

Statement of Teaching

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OVERVIEW

The opportunity to teach and mentor students is a major reason for my interest in an academic career. I thoroughly enjoy teaching and my research experience in systems building has prepared me well to teach courses such as **computer networking, operating systems, wireless embedded systems, distributed systems, machine learning, and compilers** in addition to the basic introductory programming courses. In addition to teaching these courses, I am looking forward to the opportunity to develop new courses and seminars targeting both graduate students and upper-level undergraduate students that address the latest development in **cyber-physical systems (CPSs), ubiquitous computing, distributed system design, and smart buildings and environments**.

At the University of Virginia, I worked as a teaching assistant for both an intermediate programming course and a computer-networking course. My responsibilities included conducting lectures when necessary, running lab sessions where students implemented applications in Java, holding office hours, grading assignments, and administering examinations. Throughout my undergraduate career, I also tutored underprivileged and minority students through initiatives such as the Department of Education TRIO program and the Tennessee Louis Stokes Alliance for Minority Participation (TLSAMP).

TEACHING PHILOSOPHY

Incorporating **hands-on experience** with **real-world applications** while remaining grounded in the **fundamentals** and **theory** of computer science comprises my teaching philosophy. My goal is not just to teach students, but also to help them achieve a new level of mastery in the topics they are learning. I keep the students constantly engaged in the material presented by adopting an enthusiastic and interactive teaching approach.

An important component of my teaching philosophy is an appreciation of the different learning styles of students. I believe a professor should teach a concept in as many ways as possible, so that students who do not fully understand a particular presentation of it will comprehend it better through another explanation. As a tutor, I resorted to diagrams, analogies, and stories to supplement my verbal explanation of concepts. This creativity in figuring out different techniques to explain a concept to students is one of the main reasons I enjoy teaching.

I have mentored students and served as a teaching assistant. While my research interests lie primarily in systems and networking, I have a broad interest in computer science and I believe **I can be an effective educator in many courses**.

TEACHING STRATEGIES

I believe a teacher should do more than lecture at a student; they should instill enthusiasm and excitement in their students for the subject material. Only then will students want to explore the subject beyond the classroom. I hope to achieve this through multi-modal teaching where I augment the lectures with games, demos, daily puzzles, and fun extra-credit projects. Other strategies I plan on implementing include:

Hands-on experience: The best way to learn a concept is to use it to implement something concrete. Even a class as abstract as the Theory of Computation can involve an implementation component, such as the puzzle solver I implemented as a student at the University of Virginia. The puzzle solver allowed me to explore a number of algorithms taught in class and see how they perform relative to each other before selecting the one that was best suited for the problem. This gave me a new experience with computation theory than would be possible in a class with no such project.

Group collaboration: In the real world, few people work on problems in isolation. Learning to work in a group is a key skill to impart on students. Group collaboration also allows students to tackle problems that would be too difficult for a single student to undertake. It also allows students to solidify their knowledge by teaching each other concepts that they understand.

Creativity and competition: An important component to ensuring student motivation is to assign projects and problems where there is sufficient flexibility and breadth for students to be creative with their solutions. In addition to giving students a sense of ownership, fostering friendly competition among student groups is necessary. Rewarding the best implementations for instance, results in students putting more effort into their projects, and thus benefiting much more from their work.

Flip teaching: Over the last few years, the number of high quality lectures videotaped and posted online has increased tremendously. I plan to augment my lectures by utilizing these resources for flip teaching. Flip teaching involves assigning lectures for students to watch before a class and then spending class time on assignments and activities. I plan on flip teaching one class a week and incorporating short video clips and animations in class as a change of pace.

Undergraduate research: I strongly feel that undergraduate research is an important aspect of the academic process, and have mentored three undergraduate research assistants during my time at the University of Virginia. I plan to integrate my research into the classroom, which would highlight the relevance of the course material and encourage undergraduate involvement in research. I would encourage my graduate students to supervise undergraduate research projects, and if possible provide a group laboratory, or office, for undergraduates to work together, ideally in close proximity to graduate students. While this can entail a great deal of effort, there is tremendous benefit to all involved: undergraduates get research experience, graduates get mentoring experience, and professors obtain valuable research contributions, such as the two journal articles [SUSCOM '13, SIGBED Rev. '12], two conference publications [IGCC '12, SenSys '10], and a workshop paper [CONET '12] I co-authored with my undergraduate mentees.