

The lack of diversity in STEM fields remains an elusive problem with no clear-cut solution. This disparity is particularly pronounced in computer science Ph.D. programs, where enrollment in the US during the 2019–2020 academic year consisted of only 24.8% women and 6.2% from underrepresented racial/ethnic groups [6]. Although issues of diversity, equity, and inclusion have finally begun to receive long-overdue attention, any lasting solutions will require a sustained commitment from our field to identify and understand root causes, followed by the implementation of institutional policies to rectify them. Rather than discussing my thoughts on the broader systemic changes that I believe our field must undergo, I would like to focus instead on some concrete ways in which I can personally contribute to addressing the problem, including a discussion of my past track record and future goals.

I believe that my efforts related to research mentoring have had the most direct and meaningful impact, which is why I have sought opportunities to work with students at all levels since the beginning of my time in graduate school. I have mentored 36 extremely talented students (5 Ph.D., 10 master's, 21 undergraduate), 9 of whom belong to an underrepresented group. From my perspective, the primary duty of a mentor is to help students acquire the tools and confidence necessary to succeed on their own. This idea of building confidence is particularly important for members of underrepresented groups, who may not benefit from an automatic presumption of competence or an abundance of strong role models within the field. My approach to building confidence is simple: treat students as equal stakeholders and empower them to make creative decisions independently, rather than micromanaging their efforts. For example, all undergraduate and master's students that I mentor contribute to key aspects of the research process, from initial idea generation to running experiments to writing papers. I have had 8 undergraduate and master's coauthors on full research papers published in top-tier conferences, and two papers currently under submission were led entirely by undergraduates.

Unfortunately, students who do not consider an advanced degree as a possibility for themselves may never even seek out opportunities to participate in research. Coming from a low-income background growing up, I am the first person to receive a Ph.D. in my family, a path I almost certainly would not have taken without the encouragement of my undergraduate advisor. As with building confidence, simply encouraging students to view graduate school as a viable option can have a profound impact, especially for those from marginalized communities. Of the undergraduates I have mentored, three (including two women) have gone on to Ph.D. programs at top research universities, and many others have sought master's degrees.

Students from diverse backgrounds usually have a wide disparity in access to resources and opportunities, so I strongly support efforts to make research and teaching products accessible to the widest possible audience. As a co-instructor for 15-445/645: Database Systems [1] at CMU during the Fall 2021 semester, I made all of my course materials (including lectures [2]) freely available online, and I am firmly committed to continuing this practice for every course I teach in the future. I also plan to explore other ways of making course content more accessible, such as by adapting the 15-445/645 materials into a mini-course with condensed lectures that might be more digestible for non-students (e.g., full-time workers).

Beyond publicly available course materials, effective outreach programs are even more critical for improving access to opportunities. For instance, I participated in a program at Brown to provide guidance and feedback on Ph.D. applications for underrepresented applicants [3], many of whom were from developing countries with limited access to the traditional pathways to higher education. I have also accepted invitations to speak to students at my former high school about opportunities for pursuing computer science in higher education.

Lastly, it is important to remember that not everyone has the same cultural context or lived experiences, and even small efforts to be mindful of this fact can make a big difference. As a simple example, during a lecture this semester on hash tables, I spent a few moments explaining the origin of the term “Robin Hood hashing” to avoid confusion for students who might be culturally unfamiliar with the tale from English folklore. While instances like this may seem trivial or unimportant, I believe that they can often go a long way toward creating a more welcoming and inclusive environment for everyone.

I recognize that I can always learn more about these issues, and I plan to take advantage of any DEI initiatives available to members of my future department so I can continue to grow my personal efforts. However, as a faculty member, I will also have greater influence to directly shape institutional policies, and with that influence comes a responsibility for me to promote effective change. As an immediate first step, I would like to create a new (or build upon an existing) outreach program similar to the Ph.D. application feedback program that I participated in at Brown [3]. Additionally, within my first year, I plan to apply for an exploreCSR award [4] from Google to implement a program to introduce undergraduate students from historically marginalized groups to research opportunities in the areas of data management and data science, similar to the one piloted by the systems group at Brown [5].

[1] <https://15445.courses.cs.cmu.edu/fall2021/>

[2] <https://www.youtube.com/playlist?list=PLSE80DhjZXjZaHA6QcxDfJ0SIWBzQFKEG>

[3] <https://cs.brown.edu/degrees/doctoral/applications/helpful-resources-applying-computer-science-phd-programs/>

[4] <https://research.google/outreach/explore-csr/>

[5] <https://explorecsr.cs.brown.edu/systems/index.html>

[6] S. Zweben and B. Bizot. 2020 Taulbee Survey. <https://cra.org/wp-content/uploads/2021/05/2020-CRA-Taulbee-Survey.pdf>