Diversity and Inclusion in Computer Science

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November 29, 2016

According to a recent analysis by the National Association of Colleges and Employers, Computer Science majors have the fourth highest paying salaries after graduation. As more aspects of our lives become closely coupled with information technology, the demand for competent computer scientists and other professionals with computer science skills will continue to increase. At a time when systemic inequalities such as the racial and gender wealth gap continue to grow, computer science can provide an effective path to prosperity for minorities. In addition to economic benefits, an education which includes computer science enriches individuals critical thinking skills and ability to succeed in other aspects of society. Moreover, increasing diversity within the field of computer science will not only benefit the individuals who choose to pursue a career in computer science, but will also benefit the field itself by bringing fresh perspectives to old problems.

New Mexico is a minority-majority state, and the University of New Mexico student body is over 50% ethnic minorities. During my graduate studies I have seen the unique challenges that minority students face when trying to enter a white, male dominated field. In particular, I have observed that just recruiting underrepresented minority students at the college level is not sufficient to increase the number of successful graduates. Because of the demanding nature of computer science, students need to be prepared before they arrive at college. This includes training in mathematics, science, and programming in high school, middle school, and even elementary school. As a volunteer Scientific Adviser for the New Mexico Super Computing Challenge, I have been able to see how an early introduction to computer science can have a positive impact on student from disadvantaged backgrounds.

In 2013, the University of New Mexico developed the first *Computer Science for All* program in the country which offers high school students throughout New Mexico the opportunity to learn computer programming and scientific modeling in their own classrooms. The program offered courses to middle and high school STEM students teachers to be future Computer Science teachers. These courses were developed to give teachers the tools to teach foundational computer science concepts. These types of programs allow teachers to incorporate computer science concepts into their own curriculum, and tailor their curricula to the specific best benefit the unique populations they serve.

My adviser was intimately involved with this initiative, which focuses on using computational modeling to illustrate computer science concepts. Specifically, the course material for the program was based of a computational modeling course which I helped teach as a graduate student. Assignments I conceived will be included in future CS for all courses. New Mexico is not the only state to recognize the importance of computer science. National initiatives of the same name have gained traction, including $4.1 billion in funding for states and school districts to expand CS programs throughout K-12 education. Programs such as these will be crucial in helping underrepresented minorities succeed in computer science.

In addition to building technical skills for underrepresented minorities early, we also need initiatives to help students develop the "soft skills" necessary to succeed in computer science and the workplace. Students should be offered the opportunity to learn academic strategies that they may not have had access to in their previous education. These include test taking strategies, how and when to ask for help, how to effectively communicate with professors, and strategies for group work.

Beyond gender and race, many students come to college with cognitive differences, such as PTSD or autism spectrum disorders, which can affect their ability to succeed in a traditional academic setting. This is not just an ADA issue but affects how we teach in the classroom and mentor students one-on-one. My experiences reaching out to these students have resulted in rewarding teaching experiences and fruitful collaborations.

In addition to student preparation and recruitment, computer science should strive to increase diversity at an institutional a level. This includes empowering hiring managers and committees to seek appropriate minority candidates, helping junior faculty build social networks, and eliminating unconscious biases.