# Qian Zhang — Teaching Statement

The opportunity of working with students and igniting their curiosity is what drives me to be a teacher and an advisor. My goal is to create a study and research environment that fosters equality, innovation, and creativity to help students grow into independent scientists and engineers with solid knowledge.

**1. Teaching Interests.** I am comfortable to teach *undergraduate courses* in the areas of SE, PL, compilers, digital logic, and computer organization. At the *graduate* level, I can teach several standard courses such as automated testing and debugging, computer architecture, and advanced topics in related areas. I am also interested in developing *new courses* at the intersection of SE and heterogeneous architecture. I would like to create a graduate-level course on Testing and Refactoring for Compute Intensive Systems. At the undergraduate level, I would like to develop a Data and Compute Intensive Systems course that guides students through designing software systems leveraging distributed and heterogeneous platforms.

**2. Teaching Experience and Approach.** During my Ph.D. study at CUHK, I was a teaching assistant for *eight* courses at both undergraduate and graduate levels. My teaching experience spans entry-level engineering mathematics (*e.g.,* linear algebra), circuit design, and advanced computer architecture. These experiences have shaped my following teaching strategies:

**#1. Interactive Teaching.** To encourage the engagement of students, I will adopt the *listen-read-discuss* strategy in my class, which I have practiced together with Prof. Qiang Xu in CMSC 5719 (Research Seminar) at CUHK and Prof. Miryung Kim in reading groups at UCLA. For each lecture, I will prepare reading materials and a set of questions. After giving a lecture on a scheduled topic (Listen), I will ask students to read the materials and think about the questions (Read). Then, they will be engaged in small group discussions, which they can share in front of the class (Discuss).

**#2. Example-based Learning.** I will develop a curriculum that goes beyond the theoretical knowledge of CS to incorporate practical skills needed in the industry. When I was teaching Engineering Mathematics with Prof. Hanqiu Sun at CUHK, I realized that most first-year students did not understand the importance of learning linear algebra to study CS. In response, I included a variety of real-life examples in each concept. For example, I introduced application scenarios where eigenvectors can be used in simplified digit recognition tasks using principal component analysis. My TA evaluation of this course from over 100 undergraduate students in Spring 2013 reported that "Ms. Zhang has the talent to be a teacher."

**#3. Encouraging Diversity.** I plan to teach the basics to everyone while still offering optional projects to encourage students to go the extra mile. I will also reach out to students with different backgrounds and understand their needs, such that all students feel equally respected and can find their voices in my class.

**#4. Soliciting Feedback.** I will ask the students to submit questions and their expectations about my lectures. As the semester goes, I will adapt my teaching strategies based on students' feedback and include content students wish to learn.

**3. Mentoring Experience and Approach.** I have had the privilege of working with twelve young students who are at various stages in their academic careers at both CUHK and UCLA. Seven of these students, including three female students, have published research papers at top-tier conferences. Notably, I have been working closely with one UCLA Ph.D. student, Jiyuan Wang, on my recent projects. This led to one ASE paper for him as the first-author and four papers (FSE, ASE, ASPLOS, and ICSE) as a co-author.

Establishing a *mutual understanding* and setting *clear expectations* has been working well for me. I have been deeply aware that each student has his/her learning and working style. To find the most effective way of collaboration, I always respect such differences, share my working style, and get to know their preferences, which is critical to helping students gain self-confidence and relieve stress. To ensure students make progress, my mentoring approach centers around three aspects: (1) **organized group meetings**—I will expect students to attend weekly group meetings and individual meetings. (2) **selective research taste with focus on quality**—I will help student develop their research taste by teaching them how to select research problems to advance science and how to avoid incremental research with mere focus on quantity. And (3) **systematic investigation with justified arguments**—I will encourage students to justify their proposed methods and identify unique contributions that could advance existing work.