Diversity Statement

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I believe that it is of paramount importance to create welcoming, inclusive, and diverse academic environments. Unfortunately, Computer Science suffers from a lack of diversity. According to the 2020 Taulbee survey [3], in 2020 PhDs were awarded to only 19 Black or African American students, only 26 Hispanic students, and only one Native Hawaiian or Pacific Islander student. According to the same survey, only 19.9% of PhDs were given to female-identifying students. Statistics for awarded bachelor degrees are similarly skewed, with only 3.1% going to Black or African American students, only 8.5% going to Hispanic students, and only 20.6% going to female identifying students. Clearly, a significant amount of work is required to create an inclusive and diverse environment that is more reflective of the general population.

Mentorship As a PhD student, the most direct way I have impacted traditional diversity is mentoring students from underrepresented backgrounds. Nathan Nuñez is a current Yale undergraduate student, who spent a summer working with me on an online programming environment. When Nathan began working with our group, he was early in his college career, and he did not have any prior experience in research. I worked with him to deepen his knowledge and excite him about pursuing Computer Science. Nathan is still at Yale, pursuing a degree in Computer Science. I also worked with a Bermudian high school student, Kairo Morton, on applications of machine learning to my research area, formal methods. When I met him, Kairo was already familiar with programming and machine learning concepts, but was unsure what he wanted to pursue in college. I worked with Kairo to develop his knowledge of formal methods, broadening his view of Computer Science, and guided him through the process of writing a paper, of which he was the first author [2]. Kairo is now an undergraduate student at MIT, pursuing a Computer Science degree.

In Spring 2018, I was the teaching assistant for a course called Software Engineering, in which students learned software development principles. As the TA, one of my responsibilities was to help the students organize and guide their work on team-based semester long projects. After the course, one of the students, Stephanie Hickman, approached me and asked me to help advise her software engineering work on her thesis project, which aimed to build software therapy applications for young adults with Autism Spectrum Disorder (ASD). Of course, ASD and medical software is not my area of expertise, so Stephanie had other advisors who assisted her with that topic. I provided regular feedback and assistance on software engineering principles around the tools she was building. I appreciated the chance to contribute to a project which may help people with ASD, and that Stephanie felt my guidance during the Software Engineering class was valuable enough that she sought my help again.

Student Engagement Increasing the diversity of Computer Science graduate programs requires ensuring that all students are aware that it is an option. I have participated in several panel discussions aimed at educating Yale undergraduate computer science students about various aspects of graduate school. Such events provide a crucial conduit for undergraduate students to determine if they wish to pursue graduate school, and get a clear understanding of what that both entails and provides. For example, I have found that many undergraduates seem unaware that PhD students not only do not pay tuition, but also receive a stipend. Publicizing this fact more is of critical importance, so that no students choose not to pursue a PhD because they incorrectly perceive that it will be too heavy a financial burden. When given the chance to, such as on a panel or when talking to an undergraduate about graduate school, I make sure that I bring stipends up.

There are also subtler ways I aimed to encourage widespread participation in the Computer Science department. When I was in college, I frequented office hours, and would often talk to some of my professors about topics in their subject areas, but only tangentially related to the courses I was taking with them. As a teaching assistant, I am always happy when students show an interest in the material, and want to learn more beyond what is covered in the class. However, many students would come to ask questions directly related to the class or homework, and then apologize for "taking up my time". After noticing this, I attempted to be more proactive in conversations with students to both encourage them to come to office hours for any questions they had about the general course subject area, and make it clear that I genuinely enjoyed talking to them about the subject.

Future Plans As a professor, I hope to build a diverse research group from a range of backgrounds. One way I plan to build such a group is to actively seek opportunities to visit and speak at schools where many computer science students would have traditionally underrepresented backgrounds, such as all womens schools or historically black colleges and universities. Both in my research and teaching, I hope to continue communicating my enthusiasm and that a dedicated student is never wasting my time, even when struggling with the material. I also hope to communicate the diversity of researchers and practitioners in Computer Science through my courses, by highlighting the contributions of computer scientists such as Grace Hopper and Katherine Johnson.

While outreach and support for graduate students is important, I believe the long term path to increasing the diversity and inclusiveness of Computer Science requires making Computer Science accessible to more students, both at an undergraduate and high school level. Computer Science does not suffer from a lack of diversity only among undergraduate and graduate students. The problem begins even before college. According to the 2019 State of Computer Science Education Report [1] only 45% of United States high schools teach Computer Science, and high schools with larger percentages of underrepresented minority students are less likely to have Computer Science courses.

As a professor, I'd be interested in supporting existing outreach efforts to both a wider range of undergraduate and high school students, or establishing new outreach efforts. For example, one way to accomplish this would be establishing workshops to introduce computer science to undergraduate and high school students. For slightly more advanced students, summer research is an option. Through my experience with Kairo, and also with another high school student, Elven Shum, I have experience mentoring high school students on an individual basis, and look forward to continuing to do so in the future. As previously discussed, I have often worked with undergraduates who had little to no research experience, and am excited to continue doing so in the future.

Conclusion Much work is needed to make Computer Science as welcoming, diverse, and inclusive as it should be. In the past, I have tried to do my part to welcome new people into the community primarily through individual mentorship. In the future, I aim to continue these efforts, but also widen my scope, by more proactively organizing events to attract high school students and undergraduates to Computer Science.

References

[1] State of computer science education. 2019.

[2] Kairo Morton, William Hallahan, Elven Shum, Ruzica Piskac, and Mark Santolucito. Grammar filtering for syntax-guided synthesis. In *Proceedings of the AAAI Conference on Artificial Intelligence*, volume 34, pages 1611–1618, 2020.

[3] Stuart Zweben and Betsy Bizot. 2020 cra taulbee survey. *Computing*, 30(5):1–47, 2018.