

Teaching Statement

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As technology transforms human's daily life at a faster-than-ever pace, a teacher in computer science also assumes a more important mission. Teaching computer science does not mean training skilled programmers only. Instead, the real value of a teacher in computer science lies in cultivating prospective computer scientists who can both appreciate the underlying beauty of this discipline and come up with creative bold new ideas when faced with unprecedented challenges. This mission has been serving as the guideline on the pursuit of my academic career.

Since entering Department of Computer Sciences at the University of Texas at Austin, I started gaining teaching experience in preparation for a future faculty job. I have served as a teaching assistant for various courses at both undergraduate level and graduate level. The undergraduate courses where I served as a TA include Introduction to Computer Sciences (CS304), Foundations of Computer Sciences (CS307), Computer Networks (CS356), and Compilers (CS378). I also served as the TA three times for the graduate course Communication Networks (CS386M). My duties for these courses include giving discussion lectures, designing homework problem sets, grading homework and exam papers, and holding office hours.

It is my belief that students learn more by thinking than by memorizing. Therefore, in my discussion lectures, I do not spell out the solutions in a snap. Instead, I design step-by-step sub-questions to guide the students through the problem, and encourage them to come up with the intended solution or alternative ones. Then I would also ask the students to compare and explain the advantages and disadvantages of different solutions to the same problem. I follow the same method when I hold my office hours. When students come to my office hours asking questions, I usually answer by asking them questions that lead them toward the complete solutions. Although this method may take extra time, I find it very effective in helping students learn their skills and build their confidence. Moreover, during the terms of my TA job, I attended several university-sponsored TA workshops in order to improve my teaching skills and to exchange teaching experience with TAs from other disciplines. In the next paragraphs, I discuss my teaching philosophy and teaching plan in two aspects: teaching courses and advising students.

As a faculty member, I would like to teach courses in the areas of computer networks and distributed computing at both undergraduate level and graduate level. I will use the Internet as the ground of my presentation and discuss well-known protocols in each layer of the protocol stack, along with which I will also put an emphasis on training the students' abilities of abstraction. I believe the ability of abstraction is more valuable and more useful to students than the details of existing protocols are because technologies, including the Internet itself, keep evolving as time goes by, and one day in the future they will be asked to design their own protocols and systems.

As for advanced topics, I would like to teach courses in network security and cryptography. I have ample experience with these topics through my own research in network security. In a course on network security, I will first present a couple of examples of existing attacks, like TCP connection hijacking and denial-of-service attacks, to emphasize the prominent need of network security. Then, I will teach them the concepts of network security goals, and show them steps of designing protocols to achieve each of the goals. Since correctness is pivotal and indispensable to network security protocols, I will also challenge them with bad protocols that have been proven to be incorrect, so as to help them to be more careful and more thorough in protocol design. In a cryptography course, I will discuss important cryptographic algorithms with a stress on how they can be applied to achieve network security.

Student advising will represent a key component of my teaching. For me, it is great delight to see a student grow into maturity with my help. During the years of my Ph.D. studies, I had the opportunities to mentor two undergraduate students. My advisor assigned research problems to them, and I helped them find related research papers to read. I worked with them to appreciate the strengths and criticize the weaknesses of the approaches proposed in those papers, and to design our own protocols that better suit the problems. With one student, I wrote a paper and it was rewarding to see our paper accepted and published in the IEEE International Conference on Computer Communications and Networks (ICCCN 2000). When it is my turn to advise my own students, I will first give them the full picture of my research areas and the positions of my own research in this picture, and suggest possible directions for them to follow. I will give them advice, but not limit their options, about which courses to take and what skill sets to develop. I will communicate with them frequently in order to check their progress and help them solve problems that may impede their research. Finally, I will encourage them to conduct their own research when I feel that they have accumulated enough confidence.