Teaching Statement Katy Ilonka Gero

Learning comes in stages. It starts at cultivating an interest in the material, progresses to content mastery, and ends in critical thinking and engaged citizenry. I believe that engaging students is a mix of connecting material to their personal concerns and infecting them with my own interest in the material. For content mastery, I ascribe to the spiral theory of learning, where students are repeatedly exposed to key concepts but in increasingly complex ways. Finally, critical thinking and engaged citizenry come out of asking difficult questions about how their new knowledge intersects with the technical, political, and social issues of their time.

Teaching Experience

I was a Teaching Assistant for Columbia's **Introduction to Natural Language Processing** class, an upper-level class that consisted of over 100 students, some of whom participated virtually. This taught me about how to deal with online teaching platforms, plagiarism detection, virtual machine difficulties, and grading disputes. In addition to these responsibilities and holding office hours, I developed a new programming homework assignment which explored the use of beam search in summarization tasks. I feel confident in developing new assignments that are relevant to recent technical innovations and interests.

I was also a Teaching Assistant for Columbia's **Advanced Web Development** class, another upper-level class but this time with less than 50 students. The first half of this class was lecture-and-homework style while the second half functioned as a design studio, in which students worked on a project and class time was dedicated to group critiques led by the Teaching Assistants. This class taught me how to support students in making connections between technical material and their own interests, as well as how to manage a design studio class.

I am currently an **Embedded EthiCS Teaching Fellow** at Harvard University, where I support Philosophy Postdoctoral Fellows in developing ethics modules for any Computer Science class that wishes to include one (typically a single class in the semester is dedicated to the module). This experience has taught me how to relate any Computer Science topic to philosophical theories of ethics. For some topics, ethical concerns may be more obvious (e.g. computer vision and police surveillance) than others (e.g. operating system design and decisions made by the unicode consortium). It has also taught me about core philosophical concepts as they relate to computing, such as deontological ethics, disparate treatment v. disparate impacts, and the precautionary principle. This experience has given me deep insight into curriculum building, including how to set appropriate learning goals and use appropriate teaching methods, e.g. think/pair/share activities, the use of polling in large classes, how to start classes to encourage active engagement.

I have also given several guest lectures as well as lead academic workshops and even writing workshops. I have been told that I'm an engaging lecturer, as well as an entertaining and capable M.C.

Proposed Courses

I am well-equipped to teach courses on Human-Computer Interaction and User Interface Design. In particular I am interested in teaching introductory classes that are project based, as well as research seminars in which students design and execute on a research plan. I would also love to offer or co-develop the following courses if the opportunity arises:

Human-Centered AI. Why is designing with AI "materials" uniquely difficult, and how can principles of human-centered design support using AI in impactful and ethical ways? Through individual and group projects, this course would involve engagement with technical innovations, such as fine-tuning foundation models with small datasets, but it would also engage in tough social questions about the place of AI in sensitive social systems, such as medical risk prediction or automated student evaluation.[1]

[1] This class is inspired by existing similar classes such as Hal Daumé III's class Human-AI Interaction at UMD, Elena Glassman's class Human-AI Interaction at Harvard, and Chenhao Tan's class Human-Centered Machine Learning at UChicago.

AI and the Writer. Starting with the impact of the printing press, this class contextualizes the abilities of language models in a long history of changes to how we write. What is the place of language models in planning, drafting, and revising different kinds of writing? What are the labor implications of this technology on sectors such as copywriting, screenwriting, and crafting legal documents? This class would include technical elements about how language models function and the "source" of their abilities, as well as social questions about their place in society.

Computers and Creativity. From photography to the ability to record music, technological innovation has always called into question the nature of creative work. Recent AI advances such as large language models and text-to-image generators have once again posed such questions. Can computers be creative? What is creativity? This research course will examine the technical underpinnings of generative AI as well as theories of creativity from computer science, cognitive science, and the arts. We will also tackle difficult, current-day questions about the ethics, labor, and copyright of generative AI.

I am invested in creating courses that engage students in complicated technical material, and then encourage critical thinking about the place of these technologies in their lives.

Mentoring Experience

I have mentored several undergraduate, Master's, and junior Ph.D. students. I have found that my work often attracts students with interdisciplinary interests. Jennifer Lee was a dual Computer Science and Comparative Literature major; she went on to a Ph.D. in Modern Thought at Stanford University. Alex Calderwood was in Columbia's joint Computer Science and Journalism Master's program; he went on to a Ph.D in Computational Media at UC Santa Cruz. This is in addition to mentees that went on to Ph.D.s in Computer Science. My mentoring approach depends on the needs and interests of the student.

Some students want to contribute to existing research projects, and I would assign them components of my own projects. Undergraduate students have participated in literature reviews, pilot studies, data collection and annotation, and paper writing, while Master's and Ph.D. students have contributed to planning and running user studies, and performing quantitative or qualitative data analysis.

Other students come with their own ideas they want to pursue. I guide these students towards interesting research questions and support them through technical and methodological hurdles. I have found that these students also need to learn to have appropriate levels of confidence in their work. Research is a fundamentally uncertain activity, and maintaining motivation in the face of hurdles is important. As long as their question is interesting and has some tractable elements, students often need encouragement that their difficulties are not a sign of failure but rather a sign of asking hard but meaningful research questions.

Conclusion

As a newly minted freshman, I took a required class on Material Science. I distinctly remember the first lecture. The professor, Donald Sadoway, explained that you should work on whatever you think is the most important problem of your time, and this is why he studied batteries, as he saw battery storage capabilities as the main bottleneck in shifting to renewable energy. He didn't convince me to study batteries, but I still think about his proposal: work on what you think is the most important problem of your time. I would add that you must also work on something you personally find interesting. It is this intersection of social importance and personal interest that stimulates the best learning, and I seek to support students in finding this intersection and then pursuing it to the best of their abilities.