

TEACHING STATEMENT

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Teaching is one of the primary reasons I am in academia; in particular, I want to excite students in science and technology. Here I describe how participation and course activities help build this excitement in students and how these methods help students build a career.

1. INTERACTIVE CLASSROOMS

I find traditional lecture dull, even when I'm the person in front of the class. Thus, I usually “flip” my classrooms to record lectures—with the help of the wonderful staff at Be Boulder Anywhere—so students can watch at home at their leisure. This moves discussion, working on homework, and student questions into class time (where before they happened at home or not at all).

Beyond structuring class to allow for many questions and discussion points, I end most classes with a difficult discussion of a key concept discussed in class and encouraging the class to work collaboratively together to arrive at a solution. For example:

- After introducing relational databases, I work together with the class to design a database scheme to serve the needs of a library circulation system. We talk through suggestions on what data should be stored, how it should be represented, and what implications those choices have.
- When teaching classifiers, students walk through the classification algorithms on tiny datasets (for example, documents with one or two words).
- When teaching annotation frameworks (called coding guides in the social sciences), I ask students to annotate data and compute their inter-annotator agreement. I have discovered that this, more than any collections of examples I can provide, effectively convinces students the importance of having good input data for their algorithms.

For technical classes with a large hands-on component, I provide students with ample opportunities to explore resources in a supportive environment where I or their classmates—working together in small groups—can help them overcome the small, unexpected hurdles that can appear while exploring new concepts.

I also strive to encourage interaction outside of the classroom. Every class I teach uses a virtual space (Piazza) to encourage discussion and mutual support. This helps the entire class get answers to common questions, and it also serves as a catalyst for spontaneous, unexpected communications: students sharing useful resources with each other, organizing study groups, or sharing sci-fi books that illustrate concepts.

I also try to be accessible to students through a variety of methods (e.g., Piazza, e-mail, office hours) to quickly answer questions and address their concerns so that they do not get frustrated and so that they can make progress.

2. EVALUATION AND COURSE ACTIVITIES

I typically structure classes with a few small, practical assignments (typically three to five), a midterm, and a course project.

The assignments give continuity to the class and allow students to practice skills introduced in the class; I encourage students to work together to solve homework problems. For example, in a

course introducing students to information technology, one assignment is to create a basic webpage; for a more advanced class introducing students to cloud computing, one assignment is to create an algorithm to play the “Kevin Bacon” game (i.e., to find the shortest path between an actor and Kevin Bacon based on co-starring roles).

The midterm serves as a reality check for both my students and me. I design exams with five to six questions (of which students must answer a subset) that synthesize disparate concepts from the course in a problem context (e.g., for a machine learning course, creating a set of features for a new classification problem). Based on the results of the midterm, I can identify students that might need extra help or what areas I need cover in more detail.

Finally, I use group projects to ensure students can apply what they’ve learned in the course. It reinforces key concepts from the course, connects those concepts to the rest of their curriculum and research, and often serves as a launching point to things that are useful in the real world. Projects in my courses have become a comedy troupe’s website, have unearthed previously unknown primary sources on local history, helped students advance in the workplace, and resulted in academic publications. As a testament to the effectiveness of these relationships, after one graduate course I taught (Computational Linguistics II, UMD CMSC 773), I ended up publishing papers with four of the eight students.

The projects help individuals calibrate the course to their own needs and abilities; because the project is directed to things they care about, the teams working on the projects typically stretch their abilities more than I could through predefined assignments. It also helps build the close connection with the subject area, incubating a comfort with science and technology.

3. MENTORING UNDERGRADUATES

Students realize that I’m passionate about research and that I’m also approachable so that they can explore their interests. I’ve worked with nine undergraduate students, our work with undergraduates has been published in top venues like NAACL and CHI, and the undergraduates I’ve worked with have gone on to have successful research careers (e.g., Lester Mackey is now faculty at Stanford).

4. MENTORING GRADUATE STUDENTS

I’ve graduated four PhD students and am the chair or co-chair for seven current students. I like to have a group meeting every other week with students I’m working with (broadly construed), and one-on-one meetings as needed with students, typically once a week. In addition, everyone in my group (me included) sends a weekly e-mail to the group saying: what they worked on that week; what they plan to work on next week; anything that’s holding them up or blocking their progress. I use an Internet chat program (Slack) to communicate with remote students and for lower-latency conversations than e-mail.

In their first year, students typically work on a starter project that builds on a senior student’s work, this often becomes a paper with the new student as a first author. From there, I work with the student to craft a trajectory of papers that will form a foundation for the rest of their graduate studies. While I’m fairly hands-on with conference and journal submissions, I never edit proposals or dissertations; I provide verbal feedback and suggestions but students must find their own voice in the writing process.

After graduation, my students have gone on to good positions in industry (e.g., Viet-An Nguyen, Facebook Data Science) and academia (e.g., He He, Stanford postdoc; Alvin Grissom II, Assistant Professor at Ursinus).

5. OUTREACH TO HIGH SCHOOL STUDENTS

A major part of my research is making machine learning accessible to high school students. My human-computer question answering exhibition matches have attracted thousands of interested high school students in DC, Chicago, Dallas, and Seattle.

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