Executive Summary

The Problem

There are three main issues that this application seeks to address:

- The underrepresentation of racial and gender minority graduate students in the College of Engineering (COE)
- The lack of opportunity, resources and encouragement for underrepresented graduate students who seek to do research that impacts their communities
- The lack of an institutionalized way to work on research projects at the intersection of engineering and equity

The Effect on Georgia Tech

Due to the aforementioned problems, Georgia Tech cannot fully realize its mission nor its recently created strategic plan and limits its influence by overlooking the opportunity to be a leader in the area of engineering and equity.

Final Product/Solution

The proposed solution is for the College of Engineering to create an Institute for Engineering Equity (IEE) that focuses on research at the intersection of engineering and equity while serving as a means to centralize and strengthen existing endeavors around campus. The IEE will primarily be a research institute that will also have strong foundations in equitable mentorship, professional development, community engagement and outreach. Additionally, this proposal recommends the creation of a graduate fellowship for PhD students doing work at the intersection of engineering and equity that will be renewable for up to 5 years.

Impact of the Solution

To better recruit and retain underrepresented graduate students, the IEE will focus on:

- Providing a chance to investigate unexplored opportunities in which students can use their identities and knowledge as engineers *and* as people to tackle intricate, challenging, multidisciplinary and impactful problems
- Reducing the biases underrepresented students and researchers are typically subjected to in academia by founding an institute based off of and dedicated to principles of equity and inclusion
- Supporting a diverse array of students and building a community for them early in their graduate careers
- Offering financial security for PhD students who are working in this area

Innovativeness of the Idea

The IEE will serve an existing need at Georgia Tech while simultaneously allowing the university to more holistically explore and teach engineering. It will be an engineering-centered institute built on foundations of equity in which the needs, interests and talents of underrepresented students are given equal consideration to that of their majority peers for whom this institution was initially built to serve.

Table of Contents

The Problem

According to the National Academies of Sciences, Engineering and Medicine: "increasing the participation and success of underrepresented minorities in S&E [science and engineering] contributes to the health of the nation by expanding the S&E talent pool, enhancing innovation, and improving the nation's global economic leadership" (National Academies, 2010).

An analysis of U.S. doctoral recipients from 1977-2015 found that individuals from underrepresented gender and racial groups produced more novel work than their peers from majority groups by identifying novel conceptual links using text analysis and machine learning (Hofstra, 2020). Yet, despite the novel and innovative work, the work of these students was found more likely to be undervalued and less likely to result in successful scientific careers when compared to similarly impactfully novel work of students from majority groups. Researchers dubbed this phenomenon the "Diversity-Innovation Paradox" and such a paradox highlights the need for underrepresented researchers to innovate and research through programming and spaces free of biases against them. Unfortunately, the nation continues to struggle to recruit, retain and graduate underrepresented students and colleges and universities struggle to provide environments free of bias that cater to these students' interests.

The representation found among Hispanic/Latino graduate students, Black/African American students and students from two or more racial backgrounds within the College of Engineering (COE) surpasses the representation found among engineering students nationally (see Appendix **Figure A1**), which is a testament to the work members of Georgia Tech's Institute Diversity, Equity and Inclusion (IDEI), the College of Engineering's Center for Engineering Education and Diversity (CEED) and other Institute initiatives aimed at recruiting and retaining these students. Although the COE's racial and ethnic representation surpasses that of other engineering graduate programs nationally, there is more work to be done in terms of both recruiting and supporting underrepresented minority (URM) students– particularly at the graduate level.

The COE's racial and ethnic breakdown over the past 10 years demonstrates the impact of the recruitment and retention results on the undergraduate and graduate levels. **Figure 1** shows that over the past ten years, the percentage of Black/African American undergraduate students in the COE has increased by 1.3%, the percentage of undergraduates identifying as two or more races has increased by 1.6% and the percentage of undergraduate Hispanic/Latino students has increased by 2.6% as opposed to the Black, multiracial and Hispanic graduate students who have increased by 0.2%, 0.9% and 2.3%, respectively.

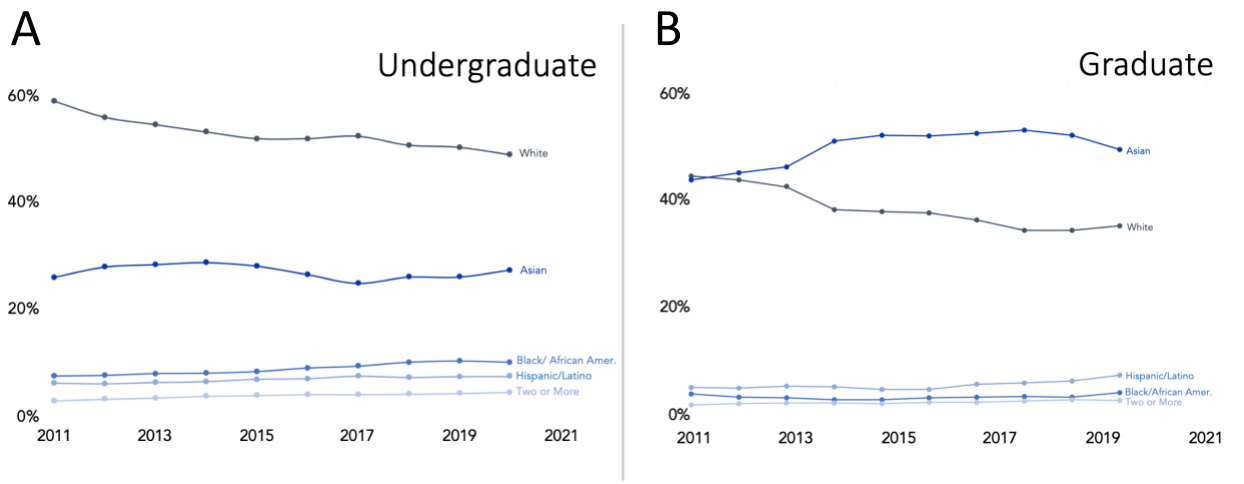

Figure 1. Percentages of undergraduate (A) and graduate (B) students in the COE over the past 10 years in top 5 largest demographic categories. Data shown does not include Hawaiian/Pacific Islander and American Indian/Alaskan students due to insufficient data (Georgia Tech Office of Institutional Research and Planning, 2020)

Not only is there a precipitous drop in URM representation from the undergraduate to the graduate level, but there has also been less of an improvement in representation at the graduate level over the past decade. Furthermore, a drop in representation is also seen in female enrollment in graduate versus undergraduate programs within the COE. At the undergraduate level, female students within the COE are better represented than those nationally but the COE slightly lags behind the national average when it comes to female graduate student enrollment as shown in **Figure 2A**.

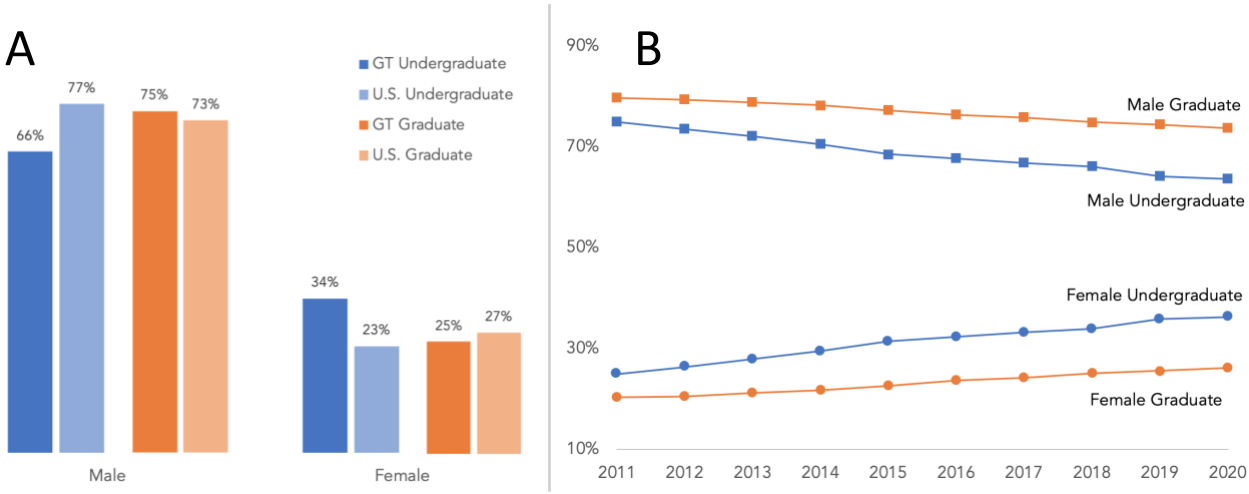

Figure 2. A) 2018 percentage enrollment in Georgia Tech's COE versus the enrollment of engineering students nationally by gender. The United States female population is about 50% and women tend to be overrepresented in colleges and universities. **B)** Percentages of undergraduate and graduate students in the COE over the past 10 years by gender (U.S. Census Bureau, 2019; U.S. Department of Education, 2019; Joseph Roy, 2019; Georgia Tech Office of Institutional Research and Planning, 2020)

Similar to COE racial and ethnic representation, female students continue to be underrepresented in engineering and even more so at the graduate level (**Figure 2B**). Over the past decade, the COE has made strides in lowering gender disparities among students through initiatives like Women in Engineering (WIE), yet these disparities persist and are even more prevalent at the graduate level.

The drop in enrollment seen with underrepresented minority and female students from the undergraduate to the graduate level suggests potential issues of retention, interest and/or resources. Despite the work done by the aforementioned diversity initiatives, there is more work to be done to not only recruit URM and female students but also to ensure their needs, interests and talents are given equal consideration to that of their majority peers for whom this institution was initially built to serve.

Impact on the Georgia Tech Community

During the summer of 2020, a series of discussions with Black graduate students in the mechanical, materials and chemical and biomolecular engineering (as well as chemistry, biology, physics and mathematics) departments indicated that many interviewees believed the Georgia Tech administration and faculty did not understand what the problems were for them in academia nor how issues of racism and bias affected them. They did not believe said administrators would come up with effective, lasting systemic changes, especially if these changes required resources and long-term investments. Inaction on the part of administrators and Diversity, Equity and Inclusion (DEI) committees to make these long-term systemic changes will both be viewed as a lack of commitment to these students and a disservice to Georgia Tech as a whole.

It should be noted that work within the College of Engineering, initiatives through CEED, particularly, have helped to better recruit and support underrepresented students, but many of these initiatives were seen as supporting undergraduates. The fact that these programs are so separated from graduate students' programs of study and departments (in which they spent majority of their time) reduced their efficacy for the URM graduate students interviewed.

According to the recently introduced strategic plan vision statement, Georgia Tech seeks to be "an example of inclusive innovation…committed to serving the public good…addressing the biggest local, national, and global challenges of our time; making technology broadly accessible, and developing exceptional leaders from all backgrounds…" (Office of the President, n.d.). Without spaces and initiatives for inclusive innovation, Georgia Tech will fall short of its vision and diminish the likelihood that it will create broadly accessible technology, produce novel ideas and deliver "exceptional leaders from all backgrounds".

Given that Georgia Tech graduates the most engineers in the country, the most African American and minority doctoral engineering students nationally as well as the fact that the College of Engineering is the largest college at Georgia Tech, the COE has a unique opportunity to support underrepresented students' research interests and development – particularly at the graduate level (Center for Engineering Education and Diversity, n.d.). In turn, the COE can better serve the mission and goals of Georgia Tech and act as a leader among Georgia Tech colleges and other universities.

Studies have found that pursuing research with altruistic values, particularly for their communities, enhances URM students' engagement in research and interest in pursuing scientific research and careers. Such "altruistic motives are uniquely influential to URM students," when it comes to their desire to pursue faculty positions (Thoman et al., 2015; Gibbs & Griffin, 2013). These altruistic and community-focused motivators do not replace typical motivators found in all doctoral students like passion, curiosity and achievement, but rather enhance these motivators (Thoman et al., 2015; McGee et al., 2016). McGee et al. found factors that motivated Black students to pursue PhDs in engineering included: "an unyielding passion for their particular discipline, a sense of responsibility to serve marginalized peoples and society, a path toward

autonomy, pre-PhD mentorship and research opportunities." These criteria should be addressed as the COE's Diversity and Inclusion Council strives to make changes to better attract and retain underrepresented graduate students and researchers.

To further test claims found in literature, I sent out a brief survey with a particular focus on groups within the COE that serve underrepresented graduate students. This survey received 93 responses with at least one response from a member of each of the 9 departments under the COE as shown in **Figure 3**. The top three majors represented were mechanical engineering, materials science and engineering and biomedical engineering representing 37.6%, 26.9% and 14%, respectively. 77.4% of respondents were pursing PhDs, 14% were pursing Masters, 4.3% were undergraduates, 3.2% were alums and 1% were faculty and about 93% of recipients had research experience.

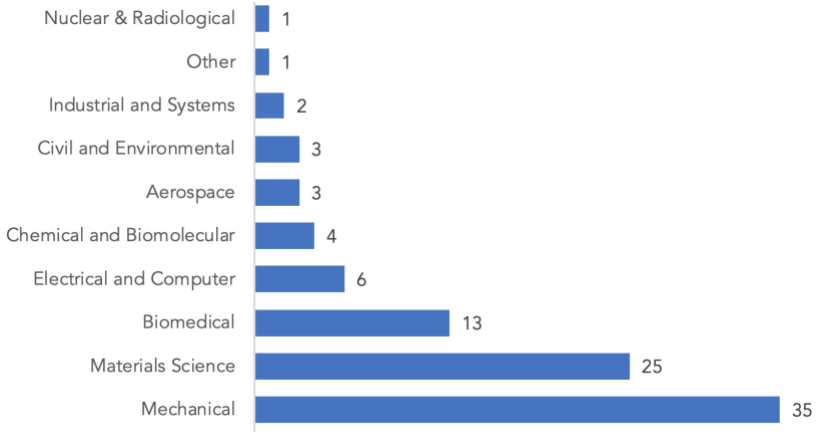

Figure 3. Departments of respondents. Two respondents selected "other"- a student in business (counted in other) and a mechanical and bioengineering major (counted in mechanical)

Although the sample size was small, the respondents were comprised mostly of racial, ethnic and gender minorities. About 70% (65) of respondents identified as female, 29% (27) identified as male and 1% (1) identified as non-binary/third-gender. The race and gender of survey respondents are found in **Figure 4** below.

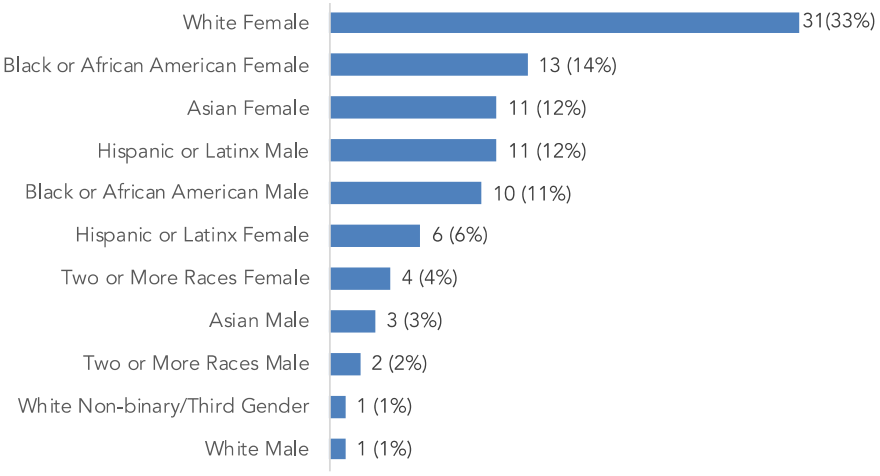

Figure 4. Racial and gender breakdown of survey respondents

Similar to the trends discussed in literature, underrepresented students (particularly Black/African America and Hispanic/Latinx) were more likely than their peers in the majority to find research that positively impacts communities they belong to/identify with (**Figure 5**) and the local community (**Figure 6**) extremely or very important.

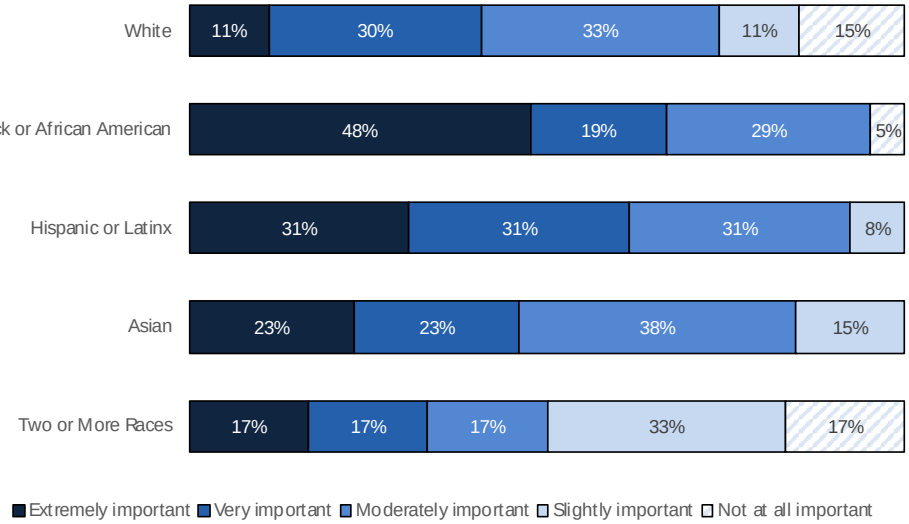

Figure 5. Racial breakdown of self-identified importance of the statement: the "research positively impacts a community I belong to/identify with" when asked how important respondents find particular aspects to be in their research. Overall, underrepresented students found this factor to be extremely important or very important at higher rates than their peers in the majority.

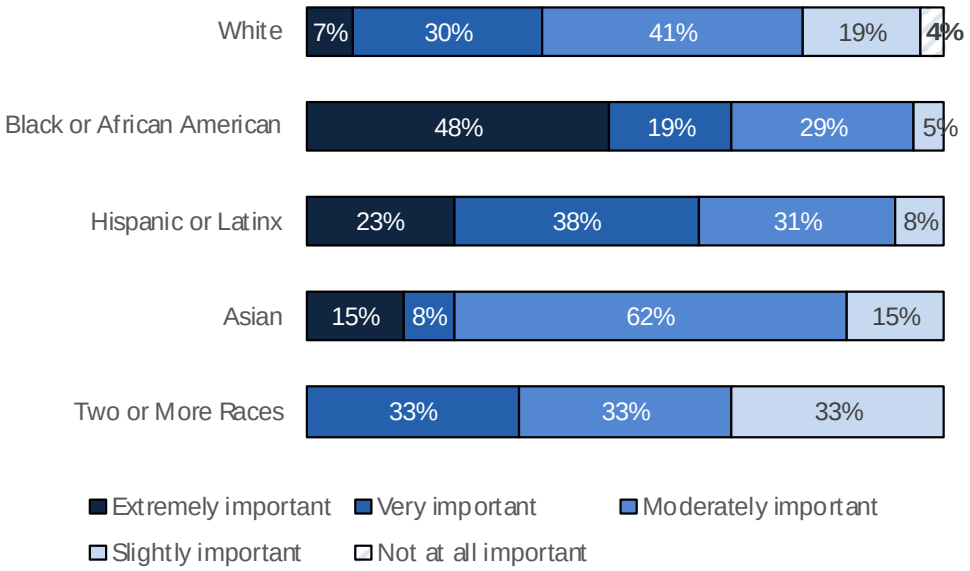

Figure 6. Racial breakdown of the importance respondents found in the statement "I make a positive impact on the local community" when talking about their research. Overall, underrepresented students found this factor to be extremely or very important at higher rates than their peers in the majority.

Unfortunately, no responses were collected from members of the COE with Hawaiian/Pacific Islander and American Indian/Alaskan backgrounds.

Final Product (Policy Proposal)

To: Georgia Tech College of Engineering SICPEA Review Committee
From: Bettina K. Arkhurst
Date: February 5, 2021
Re: SICPEA Final Product: A Policy Proposal for The Creation and Implementation of the Institute for Engineering Equity and Corresponding Fellowship

To more effectively encourage and support the technical education of underrepresented students and researchers, the College of Engineering should create an institute for research at the intersection of equity and engineering along with a graduate fellowship to support select PhD students doing research in this area for up to 5 years.

Recommendations

Recommendation 1: Create an Institute for Engineering Equity under the College of Engineering.

The Institute for Engineering Equity (IEE) will be a multi-disciplinary research institute for addressing inequities locally, nationally and internationally through engineering. The IEE will partner with existing departments and entities within the Georgia Tech community (i.e., the Ivan Allen College, Serve-Learn-Sustain, CEED and WIE) and beyond to accomplish its mission. Additionally, the IEE will consolidate and streamline related efforts that are already underway on campus.

The Institute will focus on four main areas:

1. Research
2. Mentorship
3. Professional Development
4. Community

The Institute will focus in these four areas in order to take a multipronged approach to ensuring the success of underrepresented students. These students will not only benefit from taking on research that they find interesting and that positively affects their communities, but also from having access to supportive communities on campus (Maton et al., 2016; McGee et al., 2016; Bernard & Mayfield, 2017). It should be noted that the IEE will not duplicate or divert funds from existing entities in these areas but use existing frameworks and collaborate with the aforementioned entities to build a strong foundation during its inception.

Research

The IEE's research will focus on solving problems of inequity through engineering and ensuring future technologies are designed to be equitable. Traditional STEM doctoral programs typically "do not offer, facilitate, or incentivize substantial opportunities to integrate social justice issues, community involvement, and altruism—factors which have been found to be of more importance

to these populations than to male members of well-represented groups" (Bernard & Mayfield, 2017).

Along with service to marginalized peoples and society, the Institute for Engineering Equity should take on multi-disciplinary research that will allow students to engage with local, national and international leaders because solving large, impactful problems such as government-defined "Grand Challenges" has been a point of interest for people typically underrepresented in engineering (Hicks, 2016). A public survey found engineering Grand Challenges increased interest in engineering for: "women without a 4-year college degree (+24 points) [and] African Americans (+22 points)" (Hart Research Associates, 2009).

Mentorship

Research through the IEE should be done in collaboration with faculty researchers who are working on projects at the intersection of engineering and equity who have been vetted by the IEE staff and undergone training to be positive and inclusive mentors for underrepresented students. Faculty mentorship is found to be one of the main drivers for underrepresented students pursuing PhDs, but if students are mentored in environments they feel only value them for the "diversity" they bring while being chock-full of biases against them, it leads to adverse consequences for the student (McGee et al., 2016; Dewsbury et al., 2019).

Furthermore, graduate students from underrepresented groups have not only been shown to have been strongly encouraged by their mentors but also desire to be role-models themselves (Schwartz et al., 2003). Therefore, the IEE should not only train its associated faculty to be positive and inclusive mentors for underrepresented students, but also its associated graduate students to do the same. Mentoring collaborations will be formed between members of the Institute and program coordinators within the COE with established mentorship and outreach opportunities such as CEED and WIE.

IEE graduate students will partake in community outreach and engagement – with a focus on the initiatives that are already underway at Georgia Tech through the Center for Education Integrating Science, Mathematics, and Computing (CEISMC), CEED and other on-campus collaborators (Bernard & Cooperdock, 2018). The IEE will serve as an entity to aid in streamlining, consolidating and assisting the outreach efforts within the College of Engineering, provide affiliated students with information about opportunities that are available on campus and aid members of various schools within the COE as they seek to develop and evaluate their outreach efforts.

Professional Development

In collaboration with CEED, WIE and IDEI, the Institute will hold seminars and develop and incorporate courses that focus on engineering for a more equitable future. Experts and collaborators from Georgia Tech and beyond will be brought in to network with affiliates of the IEE, mentor students and expose them to the numerous areas in which their talents can be applied within their engineering fields of interest. The Institute will also connect students with

internship, research, co-op and full-time position opportunities through existing collaborations and partnerships.

Community
A major protective factor for URM students are the communities they belong to – particularly early in their programs (Maton et al., 2016). The IEE will work with existing entities like IDEI to create an inclusive and welcoming community for all students, staff and faculty. The Institute will need a physical space for gathering and doing collaborative work similar to MIT's D-Lab with working space, available computers and a maker space. Such working spaces will be essential to the Institute's mission of building community and allow like-minded students to work on research, projects and network together in a space purposely built with diversity and inclusion as foundational principles.

Recommendation 2: Create a graduate fellowship for doctoral students working at the intersection of engineering and equity that is renewable for up to 5 years.

The graduate fellowship is a necessary form of support for PhD students and a major factor that decreases URM graduate student attrition rates (Bernard & Cooperdock, 2018). The Institute of Engineering Equity will take a holistic approach to ensure the successful recruitment and graduation of underrepresented doctoral students. Along with the research, mentorship, professional development, community and outreach, financial support will be a necessary resource for students to pursue the research they are interested in (Maton et al., 2012). The fellowship will be renewable for up to 5 years and awarded to ten PhD students selected annually to enable students to pursue research at the intersection of engineering and equity.

Implementation

The first year of the Institute for Engineering Equity will be dedicated to building a lasting foundation. Originally, the Institute will be run by three staff members and a faculty leader. Staff members will handle campus programing, outreach with various leaders, agencies and businesses and the fundraising efforts. The faculty leader for the IEE will be familiar with the Institute's area of work, have shown dedication to URM students and has an understanding of the factors and environment needed for these students to thrive and succeed. This professor will manage the Institute's operations, hiring and spearhead fundraising efforts. The Faculty Leader should have a passion for creating equitable programs and a preliminary understanding of work that is already underway on campus that aligns with the mission of the Institute since the IEE will act as a centralized resource for efforts in this area.

It is likely that the Institute will need temporary space until an appropriate permanent location can be found. Potential locations for temporary spaces include: the Kendeda Building, the renovated student center and the renovated Groseclose building among others.

Preliminary Cost Estimates

To anticipate the costs of operating the Institute of Engineering Equity, estimates were made for the first and fifth years of operation. These estimates include personnel payment (**Table 1**), project funding, funds dedicated to development and discretionary funds (**Table 2**). The Faculty Leader will receive $30,000 annually in addition to the faculty member's current salary and $10,000 of travel funding. Depending on their tier, staff members will be paid between $45,000 and $65,000. The total cost of each personnel paid through the Institute for Engineering Equity includes salary, full fringe benefits for traditional employees (32.3%), tuition remission ($1,557/month) and fringe health benefits (6.1%) for graduate students.

Table 1: First and Fifth year estimated costs for personnel paid through the Institute for Engineering Equity including salary, fringe benefits, health fringe benefits and tuition remission. The tuition remission has an escalation factor of 3% after FY22.

	Salary	Benefits and Tuition Remission	No. of Individuals	Estimated Cost (Year 1)	No. of Individuals	Estimated Cost (Year 5)
Graduate Fellowship	$34,000	$20,758	10	$547,580	50	$2,765,926
Staff (Tier I)	$45,000	$14,535	1	$59,535	1	$59,535
Staff (Tier II)	$55,000	$17,765	2	$145,530	1	$72,765
Staff (Tier III)	$65,000	$20,995			1	$65,000
Faculty Leader	$40,000	$9,690	1	$49,690	1	$85,995
Estimated Total for Institute Personnel				$802,335		$3,033,911

Table 2: First and Fifth year estimated costs for running the Institute for Engineering Equity

	Estimated Cost (Year 1)	Estimated Cost (Year 5)
Personnel Payment	$802,335	$3,033,911
Project Funding	$100,000	$500,000
Prof. Development Funds	$50,000	$100,000
Discretionary Funds	$10,000	$50,000
Estimated Total	$962,335	$3,683,911

Additional costs in the pilot year will also include costs for furniture, stationary and electronic supplies for the Institute and its staff.

Potential Funding Sources

Potential funding agencies include: the National Science Foundation (NSF), the Kendeda Foundation, USAID and the Bill and Melinda Gates Foundation among others. The NSF has reaffirmed its support for similar initiatives and provided funding for projects at the intersection of STEM and equity – such as the recent award within the COE dedicated to advancing the recruitment of underrepresented minorities to faculty positions (Parmelee, 2020).

The Kendeda Foundation also seems like a particularly promising partner for the IEE given that the their website states: "The Kendeda Fund has invested almost $800 million since its inception, and currently makes $50 to $60 million in grants annually. We also believe it is important to accomplish as much as possible within the lifetime of our founder, whether through near term philanthropic investments or long term projects that require more time to bear fruit. To that end, we are committed to spending down the majority of our assets by the end of 2023" (Kendeda Fund, n.d.).

Georgia Tech and Atlanta are also prime candidates for funding from the recently passed Endless Frontier Act - particularly in its search to create new technology hubs - given that much of the research already underway within the COE are in the Act's initial list of key technology areas (i.e., robotics, manufacturing, biotechnology, energy, materials science and disaster prevention) (Schumer, 2020). Funding allocated in the Endless Frontier Act can serve as a potential source of funding for the IEE – given that questions of equity have already arisen or will arise in the aforementioned key technology areas.

President Biden has also made issues of equity a priority of his administration, stating "… we need to make the issue of racial equity not just an issue for any one department of government; it has to be the business of the whole of government" (Remarks by President Biden at Signing of an Executive Order on Racial Equity, 2021). Although the Institute of Engineering Equity would work on issues of more than just racial equity, the administration's support for programs that promote equity may indicate other funding opportunities for the Georgia Tech COE to pursue for the creation of the IEE.

Addressing Counterarguments

Pushback

As with every initiative for equity, pushback against this investment into systemic change will be inevitable, but it will be of utmost importance to emphasize that the purpose of an institution of this nature is to better enable Georgia Tech to accomplish its already stated mission more effectively and to serve a broader range of American and global citizens. As President Ángel Cabrera stated with regards to the new Strategic Plan, the goal is for Georgia Tech to become a place in which we "*strive for excellence*, *thrive on diversity* and *celebrate collaboration*. We *champion innovation*, on our campus and around us. We *nurture the well-being* of our entire community and are committed to *ethical behavior and responsible stewardship*" (Ángel Cabrera,

(n.d.)). The Institute of Engineering Equity is meant to harness the creativity and passions of underrepresented researchers, provide a safe and collaborative environment for all students and build atop already existing resources to ensure they thrive.

Costs

The main argument against the Institute's creation will likely be that its benefit does not outweigh/justify its cost. Beyond its stated benefits, the IEE will not only benefit students but also local, national and international populations. Issues of equity are so far-reaching that an engineering institution dedicated to addressing such issues has the potential to broaden the problems Georgia Tech can solve and the funding sources at the university's disposal.

Conclusion

In the survey I sent out to members of the Georgia Tech COE community, when asked "Would you be interested in an Institute focused on work at the intersection of engineering and equity?" 67% of respondents selected "Yes", 27% of respondents selected "Maybe", 5% of respondents selected "No" and one respondent selected "Other" and added "I think it is great for it to exist, but I do not see myself working in it." **Figure 7** displays the racial breakdown of respondents. 86% of Black or African American respondents, 83% of students who identified as two or more races, 69% of Hispanic or Latinx students, 60% of white respondents and 43% of Asian respondents responded "yes", that they were interested in an Institute focused on work at the intersection of engineering and equity.

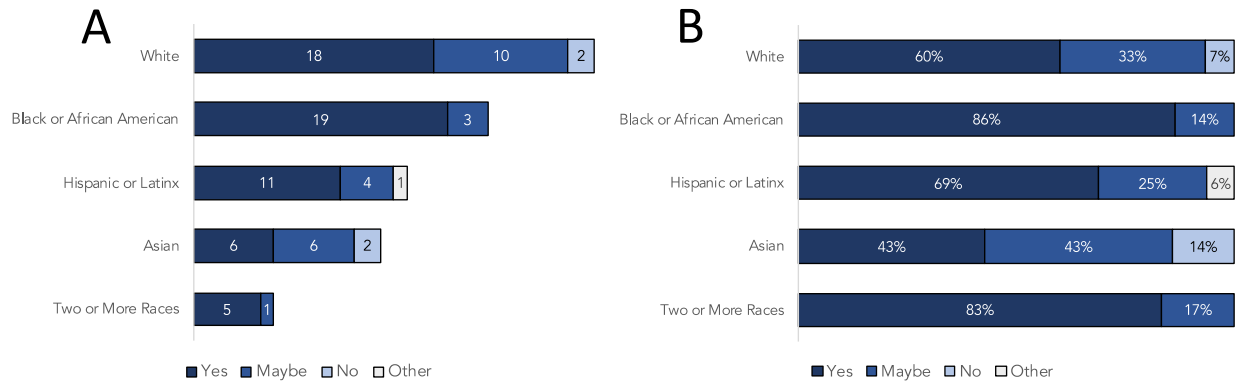

Figure 7. A) Racial breakdown of respondents' answers to the question "Would you be interested in an Institute focused on work at the intersection of engineering and equity?" **B)** Percentages corresponding to answers shown in Figure 7A

Further broken down into both race and gender, respondents belonging to racial and gender minorities within the COE showed particularly high interests in the IEE as shown in **Figure 8**.

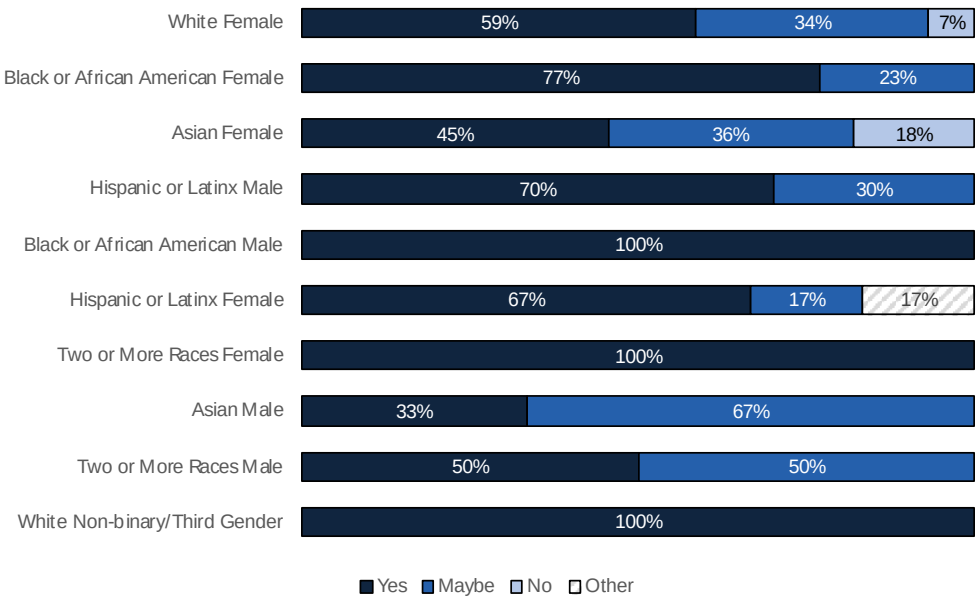

Figure 8. Racial and gender breakdown of respondents' answers to the question "Would you be interested in an Institute focused on work at the intersection of engineering and equity?"

By providing underrepresented students the resources, support and power to pursue research they find meaningful, Georgia Tech has a means by which it can truly reap the benefits of the university's diversity and URM students' unique cultural strengthens and passion for altruism. To realize these goals, the Institute for Engineering Equity (IEE) should be created. The IEE will have a mission of addressing local and global inequities through engineering. Furthermore, the research fellowship that the College of Engineering provides through the IEE will be an invaluable resource for PhD students seeking to do research at the intersection of engineering and equity.

Not only can such an institute make Georgia Tech graduate school in the COE more appealing to underrepresented students, but it also provides an opportunity for Georgia Tech to become a leader in equitable engineering. The IEE has the potential to become a cornerstone for both the COE and the university as a whole. The IEE not only aligns with the Georgia Tech mission and values, but one could argue that Georgia Tech will be remiss without such an institute on its campus.

Solution Impact

The problems the Institute for Engineering Equity (IEE) seeks to solve can be summarized into three categories: i) the underrepresentation of racial and gender minority students at the graduate level in the College of Engineering, ii) the lack of opportunity, resources and encouragement for underrepresented graduate students to work/do research that impacts their communities and iii) the lack of an institutionalized way to work on research projects at the intersection of engineering and equity. At its core, the IEE will be an engineering research institute that incorporates the interests of underrepresented students and researchers into its foundation.

The Institute will be committed to reducing biases underrepresented students and researchers are typically subjected to in academia, supporting a diverse array of students, building a community and providing financial security for PhD students who are working in this area through a fellowship. These factors, along with the chance to explore previously uncultivated opportunities in which students can use both their identities and knowledge as engineers *and* as people to tackle challenging, multidisciplinary and impactful problems are methods seen to attract, support and retain underrepresented graduate students.

The IEE also promotes equity due to the fact that the work, inherently, is at the intersection of engineering and equity so it will serve the mission of positively promoting equity and access not only for underrepresented students and researchers, but for those whom the research seeks to serve. The IEE will also be a way to centralize and strengthen engineering equity initiatives on campus and better integrate work in other schools with work in the COE. If all goes well, the COE can encourage other departments to start their own versions of the IEE or widen the scope/influence of the IEE.

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Appendix

The summer of 2020 ushered us into a new era of racial reckoning through the #BlackLivesMatter movement. This movement subsequently put a spotlight on the decades of racism and injustice in academia through social media campaigns like #BlackInTheIvory and #ShutDownSTEM (Subbaraman, 2020).

Currently, underrepresented minorities make up less than 20% of Georgia Tech undergraduates and 11% of graduates students compared to the 36.2% of the country that belong to these groups (U.S. Census Bureau, 2019; Georgia Tech Office of Institutional Research and Planning, 2020). **Figure A1A** shows that all domestic groups see a drop in enrollment percentage from the undergraduate to the graduate level, but this drop is precipitous for the underrepresented minority (URM) students.

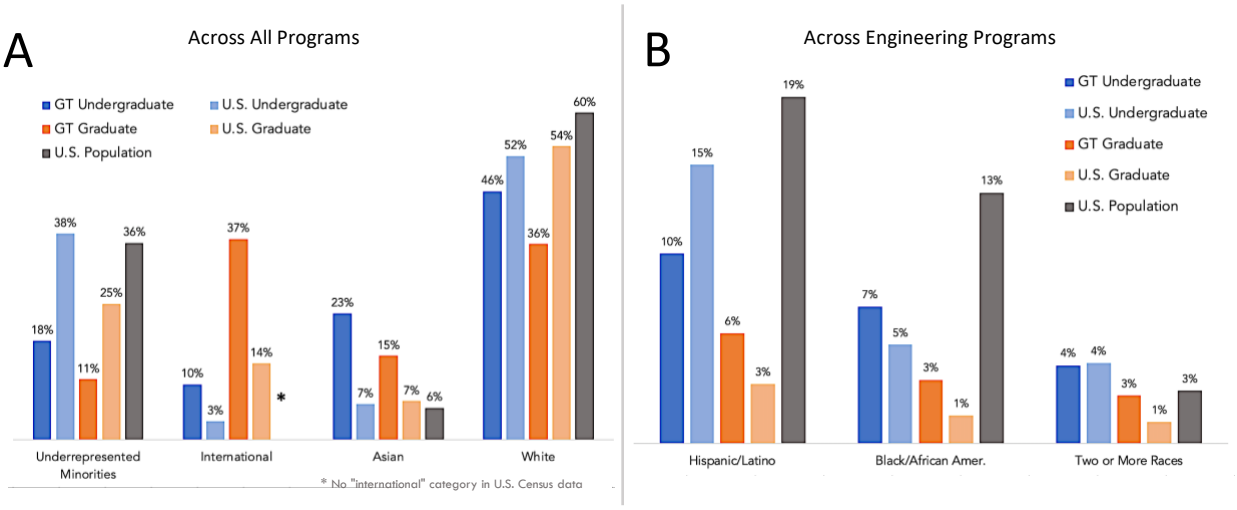

Figure A1. A) Percentage breakdown of undergraduate and graduate student enrollment of Georgia Tech Main Campus compared to enrolled students nationally and U.S. Census data. The "underrepresented minorities" were defined as Black/African American, Hawaiian/Pacific Islander, Hispanic/Latino, American Indian/Alaskan and those of Two or More Races. **B)** Percentage breakdown of 2018 undergraduate and graduate URM students enrolled in Georgia Tech's COE compared to students enrolled in engineering majors nationally and U.S. Census data. Data shown does not include Hawaiian/Pacific Islander and American Indian/Alaskan students due to insufficient data. (U.S. Census Bureau, 2019; U.S. Department of Education, 2019; Joseph Roy, 2019; Georgia Tech Office of Institutional Research and Planning, 2020)

Similar to national trends, the percentage of graduate students enrolled at Georgia Tech is lower than the corresponding proportion of members of the respective group in the U.S. population. The starkest differences are seen amongst Hispanic/Latino, Black/African American and American Indian/Alaskan students who are 28%, 26% and 4% of their U.S. population proportions, respectively. Yet, as seen in **Figure A1B**, the representation in Hispanic/Latino graduate students, Black/African American students and students from two or more racial backgrounds within the College of Engineering (COE) surpasses the representation found among engineering students nationally, which is a testament to the work members of Georgia Tech's Institute Diversity, Equity and Inclusion (IDEI), the College of Engineering's Center for Engineering Education and Diversity (CEED) and other Institute initiatives aimed at recruiting and retaining these students.