Teaching Statement

Monia Ghobadi

My primary reason for choosing an academic career at a university is to have the opportunity to work with students. I relish the opportunity to teach and mentor students, I am inspired by their limitless energy, and I find it rewarding to help them grow into independent researchers. I look forward to making teaching a significant part of my career, from sparking students’ interest in introductory courses to advising students on their own research.

**Teaching Plans.** My broad academic background equips me to teach a range of courses. I look forward to teaching undergraduate courses on introductory computer science, systems and networking, operating systems, digital communications, and algorithms. At the graduate level, I would be excited to teach more advanced topics, such as cloud computing, data center networking, network architecture, optical networks, distributed systems, and hardware-software co-design.

Regardless of the level or subject matter, my teaching is driven by my passion to inspire curiosity and provoke enlightenment. I have the ability to make complex materials accessible at many levels by framing lectures around fundamental concepts and intuitive explanations. As a teaching approach, I am a strong advocate of learning by doing. I believe that the best way to learn a complex subject is through hands-on experience; I plan to give students plenty of opportunities to do so by designing carefully crafted class projects.

One of my goals as an educator is to encourage integrated research between Computer Science and Electrical Engineering students. I believe in increasing dialogue across disciplines, and I enjoy designing new courses to encourage interactions. For example, by teaching CS concepts to EE students, I would extend their understanding of software abstractions and limitations, possibly opening up opportunities for new hardware designs. Similarly, teaching EE concepts to CS students would foster their creation of radical system designs by enabling them to expand their vision beyond software.

I also look forward to teaching courses to non-major students, to help them learn about the computer networks and software around them. As online services are an integral part of today’s society, computer science concepts—be they wireless networks, cloud computing concepts, or data science—deeply impact modern life. Creating a course on these topics for non-majors represents a great opportunity to reach a wider audience with relevant technical concepts and to have a broader social impact.

**Teaching Experiences.** My main teaching experiences are from serving as a teaching assistant for the Computer Networks course (CSC458/2209) at University of Toronto; I held weekly labs and office hours, managed a bulletin board, and graded coding assignments and exams. This course is designed such that it matches Stanford University’s Computer Networks (CS244a) course with the same coding assignments using the Virtual Network System. My favorite part of the course was teaching networking concepts through programming. The first programming assignment was building a fully functional virtual router in C, and the second was implementing a TCP-like transport protocol. This focus on teaching via programming helped students understand the core concepts, engaged them in the subject, and provided them with practical system building experience. The students had different levels of coding experiences and as the lead TA, I made sure everyone could participate in the assignments, as I believe involvement leads to motivation. I was enthusiastic about the material and kept the labs and the bulletin board highly interactive. Both my students and I enjoyed this approach. I remained the lead TA for this course for three semesters.

One of my most memorable experiences as a graduate student was co-organizing the Toronto Networking Contest. We asked the students registered in both graduate and undergraduate networking courses, as well as members of the systems and networking lab, to write a program optimizing the download time of a series of files from a server. The idea was to encourage students to learn about the best tools and operating system tricks to accelerate the downloads, but the students took it to another level by optimizing both their clients’ hardware and software. To add to the excitement, we built an online dashboard that showed the download speeds for each team in real-time during the contest. This was a rewarding experience; it created a unique partnership between students, organizers, and the rest of the systems and networking lab. Students later reported that the contest was one of the highlights of the course.
Graduate courses offer an in-depth look at a topic and are an excellent vehicle for initiating research. I believe in incorporating collaborative research and discussions of research results into advanced courses that I teach. For instance, I served as a teaching assistant for University of Toronto’s graduate course on Packet Switch and Network Architectures (CSC2209). The core parts of the course were supplemented with articles and discussions of recent technologies to illustrate research opportunities for students. The course inspired several students to team up with our research group, some of whom ultimately published papers at networking conferences. I used the same approach in Spring 2017, when I guest taught the graduate-level Advanced Topics in Networking class at Stanford University (CS244). I delivered a lecture on data centers, incorporating the fundamental concepts from two papers the students had read. I showed a hardware-based demo and encouraged the students to rethink the data center network architectures and concepts in an interactive style. The feedback at the end of the semester was very positive, for example: “The only female guest lecturer also happened to be the best. I hope she gets invited back next year.”

Mentoring. During my time at Microsoft Research and Google, I built and sustained relationships with several graduate students including Mina Tahmasbi Arashloo (Princeton University), Rachee Singh (University of Massachusetts Amherst), Danyang Zhuo (University of Washington), Arpit Gupta (Princeton University), Radhika Mittal (University of California Berkeley), Denis Pankratov (University of Chicago), and Nanxi Kang (Princeton University). All of these relationships started with their summer internships at Google or Microsoft Research and for several of the students, the collaboration is continuing as part of their PhD work. Many of my publications over the past four years have been co-authored with these students. In my mentoring, I hope to foster independence in students, giving them the confidence that they can solve problems. I consider working with students both an opportunity and a responsibility. I am particularly looking forward to long-term collaborations by merging my ideas with those of my students.