Diversity Statement

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The statement opens with a broad section that shows the candidate understands issues of diversity within their field

Computer science is one of the least diverse fields of study in post-secondary education, with only 20% of U.S. bachelor degrees in computer science awarded to women [1, Table 104.60] and 23% to members of under-represented ethnic minorities [1, Table 322.30]. In graduate school, diversity drops further: only 18% of computer science Ph.D.s were awarded to women in 2017, and 7% to members of underrepresented ethnic minority groups [2, p. 4]. My research area of computer systems is no exception: for example, of the 47 papers presented at OSDI 2018, only eight had a female lead author. I believe that this lack of diversity is rooted in implicit biases [3], still-prevalent gender stereotyping in early childhood and education, and in additional challenges imposed on women and minority students by the culture of the field. Addressing these challenges, compensating for inequities in earlier education stages, and increasing diversity are important goals of my teaching and research mentoring.

The discussion is made more personal by addressing the author's own research area

specific challenges faced by specific groups of people are named

Computer systems research is an implementation-oriented field that naturally attracts students who are already competent and experienced programmers. This perpetuates a "hacking culture" that appears to primarily value rapid engineering and robust discussion. Women and minority students often perceive themselves to be a poor fit for this culture, which reduces their confidence when they enter the field, or discourages them from entering it altogether. Part of the reason lies in the fact that women and minority students are less likely to have pre-college programming experience—a consequence of subtle, gendered signals about expected interests that society transmits to children, and of socioeconomic factors that affect access to computers, programming literature, and the freedom to immerse oneself in them. Another reason is that confident, combative individuals, who are quick to dismiss ideas or identify flaws, often drive discussion in the field. It is crucial that faculty in computer systems advertise and promote the reality that no system is perfect, and that deep understanding of concepts and creative ideas are far more important traits for a systems researcher than preexisting programming experience or a confident discussion style.

The second paragraph narrows in to analyze the applicant's subfield of computer systems

Thesis statement about what should be done to create a healthy environment

Building confidence. One key way in which I address the inequities experienced by women and underrepresented minority students is to systematically build confidence. In research mentoring, this starts with finding students to mentor: small steps of active encouragement can help convince a student with great talent but limited confidence that systems research might be for them.

Subheadings focus on specific high-level themes around actions the author has taken and will take

Clear delineation of what needs to be done and how it is and will be accomplished

[This section removed to maintain privacy of individuals mentioned]

In this paragraph, the author describes their experience with mentoring students from a variety of backgrounds, including observations about challenges that these students faced and ways that the author helped the students overcome those challenges. The paragraph includes a concrete example of a specific student's growth.

In this redacted section, the author demonstrates specific past experience and outcomes, including a concrete example

In classroom teaching, on the other hand, building confidence involves anticipating concepts and activities that may be unfamiliar to some students—for example, writing concurrent code in MIT's distributed systems class (6.824). To build these students' confidence in the face of new, challenging material, I provide structured guidance and teaching aids. In 6.824, myself and the TAs offered a special recitation for students unfamiliar with concurrent programming, and provided written materials discussing common challenges and how to approach debugging common bugs. In the recitation session, we systematically explained common patterns and key concepts—such as threads, condition variables, and Go's channels—from first principles. Women made up more than half of the

Present tense links past experience with future plans

audience of 25 students, and while the session's direct impact is hard to measure, many of the attendees did well in the class, and one is now an undergraduate researcher in our group. At Cambridge, I used similar techniques when teaching the freshman-year Operating Systems class. Students with limited prior "hacking" experience found the combination of new, abstract ideas in the class (*e.g.*, threads) and low-level details (*e.g.*, assembly instructions) overwhelming, especially when surrounded with students who appeared highly confident working with these ideas. In response, I provided a concrete example of what exactly happens at each layer of the computer when the user launches a program, from system calls down to the processor's fetch–execute cycle and the ALU's logic gates. As a result, students—and particularly those with limited prior exposure to systems engineering—felt much more confident, and often later asked inquisitive questions that belied a deep end-to-end understanding. Making such materials available as self-study materials, *e.g.*, through a detailed teaching OS description [4], can help these students feel confident that there are resources they can rely on even when starting without much hands-on experience.

Inclusive culture. In addition to boosting students' confidence, I also seek to promote a positive and inclusive discussion culture. For example, when running the operating systems reading group at the University of Cambridge, I institutionalized an initial round of discussion in which each attendee summarized, without interruption, her or his views on the paper of the day. This helped get students involved who lacked the confidence to speak up—often women, minority, or junior students—and ensured that a broad range of views entered the discussion, rather than just those of confident attendees or faculty. At MIT, I similarly work to encourage all students to participate in discussions in the PDOS group meeting, *e.g.*, by trying to emphasize the positive aspects of each paper we discuss, and by explicitly calling on students who quietly observe the discussion to contribute their views.

Finally, since implicit biases affect even those who profess to be committed to diversity [5, ch. 8], I continually evaluate my own success at providing an equitable teaching and research environment. For example, I compared the grade histograms for students with male and female gender identities in MIT's 6.824 class to understand if questions or grading had suffered from implicit bias. Fortunately, there was no difference; otherwise, I would have checked on a per-question and per-grader basis and tried to take appropriate corrective action.

Individual needs. While my discussion has focused on female students and those from underrepresented ethnic minority groups, I recognize that other traits (*e.g.*, sexual orientation, disabilities, religion, or nationality) can also constitute barriers to students' participation and progress. Many of the same techniques—such as confidence building and an inclusive teaching and research group culture—apply in these cases. However, the situations faced by individual students will also require attention to their specific needs. I plan to accommodate these needs on a case-by-case basis, and to seek advice from the relevant support organizations on campus if I personally feel ill-equipped to handle the situation.

Goals. My goal going forward into a faculty job is to continue my efforts to build student confidence and establish a positive culture, and to build on them to further promote diversity in computer systems research and computer science more broadly. This includes building a welcoming, inclusive research group, continuously evaluating my teaching for implicit biases, and striving for equity of opportunity through affirmative action when choosing students to work with.

References

[1] U.S. National Center for Education Statistics. *Digest of Education Statistics*. 2016.

[2] Stuart Zweben and Betsy Bizot. "2017 CRA Taulbee Survey". In: *Computing Research News (CRN)* 30.5 (May 2018).

[3] Corinne A. Moss-Racusin, John F. Dovidio, Victoria L. Brescoll, Mark J. Graham, and Jo Handelsman. "Science faculty's subtle gender biases favor male students". In: *Proceedings of the National Academy of Sciences* 109.41 (2012), pages 16474–16479.

[4] Russ Cox, Frans Kaashoek, and Robert Morris. *xv6: a simple, Unix-like teaching operating system*. Aug. 2017.

[5] Catherine Hill, Christianne Corbett, and Andresse St. Rose. *Why so few? Women in science, technology, engineering, and mathematics*. Washington, DC, USA: American Association of University Women, 2010.