

Teaching Statement

Junchen Jiang

The opportunity to work with students is an important motivation for me to pursue academia. I have enjoyed my teaching and mentoring experience in CMU, and I am looking forward to working with both undergraduate and graduate students in the future.

Teaching: My teaching experience comes from the opportunities of being a teaching assistant for networking courses in both graduate and undergraduate levels in CMU. I was the only TA for the graduate networking course (CMU CS 15-744) taught by Professor Srinivasan Seshan. I gave three full lectures on TCP, DNS, Content Delivery Networks, and Internet video streaming. I also designed all problem sets and exam questions, and helped supervised research projects for the entire class. In the undergraduate networking course (CMU CS 15-441) taught by Professor Peter Steenkiste, I gave recitations for 40 students in weekly recitation sections. I also designed problem sets, exam questions, and a class project that asked student to implement TCP congestion control mechanisms in the setting of a peer-to-peer system. I also helped supervised the course projects for the graduate distributed systems and OS course (CMU CS 15-712) taught by Professor Hui Zhang. From these experiences, I got a hands-on exposure to the work required to teach at both graduate and undergraduate levels.

Teaching approaches: Overall, I strongly believe in the importance of keeping students engaged. I believe teaching is an excellent example of attention economy which posits attention as a scarce resource. Students often take many courses, so it is critical to always keep students interested in the concepts they are learning, by conveying why the concepts matter to computer networks, computer science and the society. For example, to teach the concept of DNS service, I complemented the normal use of DNS in hostname translation with how DNS was also exploited by governments to perform censorship. I also believe in providing hands-on learning experience that help students thoroughly understand the many concepts whose key ideas lie in the engineering principles. For example, in the project I designed for undergraduate student, students were asked to implement a TCP-like protocol in a different application, which encouraged them to understand and generalize the key ideas in TCP. Without exception, students found the “holes” in their knowledge, and had better understanding on TCP after the project.

Courses I can teach: As a new faculty member, I would be excited to teach undergraduate and graduate courses on networking and distributed systems, as well as introductory computer science. Additionally, I am interested in teaching graduate seminars related to my research, including cloud computing, Internet video streaming, and big data analytics, where I can draw on my own experience. These courses can help graduate students (and undergraduate students and faculty) get familiar with the many new ideas and challenges in these areas. They can also help find common ground for collaboration.

Mentoring: I have been very fortunate to work with four excellent students over the years. The most helpful lesson I draw from my mentoring experience is to appreciate the fact that each student is different. Working closely with each student reveals his or her unique strengths and interests, which help me find the best way to motivate them. Shijie Sun was one of the undergraduate students I mentored, and he was helping me on an open source project that I was leading. He was a wonderful hacker, but lacked the understanding of system principles. So I motivated him by highlighting the advantage of software engineering excellence, and at the same time, explaining the differences between what made a smart hack and what made a contribution in system designs. In the end, we successfully built an end-to-end prototype for our NSDI submission. Another student, Mihovil Bartulovic, was a junior graduate student, whom I was helping on his own research project. He tried to use statistics techniques to build a tool for network engineers and researchers to perform rigorous “what-if” analysis. Though he had strong background in statistics, he did not have much knowledge in computer science. So I helped him get necessary background in systems and networking. More importantly, while stressing the benefit of theoretical rigorousness, I constantly reminded him how system researchers thought differently to theoreticians. Coming from a theory-focused class in Tsinghua, I know how important and difficult it is for a student of a different background to get used to the mindset of another community.

Overall, I believe in the importance of keeping students engaged. Only when students are strongly motivated and interested can they do their best and achieve high standards for their work. In teaching, I would motivate students by always first demonstrating the importance of the concepts and help them better digest the knowledge by providing hands-on experience. In mentoring, I would strive to understand the students’ strengths, interests and goals, and see how we can align our goals and pursue them together.