

Teaching Statement

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Why do many students not enjoy studying computer science? I would assign the blame to myself and my colleagues. We do not do nearly enough to expose the charisma of computer science to the public in an accessible way. Imagine that you have to take a basketball class. During the whole semester, you are only taught to dribble the ball and shoot, but are never shown the great games of the NBA, would that make you want to be a basketball player? If we want our young college students to appreciate the beauty and power of computer science, we have to do a better job connecting it with our daily lives.

When I think about teaching, I look forward to igniting curiosity in my students. I am dedicated to coming up with good metaphors and analogies, in a creative way, that link to something people already know and care about. When I introduce computer science to freshmen students at the University of Colorado Boulder, I often use the example of the Netflix movie recommendation system. We open Netflix.com to find a movie to watch and are immediately presented with various recommendations. How does Netflix come up with these recommendations? Well, there are sophisticated algorithms at play that analyze your past choices and correlate you with thousands of other users who are deemed to have similar interests. After all this data is processed, customers are presented with the top choices calculated by the computer. A large number of Netflix researchers' job is to understand design more accurate recommendation systems, so that the company's revenue can be significantly increased.

After drawing students' attention to computer science at the beginning of the semester, I emphasize the importance of understanding the theory and math behind it. In my teaching experience, I frequently observed students who tend to rely on existing algorithm packages without necessarily understanding the theory behind them. For example, when learning data science, almost all the students knew how to call the Scikit-Learn Python library to implement an SVM classification model. However, some of them may not really understand how the model works before calling the library. This ignorance would increase the risk of misusing computer science. A typical example is the 2008 global economic crisis, which was, to a large extent, caused by the misuse of computer models. The executives of financial firms assumed that they could use the models without knowing how they operated as long as they worked. In my class, all these examples will be used to help students understand the power of computer science, making them more willing to go deeper into the theory.

Teaching Experience

Lecturing: My teaching experience is rooted in five years of teaching undergraduate and graduate students at the University of Colorado Boulder. I served as a teaching assistant in an Algorithms undergraduate-level course, a Data Structure undergraduate-level course, and an Intro to PhD graduate-level course. In the two undergraduate-level classes, I gave recitations, taught classes in the instructor's absence, and designed assignments and exams. I was also enthusiastic about helping underrepresented students and non-CS majors see the interest and value in computer science. In the graduate-level class, I helped create and deliver a series of lectures from scratch to provide introductory guidance for all the first-year Ph.D. students in the computer science department. The topics we covered included milestones in completing a Ph.D., how to understand and contribute to your research community, how to read research papers, and how to achieve work-life balance.

Since Fall 2019, I have been participating in the university's three-minute thesis competition (3MT). 3MT is an academic competition that challenges me to describe my thesis research within three minutes to the public. I treat this event less like a competition but more like an opportunity to communicate my thesis research in a visionary way that attracts a general audience. My remarks focus on discussing the polarization phenomenon observed on social media platforms and its impacts on our society. I also highlight how we can

investigate effective strategies to design better online discussion forums which will build bridges between people with different ideologies.

Mentorship Experience My research advisors are not just effective researchers and teachers; they are also great mentors. Inspired by them, as a Ph.D. student, I have also committed to mentor both graduate and undergraduate students in a research setting. In the second year of my Ph.D. career, two master students and myself worked on a NSF-funded mobile group recommendation project. I have had the opportunity to train these two master students in mobile app development and data collection and analysis. It was a rewarding experience to share my mobile developing skills with them. After six months, the master students successfully deployed our OutWithFriendz mobile application to the Google Play store. The dataset collected from this mobile app has resulted in two UbiComp publications. I am also proud that over 50% of the students advised by me are identified with an underrepresented group, including three women.

Future Courses

Below is a list of courses that I am excited to teach:

- *Introduction to Computer Science*: A lower-level undergraduate course that inspires curiosity in programming and computer science to CS and non-CS majors.
- *Human-Computer Interaction*: An upper-level undergraduate or graduate course introducing the building blocks of human-computer interaction, describing the interdisciplinary basics of user-centered design.
- *Introduction to Data Science*: An upper-level undergraduate or graduate course introducing tools, methods, and theory behind extracting statistical insights from data using computer science algorithms.
- *Ethical and Policy Dimensions of Computer Science*: An upper-level undergraduate or graduate course exploring the ethical and legal complexities of information and computer science. The coursework will draw heavily from real-world controversies, the latest news events, and trending topics on social media platforms.
- *Computational Social Science*: A graduate-level course that introduces quantitative methods for analyzing large-scale social media datasets to understand human behavior. The course will also cover the potential for using data to address societal issues of inequality, education, climate change, and to provide complementary evidence for traditional experimental studies.