Teaching Statement

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I enjoy teaching and have actively sought out opportunities to teach at various levels as a graduate student. I have taught five undergraduate courses as a standalone instructor, with approximately forty students in each course, and have been a teaching assistant for seven courses, four of which were graduate level courses. When I first started teaching I was driven by a passion to see the "Aha! moment" in my students, that expression which signifies an understanding of the underlying concepts that transcend a particular problem instance. It seemed to me that this would be the greatest joy that teaching could offer. However, as the experience of many semesters has taught me, that moment is only one thread in a rich tapestry. Teaching truly is an endeavor where the journey is the reward.

As an educator, my goal is to help students gain a deep technical understanding of the course material, and an overall appreciation and love for the subject. I am constantly collecting teaching strategies to effectively achieve these aims in student learning. While I continue to learn and assimilate best practices, my current view is that engagement and encouragement are two key components in furthering student success. Engagement can take many forms, but the core principle is that the student must be actively involved in the learning process to truly benefit from the course material. Encouragement helps create an inclusive environment that is conducive to learning and inspires students to put in the effort required to succeed. Engagement and encouragement often go hand-in-hand and reinforce each other, creating a virtuous cycle.

As a standalone instructor for an introductory Algebra course, that was required as a part of many non-technical majors, I often had students who had internalized a strong negative feeling towards mathematics. Such students felt that the university was forcing them to "waste" time on a subject that they did not enjoy or wish to pursue. My goal was to create an engaging class to effectively reach out to such students. At the beginning of the semester I would collect a list of all the majors that were represented in my class. I would then actively collect real-world examples from these fields for concepts in my curriculum, and include them in examples and tests. Applying abstract mathematical concepts to a field that they understood and liked never failed to pique the students' interest.

To help students overcome their lack of confidence, I used problem sessions to systematically encourage participation. I would solve a given problem up to a certain point, and then solicit ideas from the class for next steps. When I would have two or three suggestions, I would divide the board into sections and proceed with each suggestion until it reached the solution or a dead-end. A fundamental aspect of this approach is to treat each suggestion with respect, and in some cases even provide situations where the suggestion might have worked if it is not the solution to the problem at hand. This procedure encouraged students to vocalize their ideas and created a sense of comfort with being "wrong" because students could see why and how things were working and not just the correct set of steps that magically solved a problem. I could see the approach work as at the start of the semester I would often need to give some hints to get multiple suggestions, but by the mid-term, I would have multiple volunteers for each problem.

I am always mindful of ways to tie in cutting-edge research with course material, which creates an opportunity to spark a deeper curiosity among the students. Furthermore, coverage of course material is always accompanied by fun "extra-credit" opportunities that are designed to spur further exploration of the subject. For example, in a course on logic,

students are encouraged to find a logical fallacy in a film or book of their choice; in a course on automated reasoning they were encouraged to estimate the dollar-value of bugs fixed by a popular driver verification tool. Overall, I use regular tests and exams to gauge mastery of technical material, and in-class participation to measure if I am succeeding in kindling a deeper interest in the subject. I am often delighted to find that a significant percentage of my students are considering optional higher level courses.

My desire to promote diversity in STEM fields has led me to seek out opportunities to participate in outreach programs, and work with students from underrepresented groups. As an undergraduate student, I volunteered with an organization that provided free small-group tutoring to underprivileged high school children. After receiving my Masters degree in India, I volunteered as a teaching assistant at Ambedkar University Delhi, a liberal arts college with a strong focus on social justice, loosely inspired by HBCU's in the US. These experiences had a profound impact on me, and educated me with respect to the systemic barriers that students from underserved communities have to overcome on a regular basis. Consequently, I pay particular attention to the progress of students from underrepresented groups and ensure that they have access to the tools necessary to succeed, including encouraging them to attend office hours, making sure they have an opportunity to participate in class discussions, and giving written encouragement on graded work. This attention regularly leads to a significant improvement in their performance and confidence.

Advising. As a PhD student in Computer Science, I have co-supervised six undergraduate and masters students with my advisor. These students worked on their own projects, for which I was the primary mentor with high-level support from my advisor. These projects were designed to give students an introduction to research. The students had different backgrounds and tastes, which made me regularly modify my style of mentoring. It was very satisfying to see that by the end of their projects, they had produced research papers or reports. They were no longer hesitant to give presentations, but were instead excited about presenting their posters in the department's undergraduate research showcase events. The success of this approach is further evidenced by the fact that five of the students have continued to work in research positions.

Teaching Interests. I look forward to teaching computing courses at all levels. My experiences as a mathematics and computer science graduate student have prepared me well to design and teach a wide variety of courses including:

- Core introductory and intermediate courses, including programming, data structures, and algorithms.
- Theoretical courses, such as logic, theory of computation, and discrete math.
- Courses in my areas of expertise: artificial intelligence, machine learning, and programming languages.
- Upper-level electives, including reinforcement learning, autonomous robotics, program synthesis, automated reasoning, and verification.

I have been fortunate to have had amazing teachers and mentors throughout my academic career. I hope to pay-it-forward by learning from my and others' experiences and pursuing best practices in creating an inclusive and intellectually stimulating classroom and lab.