

Teaching Statement

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It is my firm belief that teaching and research are mutually beneficial. Communicating concepts to students is analogous to communicating research findings to the academic community. Research can be used to cast old topics in a new light for students. The deeper understanding required to teach can reveal new insights and direction for future research. I believe that teaching is an essential, and for me enjoyable, companion to conducting research. This connection is one of the main reasons I have chosen to pursue a career in academia.

I believe that hands on experience with realistic problems is the best tool to prepare students for success. While lecturing has its place in the educational process, I believe that engaging students in discussions in the classroom and the lab are key components for student success at both the graduate and undergraduate level. This is especially true in Computer Science, where implementation and experimentation is crucial to complete mastery of abstract topics. For example, a student taking a graduate level algorithms course (for which I was the Teaching Assistant) was struggling to understand properties and devise algorithms for specific operations on max-heaps. She was focused solely on her notes and reading, but I encouraged and then helped her to implement the data structure. By experimenting with different inputs and algorithms, the student was able to construct efficient algorithms for various operations, and was able to verify the results through further experimentation.

In my experience, success as a graduate student requires another kind of laboratory setting. Specifically, a strong community and a collaborative lab culture in which students are treated as mature researchers is needed. As a Ph.D. student, my growth into an independent researcher benefited from conversations with other students both within and outside my discipline. These conversations helped me make connections between security, biology, and sociology. As a faculty member, I will cultivate an interdisciplinary culture that mirrors the academic community at large, where graduate students frequently discuss, challenge, and contribute to each others research.

I have a long history teaching across a variety of subjects in the sciences. My first experience was acting as a Teaching Assistant for *College Algebra* my sophomore year as an undergraduate. My primary responsibility was to conduct weekly ‘laboratory’ sessions in which I would help students understand material. My abilities in the Mathematics department, lead to me being asked to assist in teaching courses in Computer Science and Electrical Engineering. During this time, I conducted laboratory sessions, helped create and grade assignments, and often lectured. Aside from these official positions, because of my ability communicate with students, I was often asked by faculty to cover lectures and office hours.

In graduate school, I was a Teaching Assistant for several courses offered by the Department of Sociology. For example, in *Research Methods in Sociology*, I guided undergraduates to create capstone quantitative projects. This meant helping them find or collect reliable data and apply appropriate statistical techniques to draw meaningful conclusions. I found that often students only fully understood statistical tests and modeling after they had applied those techniques to their own

data. In the Computer Science department, I was a Teaching Assistant for the graduate level Data Structures and Algorithms course.

As I transitioned from a Teaching Assistant to a Research Assistant, I often volunteered to assist my advisor and other faculty in their teaching duties. As an informal Teaching Assistant, I've happily provided substitute lectures in graduate level *Theory of Computation* and *Complex Adaptive Systems* courses. I have also created and graded original assignments in *Introduction to Data Analysis* and *Complex Adaptive Systems* courses.

I have found that creating assignments is beneficial to my research program. In several instances, I created these assignments using data and small problems related to my own research. Tailoring recent research into class projects often clarifies important research findings and illuminates new directions for future research. Providing new challenges based on recent research is also more motivating than having students work on well worn problems. For example, for an Introduction to Data Analysis class, I created an assignment using data based on my research investigating spam interventions. Using this data source, aroused the interest of several security focused students in the class, motivating them to do additional research into the problem.

Given my background in Computer Engineering, Statistics and Computer Science, I will be comfortable teaching any undergraduate class contained in the computer science curriculum. My mathematical background and experience would allow me to effectively teach graduate theory courses. Closer to my research, I would prefer to teach graduate level security, machine learning, and data-analysis courses. I look forward to the challenges of teaching these courses.