

Teaching Statement

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Background

As a multi-disciplinary teacher, my belief is that structuring a student's ability to *think* is the core of Science, Technology, Engineering, and Mathematics (STEM) education. This includes not just specific programming languages or frameworks, or even key concepts like logical thinking and abstraction, but also a willingness to examine the social and ethical ramifications of one's work. Two dangers I see in current STEM pedagogy are a focus on hyper-specific skills that may not adapt to changing needs, and a reduction of the work down to the abstract "solving of puzzles" rather than preparing students for the reality that they are going out to do work that will have concrete impact on the world at large. I do not want to produce a generation of narrow minded, incurious, and amoral scholars.

I have applied this perspective to my teaching experiences in introductory and graduate level courses across many departments and diverse classrooms.

Teaching Experience

My first teaching experience was as a teaching assistant in Johns Hopkins' Center for Talented Youth summer program for gifted and talented middle- and high-schoolers. As part of the Introduction to Robotics course (and later, the Mathematical Reasoning course), I was able to work with promising students at the very beginning of their STEM education, building up concepts like iteration, recursion, and induction that lay at the heart of logical, programmatic, and mathematical thinking. Over the course of a summer, middle school students (the vast majority of whom had no prior formal training in programming) were able to solve both engineering and programming challenges, including competing in a robotic sumo wrestling competition, and participating in a robot obstacle course.

As an undergraduate, I was a grader and class assistant for courses in three departments. I assisted with introductory logic and critical thinking in Philosophy, statistics in Mathematics, and with the introductory course in Computer Science. I gained experience with grading, assisting in lectures, and running educational computer labs. I take pride in being able to witness, in all of these settings, "Eureka" moments from students who had never before been exposed to symbolic logic, probability, and programming, but who then had mastery over the foundational tools they would use in the rest of their careers.

In graduate school, I was a teaching assistant for an introductory calculus course, where I was able to design my own lesson plans in concert with the professor, reinforcing the material initially presented in a 200-person lecture in smaller, collaborative classrooms. I was also a teaching assistant for a senior level computer game technologies course. The capstone of this course was a multi-week game jam, a new and valuable experience for the students, many of whom had no prior experience with collaborative software engineering. Among other projects, the students were able to create a 3D racing game, an RPG based on musical notation, and a physics-based curling simulator.

My most recent teaching experiences were as a teaching assistant for the graduate level information visualization course at Madison and as part of the instructional staff for the equivalent course at Washington. These students came from a variety of departments and had varying levels of programming experience. Over the course of the semester, I led lectures, optional tutorials, and personalized feedback sessions. At the end of the semester, students were able to complete technologically sophisticated projects with immediate impact in their own fields, from a tool designed to assist in the early diagnosis of Alzheimer's to an app designed to make it easier to find local cycling groups.

While my job responsibilities at Tableau did not provide a specific teaching component, I have been a course adviser, guest lecturer, and subject matter expert for Tableau's internal machine learning fundamentals course. I regularly give guest lectures on topics such as uncertainty visualization, exploratory data analysis, and visualization ethics at institutions such as the University of Washington, MIT, Smith, Northeastern, and Berkeley, and both my papers and the lecture materials regularly appear on syllabi. Less institutionally focused, I was one of the principal organizers and lecturers for the "Visualization for Social Good" tutorial at the 2019 IEEE VIS conference and am an organizer for the annual "Vis4Good" workshop that originated from that event.

During my time at Wisconsin, I was able to supervise both a senior undergraduate (Tim Swast, currently at Google) and a masters student (Subhadip Ghosh, currently at Microsoft). Tim and I developed a tool for the digital humanities capable of showing word usage in an entire century of English texts. With Subhadip, I worked to improve the LayerCake tool for the visualization of viral mutations in HIV populations. At Tableau, I was the sole mentor for summer intern Andrew McNutt (then a graduate student at U Chicago) as we worked on a project to enumerate and automatically detect misleading visualizations. Over the course of the summer we were able to produce a multi-disciplinary literature review, two accepted submissions to the ACM CHI 2020 conference (including a best paper honorable mention), an open-sourced testing visualization "linting" tool, and a new strategic research direction for Tableau.

Future Objectives

In an academic position, I hope to continue to engage in my interest in teaching fundamental and foundational ways of thinking to diverse groups of students, as well as expand my mentorship and guidance of undergraduate and graduate students.

I have a special interest in what I call "lightbulb" courses: introductory or early-sequence courses where students experience sudden insight on how things like programming, statistical reasoning, or design work. In addition to contributing to core classes in my department, I intend to develop specialized courses in visualization, and data science. Topics of special interest to me are *data rhetoric* (how data, and presentations of data, do or do not persuade), *critical data science*, the *digital humanities*, and *statistical graphics*. In addition to being courses in important emerging topics, I believe that courses in these areas (and visualization generally) are useful places for fostering interdisciplinary collaboration, germinating longer-term research projects, and generating interesting research questions.