

Teaching Statement for Erin Chambers

My first summer in graduate school, I was an instructor for a sophomore level discrete math and algorithms class. I quickly discovered how exciting it was to interact with students, whether giving a lecture or holding office hours. Very little can compare with the rush that comes when a student suddenly comprehends a difficult topic or begins to appreciate the beauty of a particular theorem or technique. Based on my experiences with teaching, I have developed a teaching philosophy which emphasizes collaborative learning; my goal is to teach my students valuable communication skills as well as the ability to think critically about modeling real world problems.

My research and teaching focus is theoretical computer science. Algorithms provide an elegant, mathematical way to approach real world problems, but they are challenging to teach. There is no list of items to memorize; rather, students must learn how to formally model problems and how to effectively and clearly give solutions to those problems. This type of critical thinking is the most essential tool for problem solving in computer science, and it is also one of the most engaging to teach. Expressing algorithms and proofs in a coherent manner is a learned skill, and my primary goal is to help my students develop the tools necessary for this skill.

My teaching methods and philosophy have developed both through my experiences as a student and through student feedback in course evaluations. All too often, the stereotypical image of a computer scientist is that of a lone programmer coding in a basement, which alienates many talented people from the field. My own experience in a large research department has been very far from that stereotype; collaborative learning has been a key element of my education and my teaching. While a graduate student, I have had considerable experience with teaching. I have been a course instructor twice, as well as serving as a teaching assistant twice; I am also scheduled to teach the freshman level discrete math class in the spring, a course whose enrollment is typically 100 to 150 students.

Collaborative learning takes many forms in my classes. For example, in the senior level algorithms course, we conduct headbanging sessions. The students work together in small groups on problems which are selected to be a natural bridge between material in lecture and the much harder homework problems. These sessions are also fun and challenging for me as the instructor, since I am able to wander between groups and give small hints to help with the material. Another example occurs in oral homeworks. Students work in groups of 2-3 people, and they alternate turning in written solutions and presenting solutions orally to a TA. This gives me a great chance to get to know all the students, as well as immediate feedback about their comprehension of the material; the students gain practice communicating technical material and get instant corrections and explanations of their mistakes. From student feedback, I have realized how beneficial oral homeworks are in a curriculum that emphasizes programming or written homeworks. For example, students have come back later and told me how helpful the experience was for job interviews.

My goal in teaching is to show my students how excited I am about the material; in my experience, this excitement does more to get them past the technical difficulties than anything else. I strive to be approachable and fair, so that students feel free to ask questions and come visit office hours to talk about problems. My students have commented that I am “helpful and friendly”, have a “very good understanding of the material”, and am “extremely knowledgeable of topic”.

I am constantly striving to identify and address the weaknesses in my teaching. My extensive and detailed course rules, which I hand out in class and consistently abide by, are a direct result of conflicts with students in the past where I made exceptions once and then was forced to do so again and again in the name of fairness. Another problem for me is pacing the lecture appropriately, as I tend to become excited about the material and move very quickly. To address this issue, I have eliminated power point presentations, although they are the norm at my school, and use either the

white board or overhead, where I write everything as I go in order to pace my lecture.

As a faculty member, I hope to be involved in designing course materials for the theory curriculum. I would like to teach the undergraduate courses in discrete math and algorithms design, as well as data structures and introductory programming courses. I hope to use these courses to find strong undergraduates whom I can incorporate into my research group. I would also be very interested in teaching advanced topics courses in computational topology, computational geometry, and data structure design and analysis.

In addition to teaching, I feel that department service is an essential part of being an educator. Along with collaborators, I conducted a study of student attitudes in the computer science department at UIUC, which included interviewing over twenty-five students and faculty and surveying 119 graduates and undergraduates in the computer science department. Based on the results, we formulated a list of suggested strategies to improve both recruitment and retention, some of which are being implemented in the department. I have also served on the student advisory committee and the graduate admissions committee, and have organized many panels about student life, research, and advising for undergraduate and graduate students.

I also feel that mentoring is one of the most positive experiences that a student can gain in school. I participate in many forms of mentoring. I helped start the Women in Computer Science (WCS) club; through WCS, I have helped in outreach, mentoring, and many other activities. I participated in a Women In Engineering mentoring class for 3 years, as both a freshman mentee and a undergraduate and graduate student mentor to younger students. I have helped with undergraduate and graduate student advising for almost every semester I have been a student here.

To me, being an educator means having many roles: teacher, researcher, mentor. Being an excellent teacher is one of my primary goals, and I feel that my experiences will make me an extremely effective teacher in a university environment. I will also contribute to my future department, in everything from service activities to mentoring for students and other faculty.