

Diversity Statement

I am passionate about increasing access to computational methods by building interdisciplinary connections. The 'leaky pipeline' metaphor is often invoked to describe the lack of diversity in computational fields, and has been useful for raising awareness of the cultural and systemic factors that contribute to the lack of diversity in computer science. However, I think we should challenge some of the assumptions that are baked into this metaphor: that the flow of talent into tech jobs is a single, unidirectional stream that, once left, cannot be rejoined.

Rather than just patching up the leaks, I would like to create room for porous, complex interactions between computer science and other disciplines. I would like to open up room for people to collaborate and to move flexibly in and out of technical roles at various points in their careers. I believe that increasing the interactions between computer science and other disciplines can be an effective way of opening up more doors for more people.

1 Motivation

My personal focus on diversifying the computer science community by strengthening ties with other disciplines has been shaped by my own zigzagging path. I have had many people open up doors for me at times when I felt like I had fallen out of the pipeline, and my own research career has encompassed social science research, computer science research, and computational social science research.

Although I had taken CS classes since my freshman year, when I enrolled in CS to satisfy the lab science requirement and ended up loving it, I didn't consider pursuing CS after graduation until my junior year, when I realized that the same mathematical tools used to analyze meaning in natural language (type theory and modal logic) could also be applied to programming languages. This was a revelation to me because I saw that I didn't have to choose: I didn't have to give up the mathematical and computational techniques that fascinated me in order to focus on the problems that I cared about. Those skills could be applied to the domain of language and to many other domains as well.

But at many schools, this realization would have come too late. At many schools, I wouldn't have even been able to enroll in the upper-level CS classes that led me to this realization, because the seats would have been reserved for people who had come in as CS majors, people who had always been "in the pipeline". The reason that I am a computer scientist is because the Swarthmore CS department chose to keep its doors open to students from other disciplines, even if they discovered their interest in CS relatively late.

Because of this experience (and the many other times that doors have been held open for me), I am passionate about improving diversity in computer science by building bridges between the departments in which students from diverse backgrounds already feel welcome and the computer science department. Creating space for students from CS-adjacent departments, whether in our classrooms, our reading groups, or our labs, can expand access to computational skills and bring in fresh perspectives to the discipline.

2 Strengthening interdisciplinary ties

While at UMass, I have worked to strengthen the already strong ties between the Linguistics department and the CS department. I have taken classes in the CS department alongside CS graduate students, and have helped CS graduate students in Linguistics classes, as the TA for Cognitive Modeling. I have attended reading groups in the CS department, in particular, the NLP reading group. I have also started a new reading group in the Linguistics department which focuses on neural networks for linguistics.

This reading group has been more successful than I originally imagined. Although designed to run for a single semester, the group has been meeting weekly for over a year. Graduate students from both the Linguistics and CS departments have presented their research, and we have read a variety of papers focused on using linguistic expertise to probe neural networks, using neural networks to contribute to theoretical linguistics, and using linguistically-informed neural networks to solve core NLP problems. The attendance

is evenly split between faculty and students from the Linguistics department and the CS department, and in order to make the group approachable for students from Linguistics with little computational background, we started the group with a tutorial on fundamental concepts in deep learning.

3 Advocating for students

I have also worked within the Linguistics department to mentor students from backgrounds that are under-represented in computer science that are interested in pursuing computing careers. Through working with my undergraduate research assistant, I have come to see how there are both personal and structural solutions to the diversity problem.

My research assistant, Tessa, had no prior experience in computing when they came to college, but is now an excellent programmer. Nonetheless, when they interviewed for a computer science internship this past summer, the team was very reluctant to hire them because they didn't have experience with Unix. Despite having taken half a dozen CS courses at two universities, they had never been taught how to use the command-line, because this was seen as too basic to cover in a computer science class. For lack of this basic bit of knowledge, which could have been covered in a single lecture, Tessa was almost passed over for an opportunity that they ended up excelling at.

There are two lessons that I draw from this. First, it is important to teach the hidden aspects of computing explicitly: if we want to promote a diverse computing community, we cannot make assumptions about our students' backgrounds. Whenever possible, we should work to minimize the gaps between what students are taught and what they are expected to know. This is not to say that classes cannot be rigorous; they can and should be. I try to design classes to start from the very basics, but to increase quickly in difficulty. This is the approach that I took when teaching non-CS majors as the TA for Cognitive Modeling, and I saw that it allowed good students from all backgrounds to excel.

Second, as individuals, we should look out for these gaps and work to remedy them. As a graduate student, I wasn't able to change the way introductory CS classes were taught. But I was able to advocate for Tessa and help them learn command-line basics before the start of their internship.

Progress in diversity comes about through a combination of personal and structural changes. As CS community members, we can work to build ties with other departments and to welcome their students into the CS community. As instructors, we can advocate for teaching practices that are inclusive. As mentors, supervisors, and peers, we can help individuals who have not been well-served by our community to strengthen their skills and find ways of using the insights of computer science to address the problems that they are passionate about.

4 Summary

I am strongly committed to improving diversity in computer science. I aim to broaden access to computation methods in the following ways: (1) unveiling the 'hidden curriculum' in CS that disadvantages students from non-traditional backgrounds; (2) building interdisciplinary connections to help funnel students into computer science at various points in their careers; and (3) teaching classes that transfer knowledge between computer science and the social sciences.