Addressing Systematic Inequalities through K-12 Outreach

Growing up in Baltimore and having gone to graduate school in Philadelphia, both cities with deeply troubling histories of racism and segregation, I have seen up close the ramifications of longstanding injustice. One area I believe I can make a difference is in improving education opportunities at the K-12 level, where stark differences in public school resources have an enormous impact on student outcomes. Early in my PhD, I mentored a First Lego League (FLL) team at a middle school in an at-risk neighborhood of North Philadelphia, and I served as a Robot Design judge for regional FLL competitions. In addition to my work with FLL, I have run workshops for middle schoolers to teach them about concepts in computer science, and I have given talks to high school women about my path to engineering.

I am especially interested in developing pedagogical strategies for effectively engaging children, matching curricula to their abilities and interests. For example, when I volunteered with FLL, our goal was to foster interest in STEM via robotics, but the students were far more interested in watching and dancing to YouTube music videos than working with the Lego robots. Perhaps our outreach would have been more effective if we had centered our CS lesson plans around the students' excitement for music videos, rather than assuming interest in robots. At Penn, I have volunteered with SPARK, an initiative which matches middle schoolers with industry professionals based on shared interests. The students then complete 13-week mentored projects in their chosen area. Although SPARK currently only exists in a few large cities, I would be interested in joining or starting similar programs wherever I end up.

For several years, Penn's robotics lab ran an NSF-funded Research Experience for Teachers program, in which middle school STEM teachers spent the summer doing research internships mentored by PhD students. The goal was to equip teachers to incorporate computer science and engineering skills into their curricula. Based on my conversations with the teachers involved, the program was hugely successful. I am excited to work on programs like this in the future.

The Importance of Mentorship

Over my career, I've benefited significantly from formal mentorship programs, including the OurCS workshop for undergraduate women, which convinced me to apply to PhD programs; the CRA-WP Grad Cohort Workshop for Women, which helped me to build a professional network early in my PhD; and the MIT Rising Stars Workshop, which encouraged me to apply to faculty positions. As a professor, I would like to return to these as a mentor. I am also interested in and have already started improving mentorship initiatives at conferences in my research area. I am currently a co-chair of the Student Research Workshop at NAACL 2022, a top NLP conference. One of our initiatives is to offer a mentorship program where we pair junior students with senior researchers who provide feedback on their paper drafts ahead of submission.

However, when I think back to the DEI efforts that had the greatest impact on my success, the organized activities which fit neatly onto a resume are not the first to come to mind. Rather, I recall the many small actions people took to assure me I belonged to and could succeed in the CS research community. It was the senior female professor, who had no obligation to mentor me, offering to meet and assuring me that I was smart enough to be in the PhD program despite struggling with qualifier exams and understanding complex papers. Later, it was the professor who convinced me to stay in the PhD program after I emailed saying I planned to drop out. And, it was the coworkers during my first research internship at Google who stopped by my desk to

give encouragement and advice. And throughout it all, it has been my peers, the other PhD students in my cohort, who proofread my paper drafts and application materials, listen to practice talks, comfort me when I am struggling, and cheer for my successes.

In an academic's quest for paper acceptances and other accolades, it is easy to forget that one of our primary responsibilities is to mentor and train future generations of academics. During my PhD, I have done my best to pay back the debt I owe my own mentors by supporting junior PhD students, especially women and others struggling to find their place. As a professor, I aspire to emulate my mentors and build a reputation for having an open office and an open ear. Students should know they can always come to me with their problems, worries, and stresses, and I will provide reassurance and work relentlessly to see their issues be resolved. I will also make an effort to preemptively identify and reach out to students who seem to be struggling.

Good Departmental Culture Improves Inclusivity

Universities comprise many subgroups along different dimensions. The academic hierarchy of undergraduate and graduate students, staff and faculty, is one prominent dimension, but others include race, gender, and so on. Each subgroup has different and specific needs which should be addressed to create a culture of inclusivity. As a doctoral student at Penn, my focus has naturally gravitated toward improving culture in the PhD program, but I believe that creating a healthy department culture at all levels is essential for inclusivity. This is particularly important for nontraditional students who may not enter the department with a prebuilt support network of friends and family familiar with the trials of academia; for example, 26% of computer science professors have a parent with a PhD,[1] hinting at the importance of those social supports.

At Penn, I have consistently worked to make the CIS department a welcoming and positive place, where all PhD students have access to the resources needed for success. Early in my PhD, I saw the need for better departmental culture, so I co-founded the CIS Doctoral Association (CISDA). As CISDA chair, I improved communication channels between faculty and students, created social opportunities for PhD students to get to know professors outside of their research groups, and introduced more inclusive non-alcoholic social events such as weekly tea and cookies. The entirely student-run CISDA continues to thrive and grow, and will certainly outlive my tenure at Penn. The CISDA Board, where I continue to serve as chair emeritus, is now the go-to liaison point for faculty and meets weekly with the department chair. At one of those meetings, I pitched to departmental leadership a course on academic writing and presentation skills to early-year PhD students. They agreed such a course would be impactful, and the idea has since been successfully implemented as part of the department's written qualifiers.

In addition to my departmental-level work, I served on multiple School of Engineering-wide committees. One of our achievements was a pioneering mental health program at Penn, where a clinical psychologist was hired to conduct listening sessions with students and run regular support groups. As a frequent participant in these sessions, I have benefited and seen other students benefit from having a space to seek and give support.

Lastly, good departmental culture means zero tolerance for harassment or discrimnation. I will not list out the various instances of overt sexism, racism, and harassment I have experienced or heard about during my PhD. Suffice it to say it has been incredibly demoralizing to see poor behaviour tolerated and perpetrators promoted. As a professor, I will fight for justice and equitable treatment for all students and speak up when I see inappropriate behaviour.

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[1] Morgan, et. al. Socioeconomic Roots of Academic Faculty. 2021.