Claire Le Goues – Teaching Statement

As an undergraduate, I sought out classes taught by professors who were passionate, knowledgable, and engaging. I try to be the type of educator whose class I would have been excited to have taken, through a combination of preparation, interactivity, and flexibility.

Lecture

I use several strategies to communicate lecture material to as much of a class as possible, regardless of the number of students or the breadth of their backgrounds. Examples include:

- **Energy.** I prefer an enthusiastic presentation style, because I've observed that students typically rise to the energy level of the instructor. I cultivate this in lecture preparation: I start by reminding myself, at a very high level, why the material (which I may have learned a long time ago) is interesting. I also use change-ups and humor to help maintain student concentration.
- **Alternative explanations.** I prepare alternative explanations and analogies to present lecture material. For example, when I gave a lecture on Leslie Valiant's "A Theory of the Learnable," some students understood the concepts and math behind probably approximately correct learning immediately; others benefited from an extended metaphor based on learning to classify an animal as a duck ("if it walks like a duck and quacks like a duck..."). I also encourage students (especially in a lab or discussion section) to explain concepts back to me and to each other in their own words to increase the probability that everyone hears an interpretation that "clicks."
- **Questions for the students.** When preparing a lecture, I note points where it might be beneficial to pose questions of the class, and I look for such opportunities on the fly. I always wait for a student to volunteer an answer before moving on, and I am up front about this policy so that the students will not try to wait me out. This strategy works remarkably well for encouraging widespread participation. In my experience, waiting an additional few seconds for answers strongly increases the probability that non-"front row" students will raise their hands.
- **Questions from the students.** I stop often to check for questions, making sweeping eye contact, especially with the back row. I repeat student comments and questions to make sure that the entire class can hear them. I also work hard to find the insight behind a question to explain why it is interesting, so that I can give every participant meaningful praise. My lecture speed is deliberate and includes frequent pauses, which allows students time to take notes and ask questions. I developed this habit in my first year of graduate school, when I taught a section that included a hearing-impaired student; speaking slowly and pausing frequently was necessary to give his interpreter time to translate.

I have used these strategies as both a TA and substitute lecturer in a variety of course types and sizes, including a large lecture-based introductory course; a smaller, upper-level technical elective; and a graduate course. The class sizes have varied from 20–500 students.

Research mentorship

As a research mentor I work one-on-one with undergraduates and junior graduate students to identify and scope research problems, design experiments, and analyze results, with a goal of successful paper submission. To date, I have worked with four undergraduates and one Masters student, leading to a successful Masters defense, one publication in preparation, and two published conference papers.

As a mentor, I try to be **flexible** and tailor my management strategy to the student. For example, I found that one especially bright undergraduate mentee benefited most from a hands-off approach (he did his best work at 4:00am). On the other hand, another very bright student needed closer supervision than his initial performance would suggest. I discovered that the issue was actually of motivation: he (silently) ignored requests he thought were unlikely to improve our system. We settled on a bargain: I would concede any point if he experimentally showed that "his way" was in fact better than mine. This approach enabled faster progress and directly taught the student about experimental design. Although the students were very different, they both contributed meaningfully to published conference papers.

I **individualize** research meetings with a goal of striking a balance between overcoming individual student roadblocks and making research progress. For example, I spent a year and a half mentoring a

Masters student who had very limited English skills. We structured our meetings to spend half our time explicitly on research and half reviewing writing samples and just making conversation; her communication skills notably improved, and she successfully defended her Masters thesis. As another example, much of my work with my current undergraduate mentee has involved overcoming her incredible shyness (we've made considerable progress!) while teaching necessary research skills.

I actively **encourage questions** and **use myself as a model**. I regularly remind mentees that I would rather they ask a hundred questions than silently stall on something I could trivially answer. I also try to remember and relate when and how, specifically, I learned a particular skill or fact. This teaches the *how* of learning new skills (e.g., if I learned from a particular book or website) and practically demonstrates that "not knowing" is a natural part of science. I believe that showing this type of vulnerability makes me more a more relatable role model, and helps my students internalize the fact that they can learn the skills necessary to do the same sort of work I'm doing. This approach has been especially helpful with my current student.

I've also begun to integrate my research into the classroom by designing a homework assignment on automatic program repair. The exercise forced me to consider the essence of what I would like a new student to understand about my algorithm and to simplify its presentation accordingly (in the form of a simplified experimental setup). The assignment has been given in an advanced software engineering course at the University of Massachusetts, Amherst, and I look forward to using it in a graduate class of my own.

Feedback

I have received positive feedback about my teaching from both students and faculty. Although graduate students in my department are rarely the focus of formal teaching evaluations, I have received positive informal anonymous student feedback. After a recent lecture, in an otherwise unrelated email, a student added: "(BTW, I want to add that the 'substitute' last class...did a really good job. She explained things well while keeping the class engaged.)" When anonymous feedback is solicited directly, students have responded with comments like "She was very enthusiastic and knowledgeable with regard to the material...She did not simply talk to us; she asked us questions and allowed comments/additional questions at any point," "Claire did well using participation to make sure that the class was following along," and "Claire presented the material well and in an interactive way. Ultimately, she was a better lecturer than some professors I have had." I have asked members of our teaching faculty to observe my lectures and provide feedback, and try to improve my technique as a result. For eaxmple, my use of lecture change-ups is the result of a pedagogical discussion with one such observer. Overall, I received the 2008–2009 University of Virginia CS department Graduate Teaching Award, which is awarded annually to one of approximately 80 graduate students based on a faculty vote.

Conclusion

In short, I enjoy teaching. I try to be a prepared, mindful teacher; I interact with students to keep them engaged and tailor the material to their needs; and I think flexibility is important. My experience so far suggests that I am effective as a lecturer and a mentor, and I hope to have many more opportunities to serve as both.