Teaching Statement: Andrew Lovett

For me, teaching has always presented an exciting puzzle: how can I take a complicated idea and communicate it so that students will develop a robust understanding? This may be because of my background in cognitive science. I am fascinated by how people represent and understand concepts. Whereas researchers study this question across populations, instructors must consider the understanding of each individual student.

At Northwestern University, I served as a teaching assistant for several classes. My responsibilities included grading, lecturing when the professor was unavailable, and working one-on-one with students. Students who requested individual aid were often the ones who had failed to understand a topic in class. Thus, I had numerous opportunities to tackle difficult concepts with individuals or small groups. Based on these experiences, and based on my education in cognitive and learning science, I would say there are two keys to effective teaching.

Firstly, when presenting a new system, teach students its internal structure: the core components and the ways they relate to each other. This is especially important in a rigidly structured discipline like computer science. In our research, we find that comparison and analogy are immensely helpful for drawing people's attention to structure. For example, instead of showing students one example of a data structure, show them two examples, and emphasize the similarities and differences.

Analogies can be helpful for introducing a novel topic. One might say a computer program is like a highway network: you travel through it sequentially, and at each fork you go one way or the other, depending on the state of the environment. Analogies are especially important when teaching an introductory or interdisciplinary class, where the students come from diverse backgrounds. As a teaching assistant for *Introduction to Cognitive Modeling*, I found that many students needed this extra scaffolding when learning technical topics such as qualitative modeling.

Secondly, understand your students. Individuals come into a class with a range of preconceptions, often misconceptions, about a topic. Unless you address those preconceptions directly, they may bias your students' comprehension of everything you teach. Therefore, in any class, but especially an introductory class, I think it's important to begin by polling the students and learning what ideas they're bringing in with them. Throughout a class, assignments should be used not just to evaluate students, but also to gauge the success of the teaching and determine if new misconceptions may be developing.

I believe in-class interaction can be extremely valuable, even in a large lecture class. Not only does it provide immediate feedback on students' understanding, but it can keep students engaged. For example, after lecturing on simulation games in *Computer Game Design*, I led the class in designing a new game based on the principles we had discussed.

While I've lectured several times as a teaching assistant, I have never taught my own class. By designing a curriculum around solid teaching principles and staying connected with my students, I believe I can be an effective teacher. I look forward to the challenge.