Teaching statement

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I believe the most important goal of teaching is to instill in students a passion and long-term interest for the material. Inspired students will not always get a perfect grade—they may not learn the material fast enough or may struggle with required background knowledge—but will work to improve their understanding long after the class concludes, eventually far exceeding the instructor's original goals. This is the type of enthusiasm I hope to inspire in my students, both in classroom and in research environments. I also strongly believe teaching has a positive impact on the instructor's knowledge and his research. Not only does it help him understand the subject material better, but in my experience, the best student questions often have strong research implications. As such, I am excited to teach and mentor students in computer systems (at both the undergraduate and graduate level) and networking (at the graduate level), as doing so will improve their knowledge and reinforce mine.

As a postdoctoral fellow at CMU and under the guidance of Professor Garth Gibson, I developed and co-taught the inaugural version of CMU's graduate class on cloud computing (15-719, Advanced Cloud Computing). The syllabus I developed aims to provide students with a broad overview of all the topics that fall under the cloud-computing umbrella (e.g., virtualization, distributed storage, and diagnosis). It includes one to two lectures about each topic, exams, and two real-world projects, both of which I created. The first exposes students to public clouds by asking them to write large Map Reduce jobs within AWS. The second exposes students to infrastructural challenges of creating a cloud by asking them to create a load balancer for OpenStack. As a graduate student, I served as a TA for CMU's graduate storage systems class (18-746, Advanced Storage Systems) twice, the second time as lead TA. This class includes lectures, weekly homework assignments, exams, and real-world projects, such as writing FSCK and creating an iSCI RAID controller.

When teaching, I am a strong believer in the Socratic method, which engages students in a dialogue that guides them toward self-discovery of concepts and ideas. I first experienced the effectiveness of this method when enrolled in CMU's graduate performance modeling class and have since tried to incorporate its key enablers—interactive discussions and problem-solving sessions—as key parts of my lectures. For example, I constructed my Advanced Cloud Computing lecture on monitoring and diagnosis around an interactive discussion of an AWS outage that had been written about extensively. During the lecture, I presented each step AWS engineers took to debug the problem and asked students to brainstorm whether a given step improved the situation or worsened it. This discussion naturally led to how the research papers students had read as part of their assigned reading could have helped (or not helped) engineers avoid missteps. As a bonus, I framed the lecture outage as a "whodunit-style" mystery, which greatly increased student engagement. My belief in Socratic teaching methods were reinforced by the fact that multiple graduate students approached me after this lecture to ask about research opportunities on this topic.

I believe that tough, engaging real-world projects are critical for inspiring interest in course material. They also reinforce concepts taught in class and broaden students' understanding by forcing them to justify design decisions that do not have definite answers. The latter is key to developing systems intuition. Helping guide students toward good decisions by hearing their rationals and pointing out contradicting or supporting examples—but never giving away what I would do!—was my favorite aspect of teaching. In the future, I look forward to incorporating real-world projects into classes I teach, both at the undergraduate and graduate level.

I have helped mentor several junior PhD students on research activities related to my dissertation. As a postdoctoral researcher, I am helping to advise one graduate student. These experiences have helped shape my approach to advising. Most importantly, I have learned that advising involves being part cheerleader and part mentor. With regard to the former, PhD students are remarkably smart and driven. As an advisor, I need to help students maintain their drive by instilling a sense of ownership, always being positive, and helping students weather the lows that are a natural part of being a researcher. With regard to the latter, I believe that a key part of mentoring involves encouraging students to identify solutions themselves and to teach me when I am misinformed. One way to do this is to ask students—especially junior ones—"Have you thought of..." instead of disagreeing with them. I have also found that investing the effort to provide students with multiple rounds of structured feedback instead of suggesting solutions or fixing problems myself yields the fastest improvement in students' research abilities.

In addition to my formal teaching and advising responsibilities, my experiences running a reading group, mentoring junior students on presentation skills, and volunteering to teach children about science have confirmed my love of teaching and communicating information. I believe nothing will inspire a student as much as a committed instructor or mentor, passionate about his field, and always eager to help his students. I look forward to the continued opportunity to avail myself as one.

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