Teaching Statement

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I have had the pleasure to spend time as an undergraduate and graduate student teaching and developing curriculum for a wide variety of courses. These have ranged from introductory courses for high school students with no programming experience to advanced systems courses for machine learning and database researchers. In addition, I have created two courses in response to the lack of a practical data analysis curriculum at MIT. I love teaching and it is a key reason I want to be a professor.

The most interesting part of teaching is working with students that have very different backgrounds and interests. I strongly believe the job of an instructor is to motivate and excite students about a topic, help remove stumbling blocks, and then operate as support. The Introduction to Data Analysis class (dataiap.github.io) was designed around this philosophy. We replaced typical hour-long lectures with a short ten minute "teaser" that summarize how a type of analysis led to surprising results in an interesting dataset (e.g., US presidential election campaigns sometimes recieved *negative* donations). Students spent the rest of class walking through a detailed lab to replicate the teaser's findings and applying the analysis to their own datasets. Despite students that ranged from machine learning experts to non-technical CEOs at local companies, we were able to keep students engaged through the course.

Our lessons from the introductory class evolved into MIT's first Big Data course that I am co-instructing this semester. This course surveys modern techniques and systems to ingest, efficiently process, analyze, and visualize large data sets. Throughout this course, we developed eight labs that give students hands-on experience with the course topics that are relevant in industry. These have ranged from integrating venue data from Four Square and Locu to graph analysis on Amazon's cloud infrastructure.

In addition to data-oriented courses, I have experience teaching and developing introductory computer science curriculum. MEET is a middle-east peace initiative that brings top Israeli and Palestinian high school students together through an MIT-led business and computer science program that lasts from their sophomore to senior years. As Head of Curriculum, I spearheaded the program's transition from a legacy Java-centric to Python-centric curriculum. During this process, I created a new outline of topics and goals for each semester in the three year program, and developed the first year content centered around drawing and animation in Python. As of this year, MEET has grown to almost 100 students per incoming class and fully transitioned to the new curriculum.

The classes I have instructed have all been heavily lab-oriented and emphasized student directed projects. I have found that this approach, in conjunction with one-on-one meetings between the teaching staff and students is very effective at keeping students engaged. Labs let students progress and learn at their own pace, projects provide students a venue to find a topic that excites them, and meetings both give the students a chance to privately express their concerns and the staff a chance to understand student interests. This places a larger burden on the teaching staff, however it is a worthwhile trade-off in the long run.

I am fortunate that my advisor, Samuel Madden, has been extremely supportive of my research and teaching pursuits throughout my graduate career. Not only has he encouraged, co-developed, and at times funded the courses I taught, he has shown by example the effectiveness of teaching a class by simply vocalizing his own enthusiasm for the topics. I have liberally borrowed many of his teaching techniques, such as live demos and coding to use in my own classes. As an advisor, his constant enthusiasm to try anything "cool" and ability to contexualize ideas have been instrumental in my growth as a researcher. I hope to be as influential to my students as Sam has been to me.

I am excited to teach undergraduate courses in databases, data analysis, operating systems, and any introductory course in programming, data structures, or algorithms. At the graduate level, I would like to teach advanced database systems, big data systems as well as seminar courses that explore current advances in data management and their intersections with other research areas. Some examples are the intersections of databases with human computation, computational journalism, the web stack, and interactive visualization tools.

Teaching Experience

Instructor, Big Data Systems (MIT 6.885) Fall 2013

Instructor, Introduction to Data Analysis (dataiap.github.io) Spring 2012

Head of Curriculum, MEET 2011 - 2012

TA, Database Systems (MIT 6.830) Fall 2010

Instructor, MEET Summer 2010

Instructor, Introduction to Java Course (MIT 6.S092) Spring 2010, 2011

TA, Database Systems (UCB CS185) Fall 2006