

Diversity, Equity, and Inclusion Statement

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We cannot create a more diverse computing workforce unless we improve the diversity of undergraduate and graduate computer science education. To broaden participation in computer science, it is particularly important to increase access for students with no background, particularly those from underrepresented groups, and to improve the retention of these students in the computer science major. Indeed, students with no background in computer science face unique challenges when entering the field. The steep learning curve for programming and the absence of familiarity with software tools can be daunting. Research has shown that first-generation students self-report a lower sense of belonging and a lower belief in their own skills [1].

Summer Bridge. In Summer 2023, I had the opportunity to be one of three instructors for the Summer Program for Incoming Students¹ (SPIS), a summer bridge program to prepare entering first-year students for college-level computer science courses. This program was aimed at students with little or no formal background in computer science or programming. Students were taught introductory material on programming and algorithmic thinking in a supportive, no-stakes environment. Crucially, we also provided students with a practical bridge to adapting to and succeeding in college. We instructors met with every student individually each week to hear the students' perspectives, needs, and questions. Advising personnel from each student's home department provided individual advice on classes and enrollment, and seats were reserved for our students in each version of our CS1 course. Undergraduate assistants acted as near-peer mentors and helped students acclimate to living on a university campus and provided invaluable advice on college life and navigating their majors.

Inclusive Classrooms. As a faculty member, I will be active in expanding the pipeline into both the Computer Science major and onwards to graduate education. I can contribute to broadening participation in computing by adopting inclusive pedagogy (especially in introductory courses), welcoming students entering college or switching majors with no background, and by increasing retention through involvement in summer preparation and research offerings. I incorporate techniques that encourage collaboration such as active learning and peer instruction within courses; these are effective in improving course outcomes for students [2]. I am excited about developing courses for non-majors that would reach students where they are at by focusing examples and labs on positive application of computing to other fields as well as society at large. I will invite students from these courses to consider further coursework in computing.

Future Plans. I would be especially eager to contribute to summer opportunities for students. Summer bridge programs have enormous potential to improve retention for populations with historically higher attrition rates. For continuing students, research has identified summer

¹<https://spis.ucsd.edu/>

research programs, such as NSF Research Experiences for Undergraduates (REU) programs, as a way to increase the diversity of future faculty[3]. For instance, first-generation students are less likely to participate in an REU, and research has found that this was due to less awareness of research opportunities². As a previous participant in an REU, I understand how important the mentorship and hands-on research experience were for my decision to pursue a doctorate. My experience teaching and mentoring a diverse population of students in SPIS has prepared me to be a mentor for a new generation of students in computing.

References

- [1] Jennifer M. Blaney and Jane G. Stout. Examining the relationship between introductory computing course experiences, self-efficacy, and belonging among first-generation college women. In *Proceedings of the 2017 ACM SIGCSE Technical Symposium on Computer Science Education*, SIGCSE '17, page 69–74, New York, NY, USA, 2017. Association for Computing Machinery.
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- [3] Burçin Tamer and Jane G. Stout. Understanding how research experiences for undergraduate students may foster diversity in the professorate. In *Proceedings of the 47th ACM Technical Symposium on Computing Science Education*, SIGCSE '16, page 114–119, New York, NY, USA, 2016. Association for Computing Machinery.

²https://cra.org/crn/2015/01/center_for_evaluating_the_research_pipeline_infographic_january_2015/