Teaching and Mentoring Statement

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I have a great love for teaching. I have pursued teaching opportunities during my time at Penn, in particular teaching an undergraduate course (CIS198) this semester, and being on track to complete a teaching certificate from the Center for Teaching and Learning (CTL) (~~I will complete the last step for the certificate later this semester~~). This core value for teaching has also been a primary factor in my decision to pursue an academic career following graduate school. I want to contribute to a future where computer science and STEM education are better accessible to all, particularly underrepresented communities and at the early (pre-college) level.

My primary current teaching project at Penn is as the sole instructor for the introductory programming class CIS198, Rust Programming. I took this opportunity on top of the usual teaching load for CIS graduate students (2 semesters of TAing), because I wanted to expand on my teaching experience and gain a better appreciation for programming through teaching it. As it is a relatively new course and my first time teaching it, the workload is substantial: in a typical week, I spend one work day preparing lecture materials and the homework assignments. Besides teaching Rust Programming at Penn, I spent a fruitful year of TAing under Benjamin Pierce for CIS500 (Software Foundations) and under Sampath Kannan for CIS511 (Theory of Computation). I was praised for my dedication as a TA. For example, I was usually one of the most active in providing detailed answers to questions on Piazza. Additionally, I spent hours preparing homework and exam questions, particularly for CIS500, sometimes staying up late the night before an exam to help proofread.

> It doesn't sound that substantial put that way. Maybe just say more matter of factly the work involved. Like it is new, my first time teaching and in a typical week I do this

In the course of teaching CIS198, I have taken the opportunity to reflect on my role as a mentor and especially what I can do to improve my teaching. To evaluate myself objectively on these questions, I met with a Center for Teaching and Learning (CTL) fellow one-on-one, who observed my teaching and identified ways I could improve. For example, we identified together that starting each lecture with an outline or roadmap can help orient students and make the lesson easier to follow; since then, I have tried to incorporate a clear, accurate lesson plan in every lecture. I also attended and actively engaged in several workshops from CTL: what particularly stands out to me is the Fall 2020 online mini-course, taught by professor Cathy Turner, primarily due to the engaging way in which she ran the mini-course to facilitate individual interactions. I found that, more than any prescribed material, actively engaging with the other students in talking about our thoughts about teaching was far more effective in organizing my concrete teaching plans.

Finally, I want to discuss my thoughts on accessibility and equality in STEM education, first with an illustrative experience and then with my broader goals. When I was TAing for CIS500, it had been decided that we would grade the exam differently than in previous years, by penalizing guessing. I was concerned about the effect that penalizing guessing has been shown to have on women and minority students. The research consensus for why this occurs is that taking points off for guessing penalizes underconfidence, because underconfident students (particularly women, despite being equally competent with their male peers) will then not guess as readily, even when they had a good idea of what the answer might be. I dug through some research findings and sent these to the professor, who responded by reversing the planned change in policy. I took from this experience two things: first, I believe it is critical to have a humble and research-based approach to teaching. We must listen to our peers in education and gender and minority studies who have shown, through studies, that implicit biases and gendered effects such as this one can occur. Second, I think that the underlying causes of such disadvantages need to be addressed, particularly at the level of equal access to education at a pre-college level. I have a strong track record on this from my time as an undergraduate, when I was involved in several STEM teaching outreach programs at the pre-college level. In particular, I taught a local Math Circle on Saturdays, a summer math day camp, and was a counselor at the summer math program MathPath for middle school-aged students for two years. These experiences shaped me as well, and if I am fortunate to get a position as an early professor after I graduate, I would love to organize a computer science education camp for high schoolers locally at my next institution, wherever that may be.

All teaching begins with a question: what do we want to accomplish and pass on to future generations of humans? For me, that question is not about academics, but about fundamental issues in society such as

societal inequalities and, particularly in this age of technology, how our teaching affects the world morally and ethically. I believe that strong academic research programs cannot exist without a strong commitment to mentoring, both at the undergraduate and graduate levels, as well as through pre-college outreach programs. I hope to live these values in my future career as an academic.