Omid Abari

Teaching Statement

My growing passion for teaching and interacting with students has motivated me to pursue a career in academics. This passion was sparked through my experience as a teaching assistant and strengthened through mentoring undergraduate and junior graduate students.

Teaching: My first teaching experience was in the third year of my undergraduate studies. I volunteered as a lab assistant for an electronics course. I was responsible for answering students’ questions during the lab sessions. I consistently received positive feedback from students, motivating me to voluntarily tutor and help them outside regular class hours. Word spread, and by the end of the semester I was tutoring more than 20 students. According to the instructor of the course, the students I tutored had outstanding performance on their final exams. The instructor was so impressed that he decided to post my name and email on the course website as a tutor for the subsequent semesters. I enjoyed this teaching experience tremendously and quickly sought more opportunities to teach. While the engineering departments at Carleton did not permit undergraduates to serve as teaching assistants, the math department made an exception for some senior students. I applied and was accepted as the TA for two math courses during summer and winter, responsible for giving weekly lectures and grading.

During my PhD at MIT, I served as a teaching assistant for the Computer Networks graduate course (6.829). The class had 45 graduate and undergraduate students with diverse technical backgrounds. I was responsible for delivering tutorials. I developed new material for these tutorials, and also wrote new problem sets and hands-on assignments. Through my teaching experiences, I have realized the effectiveness of engaging students in class by having them participate. My approach is to ask questions, give demos, and have a sense of humor during the lectures. For example, during my tutorials when I pose a problem, I first encourage students to suggest their own solutions before I provide my explanation or solution. Not only does this get the students involved, but it also encourages them to think outside of the box. I am often impressed by their proposed solutions and frequently encourage them to try their solution at the board. I also find that demos are extremely helpful in exciting students and holding their attention. For example, one time when I explained digital modulation schemes and the impact of noise on the modulation, I used a MATLAB demo where I showed the constellations of both the transmitted and the received signals in real time. I asked students what they expected to see if I added noise to the channel, then gave the relevant equations before revealing the impact of noise in the demo. Through my teaching experience, I learned that students might have very different learning styles, thus it is necessary to explain the same concepts in a variety of ways to accommodate everyone. For example, students with strong theory backgrounds were able to comprehend wireless systems more quickly when I explained wireless fundamentals and device behaviors using equations and mathematical models. On the other hand, students with circuit backgrounds were able to digest the material more easily when I used schematics and block diagrams to explain. After the course, I was highly rated (6.4/7) in MIT’s anonymous course evaluation, the highest rating among TAs serving this course in the past four years. In the anonymous comments from the students, I was described as a “very knowledgeable” TA who was “always available for students with questions” and “willing to go through the problems in detail and be helpful.” It was extremely gratifying for me to see that I could help students to learn and enjoy the course material.

Mentoring: As a senior graduate student, I was fortunate to work with several undergraduate and junior graduate students including Austin Duffield, Michael Rodriguez, and Anubhav Jain. As a mentor, I focused on framing the problem very clearly, but at the same time always providing a lot of freedom to try different approaches and devise creative solutions. When Austin and Anubhav joined our group, I was developing a wireless sensor for smart cities. I worked very closely with them to define subsets of the project which were aligned with their interests, and was able to split the project into hardware and network components. Even though they were working on the same device, clearly delineating the scope of their separate problems made it possible for them to pursue independent designs. Furthermore, they were able to brainstorm together and to develop the interface between their parts. This culminated in greater excitement for them when they came together to finish the system, seeing where each of them fit in the scope of the bigger project. I was always available throughout the project to work through any challenges, and ultimately the sensor was completed, fabricated, and successfully deployed on street poles in Cambridge. My collaborations with these students have resulted in research papers at NSDI’17 and HotNets’16.
Courses I can teach: Given my research and academic background, I am enthusiastic and qualified to teach graduate courses on computer networking, wireless systems, and embedded systems. I am also qualified to teach undergraduate courses in computer systems, computer architecture, circuits, signals and systems, and algorithms. Beyond these courses, I would like to use my research expertise to build a new hands-on course on software-hardware systems, where students can learn how to develop IoT solutions for emerging applications such as smart cities, smart homes, and gaming. Lectures and labs would cover a wide array of tools and theory from the application layer down to the hardware layer. Over the course of a semester, students would design and implement an IoT system that incorporates both hardware and software solutions.

In conclusion, I believe teaching is a great opportunity to train the next generation of researchers and engineers, as well as to solidify and pass on our understanding of a field. I also believe this opportunity comes with significant responsibility: providing the right guidance, mentorship, and resources to the students to help them be successful in their educations and future careers. I really enjoyed my past teaching and mentoring experiences. I am very excited to expand upon and enhance my work with students going forward.