Teaching Statement

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The primary goal of universities is to train young people to be productive, well-rounded members of society. For a professor, this is a tremendous responsibility both to society and to the students themselves, for whom professors serve as influential figures in their social and professional development. It is also an exciting opportunity, for teaching and mentoring allows us to continually improve, learn, and impart our knowledge on the next generation of computer scientists. It is an opportunity that I look forward to grasping with both hands.

Teaching

I have always enjoyed teaching. In 2008, before going to college, I spent a year as a volunteer teacher in a remote part of Vanuatu, teaching English and Science to middle school aged students. In 2011, while an undergraduate at the University of Auckland, New Zealand, I co-founded Ardent Education, a private tutoring company for high school students taking both local and international examinations. While involved with Ardent, I completed over 150 hours of one-on-one or small group tutoring.

From my interaction with students, I believe that the most important technique when teaching new concepts, especially mathematical concepts, is to go to great lengths to convey the essential intuition without getting bogged down in the mathematical detail. Of course, once the intuition is established, the details must be introduced, preferably with an illustration of how things can go wrong when relying on intuition alone. This is an approach that I utilized when I twice served as teaching assistant (TA) for the undergraduate Discrete Mathematics class at Duke. The primary focus of the class is to learn to execute simple proofs; for most students, this is the first class in which they are expected to do so. My duties involved significant interaction with students in the form of teaching weekly recitation sections and holding office hours, in addition to grading and creating homeworks and managing undergraduate TAs.

For my performance as TA, I was awarded a Duke CS Outstanding TA award.

I also helped to create and served as TA for a one-off class taught by my advisor, Vince Conitzer, called Crowdsourcing Societal Tradeoffs. This was a deliberately interdisciplinary class, including both graduate and undergraduate students, based on an AAMAS Blue Sky paper that we co-authored [1]. The goal of the class was to make progress on the problem of crowdsourcing specific tradeoffs for undesirable activities (e.g., producing how many bags of trash is as bad as clearing an acre of forest?). In addition to usual TA duties, my role in this course was more creative, including helping to design the high-level structure of the course and initiating and responding to unstructured discussion online and in the classroom. Being involved with the class was both enjoyable and productive, as we ended up publishing a followup paper [2] resulting from the thinking that we, as instructors, had done about the motivating problem.

I feel that there is immense value in students completing independent projects, and I plan to incorporate them into as many of my courses as possible. Observing students in the Societal Tradeoffs class, it was great to see the extra enthusiasm they displayed when they were able to apply tools from the class, supplemented with their own research, to a topic that they felt some ownership of. Independent projects teach students valuable lessons, like teamwork, research, and presentation skills, as well as providing them with tangible output like a writeup and/or a piece of code they can put on GitHub. As a prospective academic, it naturally excites me when students decide to further their academic careers in graduate school, but I accept that many students choose to go into industry, for which having a repository of code online is crucial. I also found the project component of my graduate classes to be both constructive and fun, providing an opportunity to conduct low overhead research with the possibility of continuing it further (indeed, one of my class projects even turned into a publication [3]).

Finally, in terms of specific courses, I would naturally be excited to teach any course related to economics and computation. A course that I would particularly like to teach would be a general course in computational (micro)economics with an emphasis on applying major ideas from the field to lectures, homeworks, and tests. I would have students participate in various economic mechanisms, such as multi-choice quizzes where students answer with probabilistic degrees of certainty and are scored by proper scoring rule, peer prediction and prediction market mechanisms where payments are
made with (small amounts of) bonus points, and homeworks where students play games in a laboratory-type setting online. Many of these mechanisms would teach students about cutting edge advances in the field of algorithmic game theory, and actually participating in them would force students to think critically about them, from both the view of the designer (the perspective provided by class lectures) and the participant (from participating in the mechanism themselves).

I would also be happy to teach courses in discrete mathematics, artificial intelligence, algorithms, and data structures.

Advising

As part of our work on societal tradeoffs, during Spring 2017 I co-advised an undergraduate freshman student’s independent study, with the goal of creating a website to implement the tradeoffs algorithm from our previous work [2], ultimately achieving a skeleton site. My role included helping the student understand the necessary mathematics to implement the algorithm, discussing design choices for the website, and making sure that the project continued to move forward.

My own philosophy to advising has been guided not only by my experience as an advisor but also by the set of excellent advisors and mentors that I have had throughout my academic career so far, as a Ph.D. student, undergraduate student, and research intern in industry. In my opinion, a good advisor fulfills the role of manager, collaborator, and friend. Manager, to make sure the student remains on track with their research projects and program deadlines; collaborator, to assist them in the process of actually doing research; and friend, so that the student feels able to discuss any personal or professional issues that they need to.

I will also teach my students that research does not finish once the theorem is proven. Motivating and selling the work in papers and talks is just as important. To this end, I will encourage students to submit papers early in their careers, and take every opportunity to give a talk. I will assist them in becoming active members of the community by having them review papers, attend conferences, and by introducing them to other researchers as widely as possible.

References

