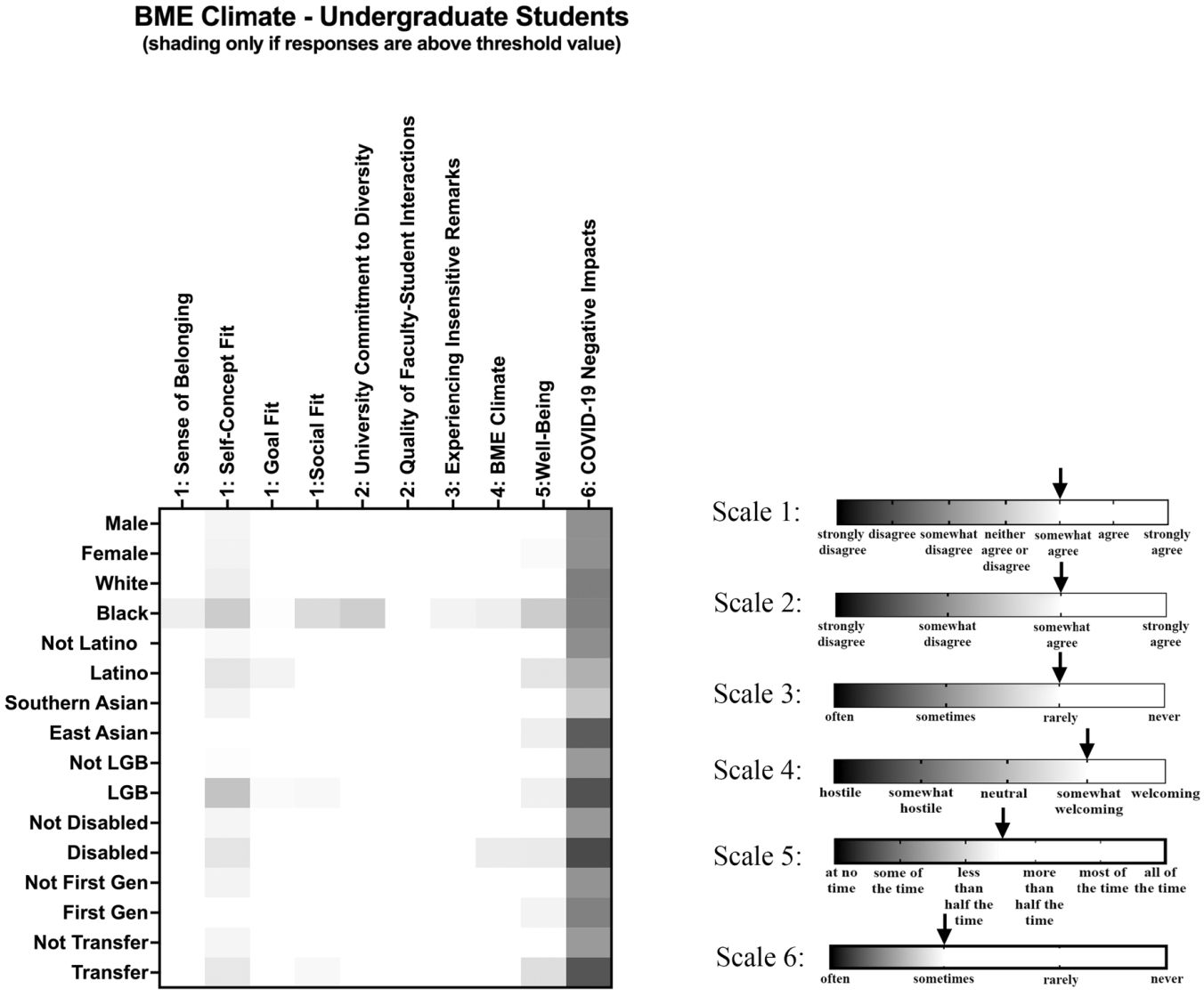
C. Quantitative Study Results

The data are visualized in two ways: First, as a set of comparisons between two groups, a reference group and a traditionally excluded identity (TEI). The effect size of differences that are statistically significant (to a p-value of less than 0.10) are shown. Differences that are detrimental to TEIs are shown in orange, whereas differences that are beneficial to TEIs are shown in blue. The effect size is represented by the intensity of the color as either small (> 0.2,) medium (> 0.5), or large (>0.8).

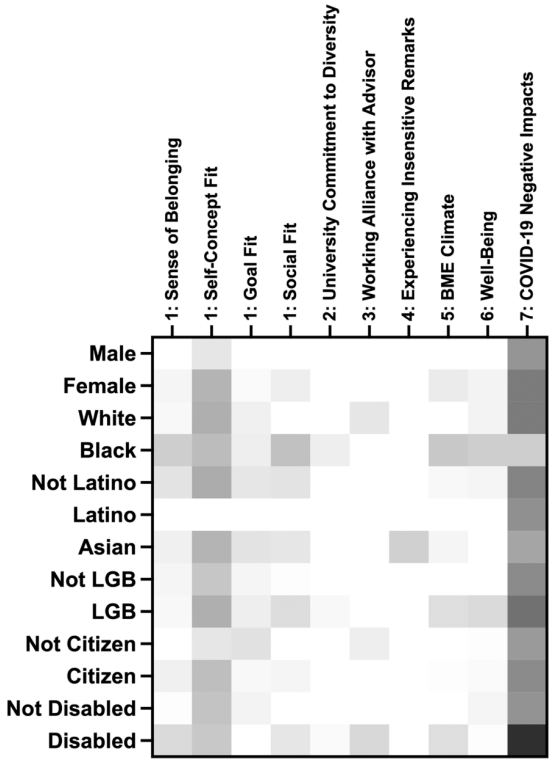

BME Climate - Undergraduate Students
Effect sizes of comparisons
Sense of Belonging
Self-Concept Fit
Goal Fit
Social Fit
University Commitment to Diversity
Quality of Faculty-Student Interactions
Experiencing Insensitive Remarks
BME Climate
Well-Being
Covid-19 Negative Impacts
Female (Male)
Black (White)
LatinX (Not LatinX)
Southern Asian (White)
East Asian (White)
LGBT (Not LGBT)
Disabled (Not Disabled)
First Gen (Not First Gen)
Transfer (Not Transfer)
large
medium
small
small
medium
large

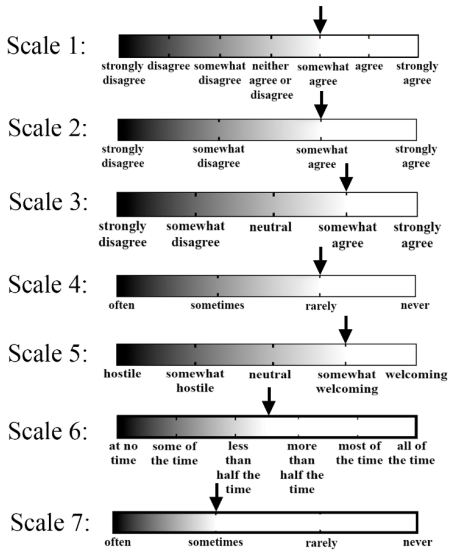

BME Climate - PhD Students
Effect sizes of comparisons
Sense of Belonging
Self-Concept Fit
Goal Fit
Social Fit
University Commitment to Diversity
Working Alliance with Advisor
Experiencing Insensitive Remarks
BME Climate
Well-Being
Covid-19 Negative Impacts
Female (Male)
Black (White)
LatinX (Not LatinX)
Asian (White)
LGBT (Not LGBT)
Not Citizen (Citizen)
Disabled (Not Disabled)
large
medium
small
small
medium
large

Second, the results are graphed on an absolute scale, as a function of several demographic groups. Scores that are above a threshold level have no color. Scores below the threshold level may suggest that improvements in our students' experience are needed. Scores that are beneath a threshold level are gray. The lower the score is below the threshold level, the darker the gray color. See the graph's legend for the relationship between gray levels and scores.



BME Climate - PhD Students
(shading only if responses are above threshold value)





C1. Summary of Undergraduate Student Results

1. Undergraduates who identify with traditionally excluded identities (TEI) report more negative experiences in BME than those who do not. Twenty-five of the twenty-seven statistically significant differences were less favorable for TEIs. The TEIs examined in this study are women, Black, LatinX, Southern Asian, East Asian, LGBT, Disabled, first generation, and transfer students. We summarize these results, starting with the groups that have the largest number of differences.
    a. Black and LGBT students report significantly less desirable outcomes in 6 of the 10 climate factors considered:
        i. Black students' sense of belonging, social fit, and well-being are lower than White students, as is their perception of Tech's commitment to diversity and the BME climate. Also, Black students' experience more insensitive remarks.
        ii. LGBT students' goal fit and social fit are lower than non-LGBT students, as is their perception of Tech's commitment to diversity and the BME climate. Also, LGBT students experience more insensitive remarks and report a more significant negative impact of COVID-19.
    b. Women, LatinX, disabled students, and transfer students report significantly less desirable outcomes in 3 of the 10 climate factors considered:
        i. Women students' perception of Tech's commitment to diversity, and the BME climate are lower than men students', and they experience more insensitive remarks.
        ii. LatinX students' goal-fit, and their perception of Tech's commitment to diversity, are lower than non-LatinX students'. In addition, LatinX students experience more insensitive remarks.
        iii. Disabled students' perception of Tech's commitment to diversity and the BME climate are lower than non-disabled students, and they report more significant negative impacts of COVID-19.
        iv. Transfer students' goal-fit and well-being are lower than non-transfer students, and they experience more insensitive remarks.
    c. East Asian students reported experiencing more insensitive remarks than students who do not identify as East Asian.

2. The factors that show the most significant differences between undergraduate TEI and non-TEI are:
    a. the experiencing of insensitive remarks (6 TEI perceive this less favorably than non-TEI: Female, Black, LatinX, East Asian, LGBT, and transfer students).
    b. perceptions of Tech's commitment to diversity (5 TEI perceive this less favorably than non-TEI: Female, Black, LatinX, LGBT, and Disabled)

c. perceptions of BME's climate (4 TEI perceive this less favorably than non-TEI: Female, Black, LGBT, and Disabled)

3. In reviewing the absolute values of the scores, we see 4 notable trends:
    a. Black students' score below the threshold values in 9 of the 10 factors examined. The only factor that is not below the threshold value is the quality of faculty-student interactions.
    b. Three factors score low among several or all groups:
        i. All groups studied report significant negative impacts of COVID-19, with the most negative impacts reported by East Asian, LGBT, Disabled students, and Transfer students.
        ii. Self-concept fit is low among several groups, especially with Black and LGBT students.
        iii. Well-being is lower than the threshold level in several groups, most prominently among Black, LatinX students, and Transfer students.

C2. Summary of Masters Student Results

The response rate from the Masters MS students was similar to that of undergraduate students. However, the small number of students in the Masters MS programs resulted in a small number of respondents (10 respondents out of 60 Masters MS students). For this reason, the statistical analysis of the Masters student MS responses is not provided to protect confidentiality of the respondents. But a pattern can be discerned from the data; a small number of the 10 respondents indicate dissatisfaction with the university commitment to diversity and do not feel a sense of belonging within the BME community.

C3. Summary of PhD Student Results

1. Some PhD students who identify with TEI have a more negative experience in BME than those who do not. The TEI examined in this study are women, Black, LatinX, Asian, LGBT, Not US citizens, and disabled students. Specifically, our results show that:
    a. Female PhD students' perception of Tech's commitment to diversity and of the BME climate are lower than Male students'.
    b. Black PhD students' experience more insensitive remarks than do White students.
    c. Asian PhD students experience more insensitive remarks than do students who do not identify as Asian.

2. In reviewing the absolute values of the scores, we see 4 notable trends:
    a. Black, LGBT, and disabled students' score low in several of the 10 factors examined.
    b. Three factors score low among several or all groups:

i. All groups studied reports significant negative impacts of COVID-19, with the most negative impacts reported by Disabled students
ii. Self-concept fit is low for almost all groups of PhD students
iii. Social-fit is low for several groups of PhD students, especially among Black and LGBT students
iv. The perception of the BME climate is less favorable than the threshold level for women, Black, LGBT, and Disabled students

C4. Summary of Post-Doctorate Results

The response rate for postdoctoral associates was slightly better than that of the undergraduate students. However, the small number of postdoctoral associates resulted in a small number of respondents (11 respondents out of 49 postdoctoral associates). For this reason, the statistical analysis of the postdoctoral responses is not provided to protect confidentiality of the respondents. But a pattern can be discerned from the data; a small number of the 11 respondents indicates dissatisfaction with the BME climate. A few indicate that they are uncomfortable with their advisor. Some postdoctoral associates indicate low scores on well-being and fitting within the BME community.

C5. Trends that span students at all levels

Taken together the main features of these data are that:

1. The Black and LGBT student experience is significantly less positive than other students.
2. Self-concept fit is low for <u>most</u> students, an effect that is most pronounced among Black and LGBT students.
3. All students report significant negative impacts from COVID-19, an effect that is most pronounced among Disabled students.

D. Qualitative Study Results

Students of all levels, undergraduate, master's, and PhD were asked one open-ended question on the climate survey: *Do you have any comments you would like to add regarding your feelings of fairness and belonging in BME at Georgia Tech?* The survey question was developed to collect qualitative information on experiences and beliefs that provide context for quantitative ratings of BME climate.

With 290 total surveys completed across student respondent categories, 45 individuals (15.5%) provided responses to the open-ended question. About 12% of undergraduate respondents

(n=25), 23% of master's respondents (n=3), and 24% of PhD respondents (n=17) provided comments.

Undergraduate student comments were analyzed separately from graduate student comments. Master's and PhD student comments were grouped together for analysis of all graduate students. With postdoctoral fellows providing four comments, these were too easily identified and were excluded from the analysis. When responses were broken into distinct comments, there were 106 total to be analyzed.

Comments were downloaded, sorted by student level, and reviewed for immersion prior to following a grounded theory approach with open coding and selective coding. Responses were sorted by demographic source of the comment and target/topic of the comment, such as faculty, administrators, advisors, etc.

Comments were sorted by positive (23.6%), negative (64.1%), and neutral/mixed (12.3%) groups. When comments were sorted by level of respondent, about 67% of undergraduate comments were negative, compared to 83% of master's students, and 61% of PhD students. Few master's students completed the climate survey, but the ones who did were more likely to share negative feelings of fairness and belonging than undergraduate and PhD students. Additional surveys or focus groups are recommended to explore the concerns of master's students.

Comments fit into three broad categories first identified in the 2017 climate study: Department Structure (38%), Department Culture (36%), or Class/Lab Culture (26%). For comments coded as Department Structure, about 79% were negative, compared to about 53% negative for Department Culture and 65% negative for Class/Lab Culture. Department Structure generated the most comments about fairness and belonging and these comments were largely negative.

Although the qualitative comments greatly increase understanding of student experiences of the culture of BME, the fact that fewer than 16% of survey respondents shared comments must be kept in mind. It is strongly recommended that student focus groups be conducted to explore these themes more thoroughly with participation by students with traditionally excluded identities.

D1. Undergraduate Student Comments and Themes

Coding and analysis revealed 4 themes with at least 5 comments representative of undergraduate student feelings of fairness and belonging.

These themes were derived from 25 undergraduate students, 84% of whom were female. Approximately 44% of coded comments were from white students, 32% from Asian students (20% East Asian, 8% South Asian, 4% North Asian), 12% from black students, 4% from middle

Eastern students, and 8% from “other” category students. About 8% of students who provided comments reported LatinX/LatinX ethnicity. Just 4% of students reported disabilities. Twenty-eight percent were transfer students. Eight percent were non-resident aliens. Eight percent were first-generation. Seventeen percent of students who provided comments reported sexual orientation as bisexual or “other.” Because of the small number of students who provided comments and limited representation in some demographic groups, comments are not labeled by category to protect confidentiality.

For undergraduate students, the 4 themes that emerged from responses to the open-ended item about feelings of fairness and belonging revealed that the climate of BME is very different for students with traditionally excluded identities (TEI). Although the department appears to prioritize inclusion, it is not perceived as supportive or inclusive for students with TEI. Team projects and group work caused students who speak English as a second language (ESL) to feel marginalized. A fair number of microaggressions were shared, but students acknowledged that BME may not be aware of the extent of the problem. Some did not report microaggressions because they didn’t know where or how to lodge complaints. Others chose not to report because of concerns about negative repercussions or retribution. The effects of COVID-19 and a remote year of study may have contributed to two other issues shared by students - impostor syndrome and isolation. It was a very challenging year with the pandemic, remote learning, Black Lives Matter protests, and a mass shooting that occurred in Atlanta the week before the survey was administered. As one student said, there is a need for “empathy for students” right now.

A sample of comments related to each theme is provided below. Some discussion points related to themes and quantitative outcomes are also provided.

THEME 1: Team projects and group work highlight inequities as ESL students are excluded from leadership roles, active participation, and TA help.

- *Because English is not our first language they assume that we know less and tend to take most of the responsibilities.*
- *TAs tend to focus more on these students (English as a first language) for discussion and help.*
- *Having an accent and a different culture creates a barrier with US citizens BME students who fail most of the time to include us during group work or discussion.*
- *It is very frustrating because it feels like just because we speak another language we are less qualified.*
- *BME program has a lot of presentations in various classes. I have always felt that international students with strong accents gets significant disadvantage on those assignments. Even when they are speaking perfect English with great contents, I have seen many instances of unfair grading due to their accents and how they look.*

- *Other than (team project classes), I've always felt I was graded and taught in fair ways.*
- *Also happy to have found a set of people that look like me to matriculate through this major with because otherwise it'd be way more difficult.*
- *It really depends on the professor. Most of my professors are very fair, but there are a few that are less so*
- *Professors need better training on how to create inclusive classrooms*

THEME 2: BME focuses on diversity, equity, and inclusion but is not perceived by some as being supportive or inclusive.

- *I'm lucky to have a pretty great external support system and a few close friends within BME, but I think they would agree with me in saying the department as a whole is not viewed as a system of support or belonging here*.
- *Areas of improvement desperately needed: empathy for students who are dealing with racial/ethnic trauma (BLM, the shooting last week), empathy for students who are suffering due to the pandemic (mental and physical health issues, socioeconomic struggles, inadequate school resources, hostile environments, grief, etc.), and better awareness of health overall (physical and mental).*
- *For a department that prides itself in innovation and individual perseverance, please have the courage to teach yourself. It is not fair to place that burden on others who already feel burdened.*
- *The BME department as a whole aims for diversity, but I feel as though it still focuses on and is built around a more normative than diverse community because of the people I interact with.*
- *I had never known the "BME Community, Diversity, and Inclusion committee" was a thing. Why is this so hushed? Why are all BME students not allowed to attend the meetings? If they are, why is this not advertised? Why is this program not a coalition between BME students and faculty? How can you expect to arrive at solutions and to implement them if you only have conversations between faculty and upper-faculty, rather than students with them?*
- *I feel welcomed here as a white, cis-gender woman. Not all of my BME friends can say the same.*
- *You also ask for minority students to attend meetings with important people outside of the department sometimes. I have had friends in the past that have had to sit silently while a top BME faculty member brags to someone about how good diversity and fairness are here. And the student stays silent even when they disagree. Silent. Silenced.*
- *I think we need more transparency with this committee (CD&I) to the BME public. I have heard from friends that higher faculty does not want this transparency of the committee. Why not? All transparency does is hold people accountable. What does this committee do?*

- *Why ask if we feel we are being treated fairly in the BME department and then get asked to answer what race we are and completely exclude Latin America?*
- *I know a group of black BME friends of mine put together a list of actionable items this department can make to help BLM @ GT BME. I have seen the document. I have looked it over. It is organized by high and low priorities and high or low effort. It is so organized, yet no leading faculty or the BME Community, Diversity, and Inclusion committee made real changes. That is devastating to hear. And devasting to live through.*
- *I also think it is inherently unfair to consistently ask black students to teach you what fairness is. It is not their responsibility to educate you… Come up with a plan and ask for their feedback.*
- *Inclusion has to come before diversity. We have one of the most diverse departments when it comes to women specifically, but as a woman I don't necessarily feel comfortable or equal in the classroom from the moment I walk in.*

THEME 3: BME can be competitive, stressful, and isolating, particularly for students with traditionally excluded identities.

- *… I haven't met many students or faculty in general. Again, I think being online contributes to this because many of the initiatives the department takes have to be communicated through email, which often gets ignored due to the sheer quantity of similar emails that students are receiving*.
- *I feel like it is really difficult to get into a lab. I have been looking for many semesters, but I don't know how to approach it and it feels like I need help to guide me…*
- *I think it'd be nice to have events that bring the BMEs together (like MSE)*
- *I have had to seriously push against a lot of imposter syndrome through my time here which has been incredibly frustrating.*
- *The only time I've experienced feelings of not belonging is usually me beating up on myself or comments from another student.*
- *The students and faculty are very high achieving, sometimes, in comparison, I feel like I am unworthy/less worthy than them… But it never affects our interactions.*
- *When I think of BME faculty that helped my transition to tech and BME, only 2 come to mind. I struggle to feel connected to faculty and it's weird because I am unsure of how to make those connections sometimes.*
- *If professors could focus on Biotech industry applications more as they do for research, then non-research-seeking students may feel more involved and get more out of their education.*
- *I have struggled as a black student who is not directly on the path toward industry-based work. It sometimes feels as if you don't belong in this community if you're not white and wanting to go on and perform device-based work.*

- *One problem I have seen is that some professors (not all professors) seem to have a negative attitude or opinion towards BME majors that have pre-health aspirations. That culture/mindset has had a negative impact on me and how I feel I fit in BME.*
- *Some professors are doing a fantastic job of this … and some are not (watching Black students be forced to beg for forgiveness policies during BLM, having a mental breakdown the night of the election while trying to cram for a hell week, trying to fight through an ADHD diagnosis when I have too much work to make time to do the paperwork and take the diagnosis tests).*

THEME 4: When peer, TA, and faculty microaggressions occur in classes and labs, students don't know how to report them and are fearful of repercussions.

- *Several of my friends have had inappropriate or sexist comments made towards them throughout the BME department (and you probably don't hear about them because students don't realize that anything can be done - to us a non-inclusive environment is often viewed as an unfortunate and immovable fact of going to an engineering school).*
- *It's much worse when it comes to racial and ethnic minorities, and from my experiences I would argue maybe even worse when it comes to socioeconomic status or disability status.*
- *Overall, i would say i have heard/seen a few pointed that show implicit bias in some of the faculty members, but i haven't met anyone who i believe would not try to adjust their viewpoint and improve if it was pointed out that they were harboring these biases.*
- *The most severe experience I have had that made me feel discriminated against or unwelcome, as an undergraduate woman in the BME program, was a blatantly sexually suggestive comment from a PhD student who was meant to be training me in a lab on campus.*
    - *I have only had one negative experience where I felt like a professor unfairly degraded me and was unnecessarily disrespectful.*
    - *Obviously, sexual harassment should never happen, but I don't think this incident was necessarily a representation of the BME department as a whole. I did not report the incident out of fear/nervousness of the repercussions of trying to resolve the issue and the potential stress that could add to my already stressful experience at Tech. I believe these types of experiences are common for women in every industry, unfortunately.*

D2. PhD Student Comments and Themes

Coding and analysis revealed 4 themes with at least 5 comments each that are representative of graduate student feelings of fairness and belonging. These themes were derived from 20 graduate students, 57% of whom identified as female, and 7% as “other” gender. Nearly half of graduate students who provided comments were white; 13% were black; 27% were Asian (20% East Asian, 7% South Asian); and 13% were middle Eastern students. Fourteen percent of students reported LatinX/LatinX ethnicity. Fifteen percent of students who shared comments reported disabilities. Eleven percent were non-resident aliens. Twenty-five percent reported sexual orientation as gay/lesbian, bisexual, or “other.” Because of the small number of students who provided comments and limited representation in some demographic groups, comments are not labeled by category to protect confidentiality.

Analysis of the comments revealed that lab culture and PI experiences define the climate of BME, regardless of what is stated or intended. BME graduate students are a more diverse group, and they want the department to exemplify diversity, equity, and inclusion, not just promote it. The pandemic has made it particularly difficult for TEI graduate students to feel departmental belonging. The pandemic has been challenging and isolating, especially for first-year students. Communication from the department has been inadequate. The master’s program is small and had a small number of survey respondents, but the message was clear – students felt somewhat forsaken. Although microaggressions continue to be experienced and reported in the department, it is interesting that LatinX/LatinX students managed to report better relationships with their advisors, greater sense of belonging, and better goal fit, social fit and self-concept fit ratings of authenticity. Something is working well for this cohort of traditionally marginalized students in BME and it should be explored further.

The 4 themes that emerged from graduate student responses to the open-ended item about feelings of fairness and belonging are explored below. A sample of comments related to each theme is provided. Some discussion points related to themes and links to quantitative outcomes are also provided.

THEME 1: BME focuses on diversity, equity, and inclusion, but is not perceived by some as being supportive or inclusive.

- *We get a ton of emails about opportunities and this and that. But what we need is someone in the administration to reach out to us and REALLY ask how we are feeling.*
- *… problems I think the department could work on in terms of inclusion: (1) The ironically dogmatic way in which inclusion itself is discussed, not allowing for varying views about how to best promote diversity.*
- *In my opinion, no matter how much the department wants to create a “safe space” the students and faculty that are recruited need to model that as well.*

- *Top administrators in BME department… have ALWAYS been incredibly disrespectful, unhelpful, and rude to me throughout my 5 years in the BME department and it has had a huge negative impact on my experience and sense of belonging here.*
- *I think there is still room for improvement but overall the department has seemed to put a lot of thought and intention behind making the department welcoming and inclusive to all.*

THEME 2: BME climate can be alienating and isolating, particularly for master's students and first-year students during the pandemic.

- *When speaking to older graduate students they have mentioned the department sending more information out earlier when there are important deadlines. This last year with COVID there have been many times when things are not clear and I do not know who to talk to.*
- *…there has been little outreach from the department to the first-year students. This is our first year, with working from home, and little guidance.*
- *Because of the pandemic, I believe all students but especially the first-years have felt isolated by Tech and the BME department.*
- *The masters students haven't heard from our program advisor in months.*
- *… I don't feel like the school or department cares enough about the students.*
- *…the lack of connecting with people (due to the pandemic) can be a little hard to deal with.*
- *I think the program itself needs more focus than our 'feelings.'*
- *I have very few interactions with the department, likely due to the remote nature of this past year.*
- *I realize the masters program is new and the focus is on the PhD program as it naturally should be, but if your going to offer a ms bme program, the least you can do is give them an advisor that checks in more often than once every 8 months.*
- *My experience has certainly been limited, given my only experience thus far has been virtual.*
- *It would mean a lot if faculty personally reached out to students and really ask them how they are doing and how the school/department can help.*
- *I have gone through this entire program without once talking to her (Advisor) or anyone else in the department and I graduate in a month.*

THEME 3: Lab culture and PI largely define the graduate student experience of BME.

- *Most of my feelings of fairness and belonging are restricted to my experience with my PI and laboratory. Over 90% of my graduate school experience rests with this individual, and the few who are also members of the lab.*
- *It will be very hard to have students feel good in the program when PhD advisors can get away with treating students very badly, with no repercussions.*
- *I think people's experiences highly depend on their advisor but also how willing they are to seek help within the department.*
- *My advisors are great but not every faculty member has made me feel welcomed.*
- *I have very few interactions with the department, likely due to the remote nature of this past year.*
- *I am currently in a PhD program and the more I see how competitive to be in academia the more stressed I get about future and about becoming a professor one day.*
- *I hope a small part of the program can train PhD students to be open to other career options, rather than the only academia.*
- *I feel, however, that my situation is a poor one relative to the standard, based on a very poor relationship with my PI, and poor relationships with the fellow students in my lab.*
- *I strongly feel like I belong to the community at GT, but this is mostly based on my interactions with my lab members.*
- *I love my PI and colleagues in my lab while I am not sure about how my little interactions with BME people outside my lab only through the classes are impacting me. But, I have not felt anything significantly negative during those interactions as well.*

THEME 4: TEI groups experienced (and did not report) both peer and faculty microaggressions.

- *There were times in classes where racial remarks were made and professors said nothing, and that's not okay. Professors should be equipped with skills and knowledge to address those situations.*
- *Many things have gone unreported to "not burn bridges" for their own interests, but also does not allow BME admin to become aware of the circumstances.*
- *Just adding an example of problematic behavior: I once had a senior design professor get up in front of the class and tell us all about his department-sponsored trip to Israel. He emphasized how close he was to the border with Gaza and joked how he was "within bombing distance" … As someone from that region of the world, I felt that it was insensitive of him to play tourist in an area with such a huge humanitarian and political crisis.*
- *Many of my colleagues have experienced unfair treatment and disrespect, which influences my own perspective for fairness in BME.*
- *We don't know who to go to about our grievances.*

- *…my peers are not open to people from different backgrounds.*

E. Discussion

The purpose of this section is to discuss the themes from the qualitative data, and where possible, connect these insights to the quantitative results.

E1. Undergraduate Themes

Theme 1 Discussion

- Many comments described inequitable treatment of students for whom English is a second language. Awareness of this bias could be addressed in TA trainings and other forums.
- Black, LGBT, and transfer students had significantly lower ratings of social fit than white students on climate surveys.

Theme 2 Discussion

- Awareness and understanding of the CD&I Committee could be improved. More messaging about diversity and inclusion efforts and outcomes and recruiting of student participants is needed.
- When students provide feedback or put together “action items” for departmental leadership on any issue, there is potential for damage to the culture if not acknowledged or acted upon in some way.
- Black and LGBT students had significantly lower ratings on BME commitment to diversity than white or non-LGBT students. Female, LatinX/LatinX, and disabled students also had significantly lower ratings of BME commitment to diversity than their comparison groups.
- TEI students are experiencing BME differently.

Theme 3 Discussion

- Students with TEI are experiencing BME culture differently than their peers. Black, disabled, and LGBT students are experiencing a significantly more hostile climate.
- Impostor syndrome is one outcome of a competitive, stressful, and isolating culture but it may be possible to mitigate with training and increased awareness.
- According to survey data, first generation students have fewer faculty to student interactions.

- The negative effects of COVID-19 on feelings of belonging were mentioned by many students in many different contexts. The isolating experiences shared in the climate study should be explored with focus groups to determine whether they are pandemic-based or more representative of cultural changes.
- Undergraduate students report that their interest in “pre-health” and away from “device-based work” or research, makes them feel excluded.
- It is interesting to note that the pandemic created a reversal of fortune for some populations that are traditionally marginalized, like LGBT and disabled students. These students experienced significantly fewer negative impacts from the pandemic than their heterosexual and non-disabled peers. White students reported significantly more negative impacts from the pandemic than South Asian students. These are unexpected results for which the underlying cause is not known. This could be an area for further exploration.

Theme 4 Discussion

- Survey questions about insensitive remarks and unfair treatment confirmed the experiences shared above. Female students experienced more insensitive remarks than male students. Black students experienced more insensitive remarks than White students.
- LatinX/LatinX students, East Asian, LGBT, first generation, and transfer students all experienced more insensitive remarks than White or opposite category students.
- Failure to report, fear to report, and lack of awareness about how to report these experiences is damaging to overall climate and belonging. These experiences should be explored further in focus groups.

E2. PhD Themes

Theme 1 Discussion

- BME is perceived as more inclusive by White students (as compared to students who do not identify as White).
- Female students rated BME’s commitment to diversity significantly lower than did male students.
- LatinX/LatinX students’ rate BME’s commitment to diversity and their sense of belonging significantly higher than those of non-LatinX students. This may warrant deeper exploration to better understand why this is the case.

Theme 2 Discussion

- The impact of COVID-19 and remote learning on graduate student experiences of BME climate cannot be overstated.
- There is an opportunity to build community and belonging through the pandemic experience with additional attention and resources from BME.

- The normal supports and opportunities to build community among graduate cohorts were not as robust with virtual learning but alternative methods should be explored.
- It is interesting to note that ratings of self-concept fit were low among graduate students. This suggests they do not feel a strong connection to BME or a strong sense of community.
- The master's program should be assessed and improved so that it is in sync with other BME efforts and standards to increase community and inclusion.

Theme 3 Discussion

- Lab culture is fundamental to the graduate student experience of BME culture because the PI and cohort community make up a majority of a graduate student's experiences.
- The CD&I was formed after the Climate Study in 2017; CD&I committees have been actively working to create and beta-test a Lab Health Assessment Tool and a tool to assess whether syllabi are inclusive.
- TEI had lower mean scores on ratings of advisor relationships, but they were not significantly worse based on TEI. It is interesting that for Asian students this relationship was significantly better than for White students.

Theme 4 Discussion

- Women overall have a less favorable experience of BME's climate than do men.
- Black students experience more insensitive remarks than do White students; Asian students experience significantly more insensitive remarks than do White students.
- Even though White graduate students may never experience microaggressions, when they see or hear about unfair treatment, it also negatively impacts their feelings about BME climate.

F. Recommendations

Based on these results, we make the following recommendations. We re-endorse the recommendations made in the 2017 climate study. In addition, we recommend centering those who are *most* marginalized. We need to ask questions such as: 1) how does our curriculum and programming serve those who are *most* marginalized? 2) how can we shift from a model of service *for* to one of service *with* marginalized populations? and 3) how do we think about what is best across vulnerable populations, considering how initiatives or policies affect those with multiple/intersecting TEIs?

Specific recommendations include:

- Prioritize improving the Black and LGBT undergraduate student experience.

- Conduct focus groups with undergraduate Black, LGBT, disabled, and transfer students to better understand their experiences in BME, particularly with respect to those that affect their well-being, sense of belonging, self-concept, social-fit, and goal-fit.
- Conduct focus groups with masters' students to gain an understanding of their experience in the Masters programs.
- Conduct focus groups with PhD and postdoctoral students, especially Black, LGBT, and disabled students, to better understand their experiences in BME, particularly with respect to those that affect their well-being, sense of belonging, self-concept, social-fit, and goal-fit.
- Raise awareness and understanding of issues of diversity, equity, and inclusion by integrating these topics within the required curriculum. Some efforts in this regard are in progress; the impact of these efforts should be evaluated and publicly shared.
- More frequently feature diverse faces and voices in department print and social media, and in permanent visual representations in the department's physical spaces.
- Require periodic training / professional development for all students and faculty on microaggressions, upstander intervention, inclusive interpersonal interactions and pedagogies, Title IX, anti-racism approaches, and mental health.
- Establish a system for students to safely share their concerns, including conflicts with their advisor or instructors or unjust events they've observed, or been subject to, in BME spaces.
- Offer more social events and/or seminar series to build community, particularly among PhD and postdoctoral students
- Increase access and participation of undergraduate TEI students in research labs
- Consult and partner with external campus experts such as CEED to lead programming or assist in conceptualization and executing steps to promote inclusion of TEI
- Increase the representation of TEI in the faculty.
- Administer a survey of the climate on an annual basis in a way that minimizes the burden to respondents and keeps the database updated and relevant. Administering portions of the survey annually will increase the ability for the department to respond in a flexible and timely manner.
- Raise the BME community's awareness and understanding of the CD&I Committee; who they are, how to get involved, what actions they are taking.

G. Appendix

We administered an online survey. Below, we describe the participants, recruitment/sampling procedures, measures to assess study variables, and key analyses and findings.

G1. Measures

We used 8 established measures with psychometric support to assess constructs of interest. In some cases (e.g., intentions to persist) we made minor modifications to the measures to specify BME, rather than STEM broadly. Several of these established measures are multidimensional, comprising multiple subscales.

Multidimensional Campus Climate Survey

The primary campus climate measure, the Multidimensional Campus Climate Survey (Hutchinson et al., 2008), comprises seven subscales that assess participants' perceptions of the BME Climate across eight psychological and behavioral dimensions including:

- Faculty support BME commitment to diversity
- Climate for diverse groups
- Race- and gender-based relations
- Fair treatment
- Unfair treatment
- Experiencing insensitive remarks and materials

We developed an additional subscale for this study to examine BME's commitment to students on the basis of their social group identities (e.g., international students and transgender students).

- Commitment to diverse students' success

Additional Measures

Sense of Belonging (Bollen & Hoyle, 1990; GT 2013 climate study items)

- We combined Bollen and Hoyle's 3-item scale with 9 items from Georgia Tech's 2013 climate survey to assess whether participants feel they are part of the BME community.

College Experiences Questionnaire-Frequency of Experiences with Faculty (Lundberg & Schreiner, 2004)

- We included 6 items from this 13-item scale that measures students' self-reported frequency of interactions with faculty members, including interactions related to academics, personal concerns, and social interactions.

Advisory Working Alliance Inventory (Schlosser & Gelso, 2001)

- We included 6 items from this 30-item scale that assesses PhD students' perceptions of their relationship with their primary mentor / PI. The measure contains three subscales

related to quality of rapport, apprenticeship, and identification-individuation. We focus on rapport and apprenticeship.

Intentions to Remain in BME (adapted; Perez et al., 2014)

- This 3-item scale assesses participants' thoughts and intentions to remain in BME both in the short and long term.

Impact of COVID-19 (GT BME created items)

- This 2-item measure assesses the participants' perceived impact, both negative and positive, of COVID-19 on their lifestyle and learning environments.

Well-Being (World Health Organization, 1998)

- This 5-item scale measures current mental well-being (time frame the previous two weeks).

State Authenticity (Schmader & Sedikides, 2018)

- We included 6 items from this 15-item scale that measures the extent to which participants feel a sense of fit to the environment. The scale measures three distinct ways in which the BME environment matches core aspects of the self of the participants. These three types of person-environment fit include environmental cues that 1) bring valued self- aspects to mind (self-concept fit), 2) signal value fit or goal affordances (goal fit), and 3) convey interpersonal validation and acceptance (social fit).
- Per the authors, "these three types of person–environment fit lead to experiences of cognitive fluency, motivational fluency, and inter-personal fluency, respectively. These outcomes, in turn, constitute precursors to a gestalt sense of state authenticity". A lack of state authenticity can motivate situational avoidance and likely has consequences for social engagement, emotional well-being, and performance.

G2. Tables

Undergraduate Participants' Demographics

	Gender	pct	population	pct
Women	98	55.7	651	60.4
Men	45	25.6	427	39.6
Unknown	33	18.8	0	0
Total	176	100.0	1078	100.0

	Ethnicity	pct	Population	pct
Hispanic/Latino	13	7.4	121	11.2
Not Hispanic/Latino	129	73.3	945	87.7
Unknown	34	19.3	12	1.1
Total	176	100.0	1078	100.0

	Race	pct	Population	pct
Non-Hispanic White	64	36.4	451	41.8
Hispanic White	11	6.3	121	11.2
Asian	40	22.7	322	29.9
Asian-White	8	4.5	0	0
Black	10	5.7	95	8.8
Arab/ME	7	4.0	0	0
Other/Multiracial	3	1.7	61	5.7
Unknown	33	18.8	28	2.6
Total	176	100.0	1078	100.0

	Disability Status	pct
Yes	14	8.0
No	162	92.0
Total	176	100.0

	First-Generation Status	pct
Yes	8	5.6
No	134	94.4
Total	142	100.0

	Academic Standing	pct	Population	pct
First Year	19	10.8	61	5.7
Sophomore	44	25.0	227	21.0
Junior	41	23.3	248	23.0
Senior	39	22.2	542	50.3
U/G Other	33	18.8	0	0
Total	176	100.0	1078	100.0

	Residency Status	pct	Population	pct
US Citizen	127	72.2	973	90.2
Resident alien	5	2.8	34	3.2
Non-resident alien	10	5.7	71	6.6
Unknown	34	19.3	0	0
Total	176	100.0	1078	100.0

	Transfer Status	pct	Population	pct
Yes	18	10.2	117	10.9
No	124	70.5	961	89.1
Unknown	34	19.3	0	0
Total	176	100.0	1078	100.0

PhD Participants' Demographics

	Gender	pct	Population	pct
Women	29	44.6	105	44.9
Men	19	29.2	129	55.1
Unknown	17	26.2	0	0
Total	65	100	234	100.0

	Ethnicity	pct	Population	pct
Hispanic/Latino	9	13.8	32*	17.3*
Not Hispanic/Latino	41	63.1	153*	82.7*
Unknown	15	23.1	0	0
Total	65	100	185*	100.0

	Race	pct	Population	pct
Non-Hispanic White	19	29.2	56*	30.3*
Hispanic White	8	12.3	32*	17.3*
Asian	13	20	53*	28.6*
Asian-White	1	1.5	0	0
Black	5	7.7	27*	14.6*
Arab/ME	2	3.1	0	0
Other/Multiracial	2	3.1	13*	7.0*
Unknown	15	23.1	4*	2.2*
Total	65	100	185*	100.0

	Disability Status	pct
Yes	6	9.2
No	59	90.8
Total	65	100

	First-Generation Status	pct
Yes	1	2
No	50	98
Total	51	100

	Residency Status	pct	Population	pct
US Citizen	46	70.8	172	73.5
Resident alien	3	4.6	8	3.4
Non-resident alien	2	3.1	54	23.1
Unknown	14	21.5	0	0
Total	65	100	234	100.0

G3. Quantitative results

	Gender	pct	population	pct
Women	98	55.7	651	60.4
Men	45	25.6	427	39.6
Unknown	33	18.8	0	0
Total	176	100.0	1078	100.0

	Ethnicity	pct	Population	pct
Hispanic/Latino	13	7.4	121	11.2
Not Hispanic/Latino	129	73.3	945	87.7
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Total	176	100.0	1078	100.0

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Non-Hispanic White	64	36.4	451	41.8
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Asian-White	8	4.5	0	0
Black	10	5.7	95	8.8
Arab/ME	7	4.0	0	0
Other/Multiracial	3	1.7	61	5.7
Unknown	33	18.8	28	2.6
Total	176	100.0	1078	100.0

	Disability Status	pct
Yes	14	8.0
No	162	92.0
Total	176	100.0

	First-Generation Status	pct
Yes	8	5.6
No	134	94.4
Total	142	100.0

	Academic Standing	pct	Population	pct
First Year	19	10.8	61	5.7
Sophomore	44	25.0	227	21.0
Junior	41	23.3	248	23.0
Senior	39	22.2	542	50.3
U/G Other	33	18.8	0	0
Total	176	100.0	1078	100.0

	Residency Status	pct	Population	pct
US Citizen	127	72.2	973	90.2
Resident alien	5	2.8	34	3.2
Non-resident alien	10	5.7	71	6.6
Unknown	34	19.3	0	0
Total	176	100.0	1078	100.0

	Transfer Status	pct	Population	pct
Yes	18	10.2	117	10.9
No	124	70.5	961	89.1
Unknown	34	19.3	0	0
Total	176	100.0	1078	100.0

Undergraduate: Gender

Measure	Significance	Female	Male
Sense of belonging	p = 0.58	n = 98 mean = 5.43 SD = 1.19	n = 45 mean = 5.54 SD = 1.09
Authenticity: Self-concept fit	p = 0.85	n = 98 mean = 4.79 SD = 1.57	n = 44 mean = 4.84 SD =1.62
Authenticity: Goal fit	p = 0.63	n = 98 mean = 5.38 SD =1.34	n = 44 mean = 5.50 SD = 1.32
Authenticity: Social fit	p = 0.62	n = 98 mean = 5.49 SD = 1.43	n = 44 mean = 5.63 SD = 1.40
University commitment to diversity	p = 0.021, effect = 0.45	n = 98 mean = 3.31 SD = 0.67	n = 44 mean = 3.58 SD = 0.52
Quality of faculty student interactions	p = 0.12	n = 98 mean = 3.28 SD = 0.51	n = 45 mean = 3.42 SD = 0.48
Experiencing insensitive remarks	p = 0.00 effect = 0.84	n = 98 mean = 1.40 SD = 0.62	n = 43 mean = 1.02 SD =0.15

Rate the climate at BME in general	p = 0.07 effect = 0.36	n = 97 mean = 4.33 SD = 0.75	n = 43 mean = 4.58 SD = 0.62
Mental health and well-being	p = 0.25	n = 98 mean = 3.44 SD = 0.97	n = 45 mean = 3.65 SD = 1.01
COVID-19 negative impacts	p = 0.96	n = 98 mean = 3.44 SD = 0.63	n = 45 mean = 3.44 SD = 0.69

Undergraduate: Race

Measure	Significance	Black	White
Sense of belonging	p = 0.07 effect = 0.57	n = 10 mean = 4.70 SD = 1.44	n = 73 mean = 5.46 SD = 1.19
Authenticity: Self-concept fit	p = 0.32	n = 10 mean = 4.72 SD = 1.96	n = 72 mean = 4.72 SD = 1.64
Authenticity: Goal fit	p = 0.32	n = 10 mean = 4.95 SD = 1.42	n = 72 mean = 5.42 SD = 1.39

Authenticity: Social fit	p = 0.04 effect = 0.65	n = 10 mean = 4.40 SD = 1.84	n = 72 mean = 5.52 SD = 1.57
University commitment to diversity	p = 0.00 effect = 1.17	n = 10 mean = 2.60 SD = 0.88	n = 73 mean = 3.48 SD = 0.60
Quality of faculty student interactions	p = 0.45	n = 10 mean = 3.24 SD = 0.59	n = 73 mean = 3.37 SD = 0.50
Experiencing insensitive remarks	p = 0.00 effect = 1.41	n = 10 mean = 2.10 SD = 0.99	n = 73 mean = 1.05 SD = 0.33
Rate the climate at BME in general	p = 0.002 effect = 0.97	n = 10 mean = 3.80 SD = 0.87	n = 71 mean = 4.55 SD = 0.66
Mental health and well-being	p = 0.06 effect = 0.70	n = 10 mean = 2.98 SD = 0.77	n = 73 mean = 3.59 SD = 0.96
COVID-19 negative impacts	p = 0.98	n = 10 mean = 3.50 SD = 0.53	n = 73 mean = 3.51 SD = 0.65

Undergraduate: Ethnicity/LatinX

Measure	Significance	LatinX	White, not LatinX
[2] Sense of belonging	p = 0.51	n = 13 mean = 5.26 SD = 0.95	n = 129 mean = 5.48 SD = 1.18
Authenticity: Self-concept fit	p = 0.48	n = 13 mean = 4.54 SD = 0.52	n = 128 mean = 4.86 SD = 1.52
Authenticity: Goal fit	p = 0.06 effect = 0.48	n = 13 mean = 4.81 SD = 1.63	n = 128 mean = 5.51 SD = 1.24
Authenticity: Social fit	p = 0.52	n = 13 mean = 5.31 SD = 1.52	n = 128 mean = 5.57 SD = 1.41
University commitment to diversity	p = 0.09 effect = 0.45	n = 13 mean = 3.12 SD = 0.74	n = 128 mean = 3.43 SD = 0.63
Quality of faculty student interactions	p = 0.70	n = 13 mean = 3.27 SD = 0.46	n = 129 mean = 3.34 SD = 0.51
Experiencing insensitive remarks	p = 0.004 effect = 0.53	n = 13 mean = 1.62 SD = 0.87	n = 129 mean = 1.16 SD = 0.87

Rate the climate at BME in general	p = 0.23	n = 13 mean = 4.17 SD = 0.63	n = 126 mean = 4.43 SD =0.73
Mental health and well-being	p = 0.24	n = 13 mean = 3.22 SD = 0.77	n = 129 mean = 3.55 SD = 1.00
COVID-19 negative impacts	p = 0.45	n = 13 mean = 3.31 SD = 0.63	n = 129 mean = 3.45 SD = 0.65

Undergraduate: Ethnicity/Southern Asian

Measure	Significance	Southern Asian	White
Sense of belonging	p = 0.34	n = 27 mean = 5.70 SD = 1.00	n = 73 mean = 5.46 SD = 1.20
Authenticity: Self-concept fit	p = 0.88	n = 27 mean = 4.78 SD = 1.27	n = 72 mean = 4.72 SD = 1.65
Authenticity: Goal fit	p = 0.99	n = 27 mean = 5.43 SD = 1.18	n = 72 mean = 5.42 SD = 1.65

Authenticity: Social fit	p = 0.34	n = 27 mean = 5.83 SD = 0.98	n = 72 mean = 5.52 SD = 1.58
University commitment to diversity	p = 0.79	n = 26 mean = 3.44 SD = 0.59	n = 73 mean = 3.48 SD = 1.39
Quality of faculty student interactions	p = 0.32	n = 27 mean = 3.25 SD = 0.49	n = 73 mean = 3.37 SD = 0.50
Experiencing insensitive remarks	p = 0.79	n = 27 mean = 1.04 SD = 0.19	n = 73 mean = 1.05 SD = 0.33
Rate the climate at BME in general	p = 0.34	n = 26 mean = 4.40 SD = 0.75	n = 71 mean = 4.55 SD = 0.66
Mental health and well-being	p = 0.92	n = 27 mean = 3.57 SD = 1.08	n = 73 mean = 3.59 SD = 0.96
COVID-19 negative impacts	p = 0.05 effect = 0.45	n = 27 mean = 3.22 SD = 0.64	n = 73 mean = 3.51 SD = 0.65

Undergraduate: Ethnicity/East Asian

Measure	Significance	East Asian	White
Sense of belonging	p = 0.23	n = 11 mean = 5.91 SD = 0.75	n = 73 mean = 5.46 SD = 1.20
Authenticity: Self-concept fit	p = 0.11	n = 11 mean = 5.55 SD = 0.96	n = 72 mean = 4.72 SD = 1.65
Authenticity: Goal fit	p = 0.42	n = 11 mean = 5.77 SD = 0.93	n = 72 mean = 5.42 SD = 1.65
Authenticity: Social fit	p = 0.18	n = 11 mean = 6.18 SD = 0.87	n = 72 mean = 5.52 SD = 1.58
University commitment to diversity	p = 0.56	n = 11 mean = 3.59 SD = 0.45	n = 73 mean = 3.48 SD = 1.39
Quality of faculty student interactions	p = 0.43	n = 11 mean = 3.49 SD = 0.48	n = 73 mean = 3.37 SD = 0.50
Experiencing insensitive remarks	p = 0.002 effect = 0.58	n = 11 mean = 1.45 SD = 0.69	n = 73 mean = 1.05 SD = 0.69

Rate the climate at BME in general	p = 0.17	n = 11 mean = 4.25 SD = 0.76	n = 71 mean = 4.55 SD = 0.66
Mental health and well-being	p = 0.39	n = 11 mean = 3.33 SD = 0.78	n = 73 mean = 3.59 SD = 0.96
COVID-19 negative impacts	p = 0.53	n = 11 mean = 3.64 SD = 0.51	n = 73 mean = 3.51 SD = 0.65

Undergraduate: LGBT

Measure	Significance	LGBT	not LGBT
Sense of belonging	p = 0.44	n = 25 mean = 5.07 SD = 1.35	n = 117 mean = 5.56 SD = 1.09
Authenticity: Self-concept fit	p = 0.74	n = 25 mean = 4.04 SD = 1.63	n = 116 mean = 4.97 SD = 1.53
Authenticity: Goal fit	p = 0.099 effect = 0.42	n = 25 mean = 4.92 SD = 1.64	n = 116 mean = 5.53 SD = 1.24

Authenticity: Social fit	p = 0.04 effect = 0.56	n = 25 mean = 4.86 SD = 1.71	n = 116 mean = 5.68 SD = 1.32
University commitment to diversity	p = 0.002 effect = 0.51	n = 25 mean = 3.09 SD = 0.89	n = 116 mean = 3.47 SD = 0.55
Quality of faculty student interactions	p = 0.87	n = 25 mean = 3.09 SD = 0.52	n = 117 mean = 3.38 SD = 0.49
Experiencing insensitive remarks	p = 0.000 effect = 1.95	n = 25 mean = 1.28 SD = 0.68	n = 116 mean = 1.02 SD = 0.13
Rate the climate at BME in general	p = 0.000 effect = 0.53	n = 25 mean = 4.04 SD = 1.05	n = 114 mean = 4.49 SD = 0.60
Mental health and well-being	p = 0.69	n = 25 mean = 3.34 SD = 0.95	n = 117 mean = 3.57 SD = 0.98
COVID-19 negative impacts	p = 0.04 effect = 0.48	n = 25 mean = 3.68 SD = 0.56	n = 117 mean = 3.40 SD = 0.66

Undergraduate: Ableness

Measure	Significance	Disabled	Not Disabled
Sense of belonging	p = 0.30	n = 14 mean = 5.17 SD = 1.04	n = 133 mean = 5.50 SD = 1.16
Authenticity: Self-concept fit	p = 0.49	n = 14 mean = 4.54 SD = 1.85	n = 129 mean = 4.84 SD = 1.55
Authenticity: Goal fit	p = 0.98	n = 14 mean = 5.43 SD = 2.39	n = 128 mean = 5.42 SD = 1.33
Authenticity: Social fit	p = 0.85	n = 14 mean = 5.46 SD = 1.37	n = 128 mean = 5.54 SD = 1.43
University commitment to diversity	p = 0.03 effect = 0.59	n = 14 mean = 3.04 SD = 0.68	n = 159 mean = 3.42 SD = 0.61
Quality of faculty student interactions	p = 0.85	n = 14 mean = 3.28 SD = 0.45	n = 161 mean = 3.30 SD = 0.52
Experiencing insensitive remarks	p = 0.93	n = 14 mean = 1.07 SD = 0.27	n = 142 mean = 1.06 SD = 0.32

Rate the climate at BME in general	p = 0.000 effect = 0.92	n = 14 mean = 3.76 SD = 0.85	n = 145 mean = 4.46 SD = 0.66
Mental health and well-being	p = 0.33	n = 14 mean = 3.27 SD = 0.78	n = 130 mean = 3.54 SD = 0.66
COVID-19 negative impacts	p = 0.09 effect = 0.52	n = 14 mean = 3.71 SD = 0.47	n = 130 mean = 3.41 SD = 0.66

Undergraduate: First Generation

Measure	Significance	First Generation College Student*	Not First Generation
Sense of belonging	p = 0.54	n = 8 mean = 5.71 SD = 0.74	n = 134 mean = 5.45 SD = 1.18
Authenticity: Self-concept fit	p = 0.48	n = 8 mean = 5.19 SD = 0.59	n = 134 mean = 4.78 SD = 1.62
Authenticity: Goal fit	p = 0.65	n = 8 mean = 5.63 SD = 1.09	n = 134 mean = 5.41 SD = 1.34

Authenticity: Social fit	p = 0.33	n = 8 mean = 5.06 SD = 1.02	n = 134 mean = 5.56 SD = 1.44
University commitment to diversity	p = 0.86	n = 8 mean = 3.44 SD = 0.51	n = 133 mean = 3.39 SD = 0.65
Quality of faculty student interactions	p = 0.50	n = 8 mean = 3.21 SD = 0.39	n = 134 mean = 3.34 SD = 0.51
Experiencing insensitive remarks	p = 0.03 effect = 0.35	n = 9 mean = 1.25 SD = 0.44	n = 131 mean = 1.08 SD = 0.21
Rate the climate at BME in general	p = 0.48	n = 8 mean = 4.23 SD = 0.67	n = 131 mean = 4.42 SD = 0.72
Mental health and well-being	p = 0.70	n = 8 mean = 3.38 SD = 0.90	n = 134 mean = 3.51 SD = 0.99
COVID-19 negative impacts	p = 0.78	n = 8 mean = 3.50 SD = 0.54	n = 134 mean = 3.43 SD = 0.65

Undergraduate: Transfer Status

Measure	Significance	Transfer Student	Not a Transfer Student
Sense of belonging	p = 0.61	n = 18 mean = 5.33 SD = 1.26	n = 124 mean = 5.48 SD = 1.15
Authenticity: Self-concept fit	p = 0.58	n = 18 mean = 4.61 SD = 1.61	n = 124 mean = 4.83 SD = 1.61
Authenticity: Goal fit	p = 0.58	n = 18 mean = 5.58 SD = 1.19	n = 124 mean = 5.40 SD = 1.35
Authenticity: Social fit	p = 0.04 effect = 0.47	n = 18 mean = 4.89 SD = 1.75	n = 124 mean = 5.63 SD = 1.35
University commitment to diversity	p = 0.58	n = 18 mean = 3.31 SD = 0.66	n = 123 mean = 3.41 SD = 0.64
Quality of faculty student interactions	p = 0.45	n = 18 mean = 3.41 SD = 0.59	n = 124 mean = 3.32 SD = 0.49
Experiencing insensitive remarks	p = 0.04 effect = 0.69	n = 18 mean = 1.30 SD = 0.39	n = 123 mean = 1.09 SD = 0.21

Rate the climate at BME in general	p = 0.31	n = 18 mean = 4.25 SD = 0.74	n = 121 mean = 4.43 SD = 0.72
Mental health and well-being	p = 0.097 effect = 0.47	n = 18 mean = 3.14 SD = 0.73	n = 124 mean = 3.56 SD = 1.01
COVID-19 negative impacts	p = 0.11	n = 18 mean = 3.67 SD = 0.49	n = 124 mean = 3.40 SD = 0.66

Doctoral Students: Gender

Measure	Significance	Female	Male
Sense of belonging	p = 0.62	n = 28 mean = 4.82 SD = 1.55	n = 18 mean = 5.06 SD = 1.61
Authenticity: Self-concept fit	p = 0.16	n = 29 mean = 3.81 SD = 1.73	n = 18 mean = 4.58 SD = 1.96
Authenticity: Goal fit	p = 0.82	n = 29 mean = 4.90 SD = 1.22	n = 18 mean = 5.00 SD = 1.86

Authenticity: Social fit	p = 0.17	n = 29 mean = 4.72 SD = 1.60	n = 18 mean = 5.36 SD = 1.38
University commitment to diversity	p = 0.07 effect = 0.57	n = 29 mean = 3.07 SD = 0.77	n = 19 mean = 3.46 SD = 0.60
Quality of faculty student interactions	p = 0.98	n = 28 mean = 4.09 SD = 0.96	n = 19 mean = 4.10 SD = 1.02
Experiencing insensitive remarks	p = 0.41	n = 29 mean = 1.62 SD = 0.94	n = 18 mean = 1.39 SD = 0.92
Rate the climate at BME in general	p = 0.02 effect = 0.77	n = 28 mean = 3.77 SD = 1.00	n = 18 mean = 4.43 SD = 0.68
Mental health and well-being	p = 0.43	n = 29 mean = 3.38 SD = 1.00	n = 19 mean = 3.61 SD = 0.99
COVID-19 negative impacts	p = 0.67	n = 29 mean = 3.52 SD = 0.79	n = 19 mean = 3.42 SD = 0.69

Doctoral Students: Race

Measure	Significance	Black and Mixed[5]	White
Sense of belonging	p = 0.44	n = 5 mean = 4.20 SD = 1.32	n = 24 mean = 4.88 SD = 1.83
Authenticity: Self-concept fit	p = 0.81	n = 5 mean = 3.90 SD = 1.96	n = 25 mean = 3.70 SD = 1.71
Authenticity: Goal fit	p = 0.94	n = 5 mean = 4.70 SD = 1.30	n = 25 mean = 4.76 SD = 1.58
Authenticity: Social fit	p = 0.23	n = 5 mean = 4.00 SD = 1.87	n = 25 mean = 5.00 SD = 1.62
University commitment to diversity	p = 0.29	n = 5 mean = 2.85 SD = 0.99	n = 25 mean = 3.24 SD = 0.72
Quality of faculty student interactions	p = 0.36	n = 5 mean = 4.20 SD = 0.83	n = 24 mean = 3.69 SD = 0.23
Experiencing insensitive remarks	p = 0.08 effect = 0.68	n = 5 mean = 1.60 SD = 0.89	n = 25 mean = 1.12 SD = 0.44

Rate the climate at BME in general	p = 0.15	n = 4 mean = 3.34 SD = 0.93	n = 24 mean = 4.13 SD = 1.00
Mental health and well-being	p = 0.46	n = 5 mean = 3.00 SD = 0.93	n = 25 mean = 3.38 SD = 1.06
COVID-19 negative impacts	p = 0.44	n = 5 mean = 3.20 SD = 0.84	n = 25 mean = 3.52 SD = 0.82

Doctoral Students: Ethnicity/LatinX

Measure	Significance	LatinX	White, not LatinX
[8] [9] Sense of belonging	p = 0.003 effect = 1.29	n = 9 mean = 6.18 SD = 0.98	n = 39 mean = 4.54 SD = 1.50
Authenticity: Self-concept fit	p = 0.007 effect = 1.05	n = 9 mean = 5.50 SD = 1.71	n = 40 mean = 3.68 SD = 1.75
Authenticity: Goal fit	p = 0.04 effect = 0.86	n = 9 mean = 5.78 SD = 1.12	n = 40 mean = 4.59 SD = 1.60

Authenticity: Social fit	p = 0.003 effect =	n = 9 mean = 6.22 SD = 0.94	n = 40 mean = 4.56 SD = 1.54
University commitment to diversity	p = 0.08 effect = 0.73	n = 9 mean = 3.58 SD = 0.52	n = 41 mean = 3.11 SD = 0.75
Quality of faculty student interactions	p = 0.92	n = 9 mean = 4.13 SD = 1.01	n = 41 mean = 4.09 SD = 0.95
Experiencing insensitive remarks	p = 0.48	n = 9 mean = 1.22 SD = 0.67	n = 40 mean = 1.43 SD = 0.78
Rate the climate at BME in general	p = 0.36	n = 9 mean = 4.24 SD = 0.82	n = 39 mean = 3.91 SD = 0.97
Mental health and well-being	p = 0.69	n = 9 mean = 3.56 SD = 0.79	n = 41 mean = 3.41 SD = 1.04
COVID-19 negative impacts	p = 0.88	n = 9 mean = 3.44 SD = 0.53	n = 41 mean = 3.49 SD = 0.78

Doctoral Students: Ethnicity/Asian

Measure	Significance	Asian	White
Sense of belonging	p = 0.83	n = 12 mean = 4.75 SD = 1.23	n = 24 mean = 4.88 SD = 1.83
Authenticity: Self-concept fit	p = 0.89	n = 12 mean = 3.79 SD = 2.22	n = 25 mean = 3.70 SD = 1.71
Authenticity: Goal fit	p = 0.71	n = 12 mean = 4.54 SD = 1.81	n = 25 mean = 4.76 SD = 1.58
Authenticity: Social fit	p = 0.43	n = 12 mean = 4.58 SD = 1.16	n = 25 mean = 5.00 SD = 1.62
University commitment to diversity	p = 0.90	n = 13 mean = 3.27 SD = 0.67	n = 25 mean = 3.24 SD = 0.72
Quality of faculty student interactions	p = 0.02 effect = 0.96	n = 13 mean = 4.50 SD = 0.30	n = 24 mean = 3.69 SD = 0.23
Experiencing insensitive remarks	p = 0.002 effect = 1.04	n = 12 mean = 1.92 SD = 1.00	n = 25 mean = 1.12 SD = 0.44

Rate the climate at BME in general	p = 0.46	n = 13 mean = 3.88 SD = 0.92	n = 24 mean = 4.13 SD = 1.00
Mental health and well-being	p = 0.76	n = 13 mean = 3.49 SD = 0.92	n = 25 mean = 3.38 SD = 1.06
COVID-19 negative impacts	p = 0.58	n = 11 mean = 3.36 SD = 0.67	n = 25 mean = 3.52 SD = 0.82

Doctoral Students: LGBT

Measure	Significance	LGBT	Not LGBT
Sense of belonging	p = 0.94	n = 9 mean = 4.89 SD = 1.34	n = 39 mean = 4.85 SD = 1.61
Authenticity: Self-concept fit	p = 0.61	n = 9 mean = 3.72 SD = 2.21	n = 40 mean = 4.08 SD = 1.81
Authenticity: Goal fit	p = 0.86	n = 9 mean = 4.72 SD = 2.00	n = 40 mean = 4.83 SD = 1.50

Authenticity: Social fit	p = 0.38	n = 9 mean = 4.44 SD = 1.83	n = 40 mean = 4.96 SD = 1.53
University commitment to diversity	p = 0.26	n = 9 mean = 2.94 SD = 0.89	n = 41 mean = 3.25 SD = 0.69
Quality of faculty student interactions	p = 0.95	n = 9 mean = 4.07 SD = 1.10	n = 40 mean = 4.10 SD = 0.93
Experiencing insensitive remarks	p = 0.51	n = 9 mean = 1.33 SD = 0.71	n = 40 mean = 1.18 SD = 0.64
Rate the climate at BME in general	p = 0.19	n = 9 mean = 3.60 SD = 1.11	n = 39 mean = 4.06 SD = 0.90
Mental health and well-being	p = 0.74	n = 9 mean = 3.13 SD = 0.84	n = 41 mean = 3.50 SD = 1.02
COVID-19 negative impacts	p = 0.74	n = 9 mean = 3.56 SD = 0.53	n = 41 mean = 3.46 SD = 0.78

Doctoral Students: US Citizenship

Measure	Significance	Not a US Citizen	US Citizen
Sense of belonging	p = 0.07 effect = 0.95	n = 5 mean = 6.07 SD = 1.23	n = 44 mean = 4.75 SD = 1.54
Authenticity: Self-concept fit	p = 0.46	n = 5 mean = 4.60 SD = 2.30	n = 45 mean = 3.94 SD = 1.81
Authenticity: Goal fit	p = 0.63	n = 5 mean = 4.50 SD = 2.35	n = 45 mean = 4.87 SD = 1.50
Authenticity: Social fit	p = 0.46	n = 5 mean = 5.40 SD = 1.47	n = 45 mean = 4.84 SD = 1.60
University commitment to diversity	p = 0.90	n = 5 mean = 3.25 SD = 0.94	n = 46 mean = 3.21 SD = 0.72
Quality of faculty student interactions	p = 0.49	n = 5 mean = 3.80 SD = 1.16	n = 45 mean = 3.80 SD = 1.16
Experiencing insensitive remarks	p = 0.22	n = 5 mean = 1.60 SD = 1.34	n = 45 mean = 1.20 SD = 0.59

Rate the climate at BME in general	p = 0.60	n = 5 mean = 4.20 SD = 1.04	n = 44 mean = 3.96 SD = 0.94
Mental health and well-being	p = 0.94	n = 5 mean = 3.48 SD = 1.07	n = 46 mean = 3.44 SD = 0.99
COVID-19 negative impacts	p = 0.88	n = 5 mean = 3.40 SD = 0.55	n = 46 mean = 3.46 SD = 0.78

Doctoral Students: Ableness

Measure	Significance	Disabled	Not Disabled
Sense of belonging	p = 0.47	n = 5 mean = 4.40 SD = 1.14	n = 50 mean = 4.94 SD = 1.59
Authenticity: Self-concept fit	p = 0.93	n = 5 mean = 4.10 SD = 2.56	n = 46 mean = 4.02 SD = 1.78
Authenticity: Goal fit	p = 0.26	n = 5 mean = 5.60 SD = 0.89	n = 47 mean = 4.78 SD = 1.59

Authenticity: Social fit	p = 0.62	n = 5 mean = 4.60 SD = 1.64	n = 46 mean = 4.98 SD = 1.61
University commitment to diversity	p = 0.47	n = 5 mean = 2.95 SD = 1.02	n = 58 mean = 3.20 SD = 0.71
Quality of faculty student interactions	p = 0.20	n = 5 mean = 3.53 SD = 1.39	n = 48 mean = 4.10 SD = 0.89
Experiencing insensitive remarks	p = 0.62	n = 5 mean = 1.00 SD = 0	n = 52 mean = 1.12 SD = 0.51
Rate the climate at BME in general	p = 0.32	n = 5 mean = 3.60 SD = 1.15	n = 52 mean = 4.03 SD = 0.90
Mental health and well-being	p = 0.85	n = 5 mean = 3.48 SD = 0.83	n = 49 mean = 3.39 SD = 1.04
COVID-19 negative impacts	p = 0.29	n = 5 mean = 3.80 SD = 0.48	n = 49 mean = 3.43 SD = 0.76

G4. Qualitative raw data

These are all the responses left by survey participants to the prompt “Do you have any comments you would like to add regarding your feelings of fairness and belonging in BME at Georgia Tech?”. NOTE: Four responses were modified or not included because they identified individuals by name.

Critical comments

- Top administrators in BME department (other than one academic advisor) have ALWAYS been incredibly disrespectful, unhelpful, and rude to me throughout my 5 years in the BME department and it has had a huge negative impact on my experience and sense of belonging here.
- … I don't feel like the school or department cares enough about the students.
- You also ask for minority students to attend meetings with important people outside of the department sometimes. I have had friends in the past that have had to sit silently while a top BME faculty member brags to someone about how good diversity and fairness are here. And the student stays silent even when they disagree. Silent. Silenced. Do you think this is fair?
- I think people's experiences highly depend on their advisor but also how willing they are to seek help within the department.
- It will be very hard to have students feel good in the program when PhD advisors can get away with treating students very badly, with no repercussions.
- I think the program itself needs more focus than our 'feelings.' I’ve since talked to other departments about adding programs and have had more luck actually applying them than I have had getting a single email back from our advisor
- The masters students haven't heard from our program advisor in months.
- I have gone through this entire program without once talking to her (Advisor) or anyone else in the department and I graduate in a month.
- I realize the masters program is new and the focus is on the PhD program as it naturally should be, but if your going to offer a ms bme program, the least you can do is give them an advisor that checks in more often than once every 8 months.
- (My advisors are great) but not every faculty member has made me feel welcomed.
- When I think of BME faculty that helped my transition to tech and BME, only 2 come to mind. I struggle to feel connected to faculty and it's weird because I am unsure of how to make those connections sometimes.
- I have struggled as a Black student who is not directly on the path toward industry-based work. It sometimes feels as if you don't belong in this community if you're not white and wanting to go on and perform device-based work.
- BME program has a lot of presentations in various classes. I have always felt that international students with strong accents gets significant disadvantage on those assignments. Even when they are speaking perfect English with great contents, I have seen many instances of unfair grading due to their accents and how they look.
- Other than that (team project classes), I’ve always felt I was graded and taught in fair ways.

- One problem I have seen is that some professors (not all professors) seem to have a negative attitude or opinion towards BME majors that have pre-health aspirations. That culture/mindset has had a negative impact on me and how I feel I fit in BME.
- Some professors are doing a fantastic job of this … and some are not (watching Black students be forced to beg for forgiveness policies during BLM, having a mental breakdown the night of the election while trying to cram for a hell week, trying to fight through an ADHD diagnosis when I have too much work to make time to do the paperwork and take the diagnosis tests).
- I have only had one negative experience where I felt like a professor unfairly degraded me and was unnecessarily disrespectful.
- It really depends on the professor. Most of my professors are very fair, but there are a few that are less so.
- TAs tend to focus more on these students (English as a first language) for discussion and help.
- I am currently in a PhD program and the more I see how competitive to be in academia the more stressed I get about future and about becoming a professor one day.
- I am concerned with the pervasive rhetoric among the graduate student population and graduate student organizations specifically perpetuating themes of reverse racial bias toward caucasians.
- Having an accent and a different culture creates a barrier with US citizens BME students who fail most of the time to include us during group work or discussion.
- Because English is not our first language they assume that we know less and tend to take most of the responsibilities.
- … I have been a part of conversations where someone was talking about my friends, not knowing that they were my friend, solely based on how they talked and their mannerisms.
- … my peers are not open to people from different backgrounds.
- The only time I've experienced feelings of not belonging is usually me beating up on myself or comments from another student.
- There were times in classes where racial remarks were made and professors said nothing, and that's not okay.
- The classes that made me feel most unfair was the team project classes.
- The most severe experience I have had that made me feel discriminated against or unwelcome, as an undergraduate woman in the BME program, was a blatantly sexually suggestive comment from a PhD student who was meant to be training me in a lab on campus.
- I feel, however, that my situation is a poor one relative to the standard, based on a very poor relationship with my PI, and poor relationships with the fellow students in my lab.
- I know a group of black BME friends of mine put together a list of actionable items this department can make to help BLM @ GT BME. I have seen the document. I have looked it over. It is organized by high and low priorities and high or low effort. It is so organized, yet no leading faculty or the BME Community, Diversity, and Inclusion committee made real changes. That is devastating to hear. And devastating to live through.

- I had never known the "BME Community, Diversity, and Inclusion committee" was a thing. Why is this so hushed? Why are all BME students not allowed to attend the meetings? If they are, why is this not advertised? Why is this program not a coalition between BME students and faculty? How can you expect to arrive at solutions and to implement them if you only have conversations between faculty and upper-faculty, rather than students with them?
- I know bmeSAB exists, but I do not know what their involvement with this is- if any. I think we need more transparency with this committee (CD&I) to the BME public. I have heard from friends that higher faculty does not want this transparency of the committee. Why not? All transparency does is hold people accountable. What does this committee do? How are students supposed to hold them accountable if there is no method for accountability.
- Because of the pandemic, I believe all students but especially the first-years have felt isolated by Tech and the BME department.
- We don't know who to go to about our grievances.
- I feel like it is really difficult to get into a lab. I have been looking for many semesters but I don't know how to approach it and I feel like I need help to guide me in how finding a research lab.
- … the lack of connecting with people (due to the pandemic) can be a little hard to deal with.
- … there has been little outreach from the department to the first-year students. This is our first year, with working from home, and little guidance.
- When speaking to older graduate students they have mentioned the department sending more information out earlier when there are important deadlines. This last year with COVID there have been many times where things are not clear and I do not know who to talk to.
- Why are we constantly asked about ethnicity and race? I really hate those two sections. I am LatinX, so I mark the LatinX ethnicity section correctly (but why include that). However, the race question is so frustrating. What do we mark if we are from Latin America? seriously? These questions always make me so upset.
- Why are we ask if we feel like we are being treated fairly in the BME department and then get asked to answer what race we are and completely exclude Latin America? So confusing and disappointing.
- … i havent met many students or faculty in general. Again, i think being online contributes to this because many of the initiatives the department takes have to be communicated through email, which often gets ignored due to the sheer quantity of similar emails that students are receiving.
- I have had to seriously push against a lot of imposter syndrome through my time here which has been incredibly frustrating.
- In my opinion, no matter how much the department wants to create a "safe space" the students and faculty that are recruited need to model that as well.
- It is very frustrating because it feels like just because we speak another language we are less qualified.

- BME students come from very competitive background and tend to be judgmental, so that can make me feel a little uncomfortable.
- I have not met a lot of students or faculty that bring ideas or beliefs that differ from mine significantly as someone who typically experiences a very normative environment.
- Two problems I think the department could work on in terms of inclusion: (1) The ironically dogmatic way in which inclusion itself is discussed, not allowing for varying views about how to best promote diversity. (2) The lack of awareness/support for grad students with dependents. Activities and support seem to be almost exclusively geared towards students without family obligations.
- I also think it is inherently unfair to consistently ask black students to teach you what fairness is. It is not their responsibility to educate you. That is taxing. It is your responsibility to educate yourself. Come up with a plan and ask for their feedback.
- the students and faculty are very high achieving, sometimes, in comparison, I feel like I am unworthy/less worthy than them… But it never affects our interactions
- The BME department as a whole aims for diversity, but I feel as though it still focuses on and is built around a more normative than diverse community because of the people I interact with.
- Many of my colleagues have experienced unfair treatment and disrespect, which influences my own perspective for fairness in BME.
- Obviously, sexual harassment should never happen, but I don't think this incident was necessarily a representation of the BME department as a whole. I did not report the incident out of fear/nervousness of the repercussions of trying to resolve the issue and the potential stress that could add to my already stressful experience at Tech. I believe these types of experiences are common for women in every industry, unfortunately.
- Several of my friends have had inappropriate or sexist comments made towards them throughout the BME department (and you probably don't hear about them because students don't realize that anything can be done - to us a non-inclusive environment is often viewed as an unfortunate and immovable fact of going to an engineering school). It's much worse when it comes to racial and ethnic minorities, and from my experiences I would argue maybe even worse when it comes to socioeconomic status or disability status.
- Many things have gone unreported to "not burn bridges" for their own interests, but also does not allow BME admin to become aware of the circumstances.
- Inclusion has to come before diversity. We have one of the most diverse departments when it comes to women specifically, but as a woman I don't necessarily feel comfortable or equal in the classroom from the moment I walk in.
- Areas of improvement desperately needed: empathy for students who are dealing with racial/ethnic trauma (BLM, the shooting last week), empathy for students who are suffering due to the pandemic (mental and physical health issues, socioeconomic struggles, inadequate school resources, hostile environments, grief, etc.), and better awareness of health overall (physical and mental).
- I love this major and the community. I am so grateful to be learning at this institution and from brilliant professors, but you must do better. It will be an embarrassment to not improve if it is not one already. Thank you for doing this survey and asking for feedback.

- I'm lucky to have a pretty great external support system and a few close friends within BME, but I think they would agree with me in saying the department as a whole is not viewed as a system of support or belonging here.

Supportive comments

- My advisors are great (but not every faculty member has made me feel welcomed).
- The scientific rigor at Georgia Tech has impressed me. I was struck by how carefully professors qualify their claims; there are clear delineations between what has been experimentally shown and what only exists in theory and deserves more exploration.
- The department contains a wealth of experts in a wide range of fields.
- I have found that any professor at Georgia Tech has been willing to sit down and talk through scientific and engineering ideas, bringing perspectives and critiques that I would have never considered from my own small field.
- I feel very welcomed and engaged in all BME department faculty and student interactions.
- The professors/faculty has been extremely helpful in my transition into a professional mindset.
- I think the BME community is great at listening to student feedback, and the professors care a lot about our mental and physical health.
- I think that there are great faculty members here, and good people.
- The faculty in the BME department at GT are very encouraging and really help students feel like they belong.
- Also happy to have found a set of people that look like me to matriculate through this major with because otherwise it'd be way more difficult.
- I love my PI and colleagues in my lab while I am not sure about how my little interactions with BME people outside my lab only through the classes are impacting me. But, I have not felt anything significantly negative during those interactions as well.
- I think the BME department is one of the better ones on campus with fairness and belonging, there's more of a sense of community among the BMEs than some other departments. Great job!
- … the past year during the pandemic we learned how we don't have to commute to attend a lecture or conference, so it was positive from that aspect.
- … I feel like the BME department at Georgia Tech is such a supportive and fulfilling environment, and I am SO happy to be here.
- I am very involved in the department (TA, clubs, etc.) which I believe contributes heavily to my sense of belonging.
- Overall I think BME at Georgia Tech is inclusive and really wants students to succeed.
- I strongly feel like I belong to the community at GT, but this is mostly based on my interactions with my lab members.
- I feel like the BME classes are fair
- Very diverse and inclusive program.
- Nope, good climate! I enjoy it here

- … I've never been made feel less achieving by anyone.
- It has been great to see how the department has grown the past 5 years in its focus on community, diversity and inclusion.
- I think there is still room for improvement but overall the department has seemed to put a lot of thought and intention behind making the department welcoming and inclusive to all.

Neutral or mixed comments

- Overall, i would say i have heard/seen a few pointed that show implicit bias in some of the faculty members, but i havent met anyone who i believe would not try to adjust their viewpoint and improve if it was pointed out that they were harboring these biases.
- I have very few interactions with the department, likely due to the remote nature of this past year.
- My experience has certainly been limited, given my only experience thus far has been virtual.
- ive only had two classes and in one of them i spend more time with my team (consisting of similar minded individuals) the majority of the time. Being online adds to the difficulty of being able to judge this in the department.
- Most of my feelings of fairness and belonging are restricted to my experience with my PI and laboratory. Over 90% of my graduate school experience rests with this individual, and the few who are also members of the lab.
- It is important to add the context that I switched labs. I am no longer in the lab I answered the PI section about, but the environment of that lab influenced the majority of my career thus far in BME and my sense of belonging, so it felt most accurate for this survey. I answered all other questions based on current interactions with my experience of the overall climate in BME.
- I feel welcomed here as a white, cis-gender woman. (Not all of my BME friends can say the same.)

G5. Surveys

Undergraduate and Graduate Student Survey

https://docs.google.com/document/d/1F7FiYP-5_ijV8tFhctlzXuzd8H6Llth_Bm7Yiev8vE8/edit?usp=sharing

Postdoc survey

https://docs.google.com/document/d/1nJDn1y0NKz9iRLadVelYVrvRX_SvjTHc9ViVOEXpP0A/edit?usp=sharing

G6. CD&I annual reports

2018

https://drive.google.com/file/d/1oRF0UR6vHAeQdS6Ui3CY9Bjc-WEoJZta/view?usp=sharing

2019

https://drive.google.com/file/d/13evIzHZFSTs-3leklgeMZkgcZBPnqwjC/view?usp=sharing

2020

https://drive.google.com/file/d/1azHtYqnqbdXKWHFUZfWW4JuREuBD28c0/view?usp=sharing

2021

https://drive.google.com/file/d/1UuiHG9FqUQgyIBLs7rJDIfq6XqIxaOxD/view?usp=sharing