Teaching Statement | Qi Alfred Chen

The opportunity to educate and work with the future generations of computer scientists and engineers is one of the most important reasons for my pursuit of an academic career. I have been practicing and have deeply enjoyed teaching and mentoring in educational settings ranging from classroom teaching, to student mentoring, and to community outreach.

Course offerings. I am equipped to teach computer science courses at both the undergraduate and graduate levels in topics ranging from computer fundamentals such as programming, data structures and algorithms, operating systems, and computer architecture, to more advanced topics such as computer security, computer networks, distributed systems, and compilers. I am especially passionate about teaching courses related to computer security and privacy. In computer products, security has been long treated as an afterthought, resulting in numerous disastrous security breaches. To solve this problem, it is highly desired to teach future generations of computer professionals to approach problems with a security mindset, questioning not only how systems work but also how they can fail. Thus, I envision this to be one of my core teaching roles.

Philosophy. I strongly believe that to become a successful computer science professional, students must not only have the interest and passion to acquire the knowledge, but also have the skills and experience to apply it creatively to solve real-world problems. Thus, my teaching is designed around expositions to ignite interest and curiosity, application tasks to practice and reinforce the knowledge, and student-initiated projects to cultivate initiative and creativity. Through this style of teaching, my objective is to instill the traits of active learners, practitioners, and innovators into my students. I believe that these traits will have a long lasting benefit in both their computer related careers and other areas of their life.

Teaching experience. During my graduate study, I have served as a guest lecturer in graduate course Advanced Computer Networks to discuss topics related to my research. Besides university courses, I am also the instructor in Osher Lifelong Learning Institute (OLLI) at the University of Michigan and my role is to teach middle-aged and elderly people computer technology and security. In OLLI, I got the opportunity to design my own course in Fall 2017 on the technology and security of smart devices and smart systems. It has received numerous positive feedback and I will teach it again in Winter 2018.

In my teaching, I adopt two methods to keep my classes engaging and attractive. First, I usually start research discussions with video demos and sometimes live demos. For example, when discussing my work on smartphone UI phishing, I brought a smartphone with my proof-of-concept malware installed to let students concretely feel the attack. I find this very effective in piquing the interest of the students, making them more curious about the details behind the scene. Second, I proactively solicit feedback and adapt the content accordingly. For example, I fully utilize office hours and online forums to interact with students, and also prepare feedback cards for the elderly students in OLLI who are more used to handwriting. In my Fall 2017 OLLI class, I largely customized the class materials based on the feedback and added a special lecture on social engineering attacks to best meet the students’ interest. My students rated my OLLI course highly, and the institute course evaluator commented that “the group participation and interest was far above our norm at OLLI”.

Mentoring experience. Besides teaching, I have also been fortunate to mentor 10 talented undergraduate students in total. For five of them, I was the student mentor for their project in the College of Engineering Multidisciplinary Design Program (MDP), in which I guided them in developing a security vulnerability scanner. The other five were individually mentored by me in projects related to my thesis research. These research participations were all volunteered, meaning that they can stop anytime if they are no longer interested. Very encouragingly to me, all of them kept working with me until graduation, and four of them decided to pursue doctoral degrees to continue working on computer security research. Particularly, three of them worked with me for over half a year and each of them co-authored a top-tier conference paper with me (two in ISOC NDSS and one in ACM CCS). One of them, Yucheng Yin (B.S., expected 2018), is nominated for the 2018 CRA Outstanding Undergraduate Researcher Award due to his excellent research achievement under my mentoring.

A common problem in my mentoring is that the students sometimes focus too much on detailed tasks without actively thinking about the overall picture and the research questions behind the tasks. This usually leads to unsatisfied results and, most importantly, they can hardly learn anything about research thinking process. To solve the problem, my strategy is to (1) always involve students in high-level research discussions, e.g., research direction and hypothesis discussions, (2) frequently discuss related news and research papers, which I find can greatly help students gain interest in the problem domain and also develop critical thinking skills, and (3) build a sense of ownership in students to promote active learning and thinking.

Community outreach. I am always enthusiastic to share my knowledge and research to the broader public. In Fall 2017, I opened the first ever computer security course in OLLI to educate middle-aged and elderly people about common security and privacy threats in their everyday smartphone usage and teach them state-of-the-art protection techniques. Every time I went back to China for vacation, I gave guest lectures on my latest research in top universities such as Tsinghua University, Shanghai Jiao Tong University, and Nanjing University, and usually spent more than half a day chatting with students in research and life. These visits always energize me and I hope to continue this type of outreach in the future.