

Teaching Statement

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Successful teaching is not just about conveying knowledge; it should also be about cultivating the capability of critical thinking, inspiring grand visions, encouraging enthusiasm, and training future scientists and engineers. The opportunity to educate students is one of my main reasons for pursuing an academic career.

My experience in teaching computer science began in 2002, when I was an undergraduate student at Tsinghua University. I volunteered as a student coach of the Chinese team for the International Olympiad in Informatics (IOI), the premier international programming competition for pre-college students. Together with other coaches, we prepared mini-lectures and qualifying trials, and designed training practices based on our own experiences. In IOI 2003, the Chinese team has delivered great performance, winning one gold, two silver and one bronze medal. In addition to my teaching experience with the elite students, I served as a teaching assistant (TA) for a C++ course, the introductory course for freshmen majored in computer science. The unique challenge came from the diverse educational background of the students, some of whom had never written any computer programs. My task as a TA was to help these students quickly understand the object-oriented paradigm and foster their programming skills in developing a variety of C++ projects. I held office hours, and taught weekly laboratory courses to groups of about 30 students. It was particularly rewarding when I saw my students grasp difficult concepts and do well in class.

I have continued to develop my teaching skills at the University of Pennsylvania, where I have served as a TA for two graduate computer systems courses, CIS553 (Networked Systems) and CIS505 (Software Systems). My responsibilities included holding office hours, preparing projects, and grading homework. My role gave me a comprehensive appreciation for the level of preparation required to communicate advanced topics. Additionally, in the both courses, I have had opportunities to give guest lectures that introduce recent advances of researches in distributed systems. From the preparation and feedback of these lectures, I have learned that giving lectures has different emphases than presenting a research paper at conferences, requiring the instructor to consider not only *what* to teach from the immense and rapidly growing literature; but also *how* to compile them in an easy-to-grasp manner for students with diverse educational background and learning styles. With the efforts from both the instructor and TAs, CIS553 is the highest rated class in the TCOM program, and CIS 505's ratings and enrollment are doubled/tripled in recent years.

I believe direct hands-on experience is a great way to reinforce the learning of the abstract concepts from books or research papers. For instance, the projects for CIS553 were based on the popular ns-3 network simulator, and required students to progressively implement network routing protocols, from the basic distance-vector and link-state protocols, to an overlay network built upon them. The final project of CIS505 was to build a full-fledged mail system that exercises the techniques for caching, replication and synchronization. The students enjoyed these projects, and I was delighted to see that they demonstrated good command of the corresponding concepts on their final exams.

In my experience, teaching and research have a synergistic relationship. My mentoring experience has been directly beneficial to my research and vice versa. At Penn, I have had the opportunity to mentor several talented master students on projects related to data-centric approaches for maintaining and querying system dependencies. The results of our work were published at premier conferences in databases and systems, such as SIGMOD and SOSP, and our prototype systems were demonstrated at SIGMOD and SIGCOMM. Likewise, my training as a researcher has led me to become a more competent and organized mentor. During my mentoring experience, I was committed to help increase the representation of women and ethnic minorities in Computer Science – three out of the four master students that I have mentored were female students, and they are now working as software developers at Microsoft and Amazon.

In terms of my teaching plans, I am interested in teaching undergraduate- and graduate-level courses in databases, distributed systems and networking, as these areas closely match my research interests. At the undergraduate level, my priorities are on getting students interested in the course materials, and helping students gain valuable hands-on experiences by offering course projects based on real-world software. For instance, the class project for databases and distributed systems courses can involve developing applications that deploy on the commercial Cloud computing platforms (e.g. Amazon EC2). The graduate level courses that I teach will reflect my own inclinations for inter-disciplinary systems research. I would like to experiment with a graduate-level inter-disciplinary systems course that combines databases, networking and programming languages. The main goal is to explore common systems research themes and foster collaboration among students in these three areas.