

Statement of Teaching Qualifications and Approach

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In this statement, I enumerate the course topics I am most qualified to teach, summarize my past teaching experiences, and present goals and key elements of my teaching approach.

Course Offerings

My dissertation research and graduate program have focused on multiprocessor computer architecture. Prior to entering graduate school, I worked as a software development engineer. Hence, at the undergraduate level, I am most qualified to offer courses in digital logic design, computer organization/architecture, software development, parallel programming, and systems software. At the graduate level, I can offer advanced courses in computer architecture, parallel and multiprocessor systems, and computer system performance evaluation.

Teaching Experience

At Carnegie Mellon, I have served as lead teaching assistant for the graduate computer architecture and advanced multiprocessor architecture courses on three occasions. My primary responsibility lay in preparing, guiding, and evaluating semester research projects. In these two courses, students are asked to perform a semester-long project that includes significant original research. Students pursue their projects using the same state-of-the-art infrastructure that faculty use in their research. In some cases, these course projects spawn research that lasts beyond the course and eventually lead to publications (for example, the research leading to my “*SMARTS*” ISCA 2003 publication began as a collaborative course project). As lead teaching assistant, my specific duties included preparing labs and tutorials to introduce students to the research infrastructure, suggesting topics for research projects, meeting regularly with project teams to guide their research, and evaluating project presentations/reports. Finally, on several occasions, I have delivered lectures in these courses on behalf of instructors who were traveling.

In addition to these classroom experiences, I have also delivered tutorials (in collaboration with Roland Wunderlich) on computer architecture performance evaluation methodology at the International Symposium on Microarchitecture (MICRO 2005) and the International Symposium on Computer Architecture (ISCA 2006). In these half-day tutorials, we presented techniques for applying rigorous statistical methods to simulation studies of computer system performance. Furthermore, we present key aspects of the design of *Flexus*, the timing-accurate full-system multicore/multiprocessor simulation infrastructure we have developed at Carnegie Mellon. More information on Flexus and these tutorials is available at <http://www.ece.cmu.edu/~simflex>.

Teaching Goals and Approach

My primary goals in teaching are to provide students with insight into the reasoning behind solutions to systems engineering problems, and the critical thinking skills to choose or reject known solutions when faced with a new problem. Rather than present a catalog of the design details of past artifacts, a systems course should motivate problems and introduce a spectrum of possible solutions. Past designs then act as case studies which demonstrate how particular constraints led designers down a specific path.

To achieve these goals, I prefer an interactive lecturing style where students deduce the material being taught through prompted discussion rather than direct presentation. By re-tracing the reasoning of past designers, students gain a deep appreciation of the applicability and limitations of alternative solutions. Furthermore, interactive lectures keep students interested and engaged in the course.

In upper-level undergraduate and graduate courses, I am a strong proponent of semester-long original research projects similar to those I described above. I believe the advanced courses offer an excellent chance for students to learn how to pursue research with a scientific approach while making real progress on cutting-edge problems. A course project provides an excellent context to perform preliminary opportunity studies or proof-of-concept investigations that may inspire students to continue the project and publish the work.

For a teaching reference, please contact Prof. Babak Falsafi (contact information on references page).