Teaching Statement — Jadrian Miles

Helping others learn is a core part of who I am. My love of teaching has led me to seek out a wide variety of teaching opportunities over the past decade. In addition to TAing in my undergraduate and graduate years, leading workshops, and giving talks, I have also done less-formal tutoring, writing, and outreach to a variety of audiences, from children to my graduate colleagues. These experiences taught me a lot about how people learn, and inspired me to study formal theories of education and pedagogy. In my everyday life, I often consider how my experiences apply to the practice of teaching and to the social role of education.

In particular, I view computer science education as a social justice issue. Since technology now has such bearing on public life, from economic activity to personal expression, computational knowledge is essential for modern civic empowerment. I believe that computer scientists therefore have the responsibility to educate as diverse a range of students as possible. I would like to help create a world in which every individual is capable of engaging with technology knowledgeably, critically, and creatively.

Volunteering at New Urban Arts, a non-profit art studio for inner-city high-school students, was a formative teaching experience. I mentored students at the studio one-on-one in subjects like math and physics for two years. In this role I helped a variety of students, many of whom were intimidated by math and doubted their abilities, to learn better study habits, to improve their test scores, and to see technical subjects as more approachable. I benefited from this experience as well: I learned important lessons about teaching, and I also met other passionate educators there, who set me on the path of studying the pedagogical theories of Eleanor Duckworth, Paulo Freire, and John Dewey.

I work to improve constantly as an educator through my experiences and study. They have shown me that students learn best when it is clear to them that their teacher respects them, and when they have a sense of agency over the progression of their learning process. I have also learned how to notice the ways individual students learn, adapt to them, and explain abstract topics in multiple ways. In addition I have learned more concrete tactics: to lead with examples before delving into specific or abstract topics; to encourage student autonomy by easing away from lecturing and toward facilitation.

I recently had the opportunity to put these lessons into practice when I led a workshop on regular expressions and web scraping for a classroom of Digital Humanities researchers and librarians, all of whom were programming novices. I began by demonstrating a couple of example Python scripts I had written. I then stepped through some simple regular expressions, and had the students follow along on their own computers. I asked them to explain the results or make predictions, and returned occasionally to the source code of the example scripts, where the concepts we were learning were applied in context. They asked me questions when they got confused or noticed something curious. In this way we worked organically and collaboratively through the basics of regular expressions. After a while I took a poll of the class, and we decided to move on to web scraping. The feedback I and the conference organizers received was positive and encouraging; though the workshop was only two hours long, several participants told me they planned to study these topics more on their own.

I am very excited to take on a new challenge this Spring, when I will teach the undergraduate course “Introduction to Computation for the Humanities and Social Sciences” in my department. Each of the twenty-five students in the class will learn basic programming concepts and computational problem-solving skills, and demonstrate them by designing three independent
projects. Each project will involve finding data, writing programs, and interpreting the results. The students will learn how to pose questions in a manner amenable to computational investigation, and also how to teach themselves independently about computational concepts. I hope that in turn the students will discover new realms of questions for future investigation that they would not have otherwise asked.

This course is a direct expression of my desire to share computer science skills with a diverse population. In previous years, this course has attracted students from more than two dozen departments outside the sciences, and more than half of them were women. The students in my class will benefit professionally from learning competence and independence in the design of computational tools. The world will benefit, too, from having a few more people in it who know their own fields of interest as well as the art of computational problem solving. And some of the students, I hope, will discover a passion for programming or even deeper subjects in computer science, and choose to take more CS classes.

During my PhD I have also mentored more advanced students. I have helped several fellow graduate students critique and refine their research, presentation technique, and writing. I also mentored an undergraduate student, Nathan Malkin, in his work with my research group for one year. I supported him as he analyzed and implemented various software tools for medical image processing, meeting periodically and occasionally coding together.

It is my hope to expand on these experiences in the future to share my passions with advanced students, through both mentoring and teaching. My dissertation work in medical imaging is a synthesis of my interests in mathematical modeling, statistics, numerical optimization, graphics, and computer vision. Each of these topics is worthy of study on its own, and I would love to design courses that cover them. Medical imaging is also especially exciting because of its interdisciplinarity; the computer scientist sits in the middle of a conceptual pipeline that begins at the MRI scanner with physicists and engineers, and ends in the laboratory with brain scientists and doctors. I think that a seminar course reviewing important concepts and contemporary literature at all stages of this pipeline could be very engaging for advanced students.

In conclusion, I believe strongly in the philosophy of the liberal arts: that confidence and competence in a wide variety of fields enriches the individual student and the world at large. Computer science in particular stands to benefit from a diverse population learning its principles and practices. I believe all students, from novice to specialist, require and deserve respectful, collaborative, and energetic guidance from their teachers. Across the board, the core value of good teaching remains the same to me: empower students, change the world.