

Teaching Statement—An-I Andy Wang

My teaching goals are twofold: (1) to equip students with the knowledge and skills to adapt and excel in this swiftly evolving technological field, and (2) to create a pipeline of able and enthusiastic students for the systems research program, knowing that less than 10% of programmers are capable of performing operating-system (OS) development.

At the undergraduate level, I have taught both lower- and upper-division courses in data structures and operating systems. My instruction extensively uses everyday, ideally funny, analogies. For example, a refrigerator can help explain how computer memory can be managed. A student can make room in a refrigerator by removing old items, large items, or simply, roommates' items. Through seeming baby steps, I am able to lead undergraduates to appreciate graduate-level materials toward the end of a semester. My exams stress how to apply learned knowledge when technical trends and user behaviors are changed. A test question would ask how to design an energy-efficient OS. For projects, after the capstone OS course, students can construct OS mechanisms to read and write USB drives and extend Linux by adding OS entry points and system modules. I have been nominated for the university undergraduate teaching award for having high teaching evaluations (from both students and peers) over the years.

At the graduate level, I have taught courses in advanced operating systems and kernel and device drivers programming. Since most graduate students take my classes during their first year, my approach focuses on research training. Students are exposed to major and recent advances in systems (e.g. Google file system) and open questions such as simultaneously achieving data consistency and availability while being tolerant of network failures. Additionally, students are required to propose their projects, develop and measure prototypes, and write and present their papers with peer critiques. I encourage students to try new ideas. Moving from an idea to a prototype working 10% of the time is more far-reaching than improving a system from 80% to 90%. Students have applied the skills learned from my courses to obtain positions in top places (e.g. Google and Lawrence Livermore National Laboratory).

In terms of mentoring, I have discovered that good teaching is the key to training and attracting able and passionate students for research. I currently supervise 3 Ph.D., 2 Masters, and 2 undergraduate students. I also have graduated 12 Masters and 2 Honors thesis students. I believe that acquiring research skills is analogous to learning a language—there is no shortcut. Compounded daily progress will outpace short-term deadline rushes. I encourage students to focus on the quality and impact of their work. With an analogy from the music industry, one hit is all it takes. To help students overcome daunting challenges, I advise students to focus on just the next step. I recall teaching Kirchhoff's law to an Honors student with wires, LEDs, resistors, batteries, and a voltmeter. Little did he know, he would eventually be able to build a power-measurement framework that would contribute to our work on energy-efficient storage system, published in the flagship storage conference.

Furthermore, I have sponsored 16 undergraduate students for independent studies. This early research exposure encouraged 12 of them to pursue graduate studies. Many of my graduate students are trained from this pool.

Overall, my teaching experience is very rewarding, knowing many students are from families with no prior college degrees, and that their education will have definite impact on the accessibility to higher education to their future generations.

Table 1: Student Involvement in Publications since 2003.

Type of Publication	Frequency of Student Co-Authorship	Total Number of Students Co-Authoring Publications
Refereed Journal Articles	50% (2/4 papers)	4
Refereed Conference Papers and Proceedings	83% (10/12 papers)	20
Technical Reports	100% (6/6 reports)	10
Other Non-Refereed Publications	100% (1/1 paper)	2
Total Student Involvement in Publications	83% (19/23 papers)	36

Table 2: Student Involvement in Presentations since 2003.

Type of Presentation	Frequency of Students Co-Presenting	Total Number of Students Co-Presenting
Refereed Presentations	83% (10/12 presentations)	20
Non-Refereed Presentations	100% (1/1 presentation)	2
Total Student Involvement in Publications	85% (11/13 presentations)	22