

## Education Statement for David Andersen

I believe that the most important job a teacher can do is to inspire in students interest and passion about the material. Excited students will learn more about a subject than the teacher ever imagined, and disinterested students will leave their knowledge at the door. My own interest in teaching, research, and particularly in operating systems was strongly influenced by a great undergraduate operating systems course. While taking that course, I really started to see how amazing computing is, with its combination of elegant system designs, algorithmic design, and the joy (and suffering!) of creating real, working systems. I want to engender that kind of enthusiasm in my own students.

I was fortunate to be allowed to help TA the networks course at the University of Utah while an undergraduate there. At MIT, I was the head TA for the graduate networks class (6.829). One of the most gratifying aspects of this course was working with the students on the small research projects they undertook for their course projects. Students had the opportunity to pick their own research project or to implement a project that I designed in which they built a multi-site file distribution system.

In my experience, there are two ways to help students get excited about a course or a project. The first is to make the relevance of the material clear. For instance, many pertinent systems topics, such as routing, caching, and consistency are explainable via modern peer-to-peer systems with which students have personal experience. The second is by making the course hands-on through experiments and projects. These techniques work best in “lab” courses, which are the courses I’m most interested in teaching: advanced networking and computer systems classes at the graduate level, and networking, OS, and introductory programming courses at the undergraduate level.

Systems classes need to blend the principles underlying computing systems with enough of the implementation details and hands-on experience to give students an intuition for the concepts; the experience necessary to apply the principles; and a reality-based lens through which they can critically examine both solutions to future problems *and* the course material. Real-world problems involve both the application of theory (e.g., wireless MAC protocols, synchronization techniques, algorithms, etc.) and experience with the problems that arise when using, designing, implementing, and debugging real systems. I believe that classes with a strong hands-on component are the best way to expose students to both aspects of systems.

For most students, a good computer science education occurs as much outside the classroom as it does inside. Whether this happens through involvement in research, independent projects, or interaction with industry, these outside activities and larger course projects introduce students to open-ended creative problems in which they are responsible for both the design and the challenges of implementing their design. I believe that it’s important to give students the opportunity, at both the graduate and undergraduate level, to be involved in research and real system building.

To this end, systems classes offer students a springboard to further involvement with a faculty member’s research, an experience I believe is valuable both for research and industry-bound students. In the MIT networks course I TA’d, several groups of students went on to turn their course projects into full-fledged research papers, something I hope to continue in my own courses and in my research group. From that networks course, I also met the three undergraduate students whom I mentored on their UROP (undergraduate research opportunity) and senior thesis projects. I learned as much during this mentoring

as my students did, and I would like to have my own graduate students participate in the co-supervision of undergraduate projects.

In addition to computer science teaching, I also organized, helped design, and lectured for the MIT Outing Club's month-long winter mountaineering classes. Having the opportunity to design my own course from the ground up was as gratifying as it was time intensive, and the experience confirmed for me that I truly enjoy both the process of helping people learn and the amazing education that one gains while teaching others.