Teaching Statement

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I am passionate about teaching and find it to be a central part of my career goals as an academic. Particularly in the context of my research agenda, where I hope to distill foundational principles from varied applied work, I consider teaching to be an integral part of the research process. As an applied statistician, I consider the communication skills necessary to be an effective teacher to be a core requirement of my job. To this end, I aspire to take a leadership role as a teacher as well as a researcher.

I was not always a natural at Statistics, and it was only during my graduate career, with the benefit of excellently designed instruction, that I was able finally develop a deep intuition for the field. The rocky path that I took has strongly influenced me as a teacher – I understand both how opaque and how natural statistical ideas can appear. This helps me take the perspective of the audience regardless of technical level, and has made me a highly effective communicator of statistical ideas, particularly to those who are not experts in the field.

As a teacher, I strive to have my students come away from my classes with not only a competence in the particular methods that I have taught, but also an intuition for the subject matter that they can generalize to new circumstances. Bluntly, I consider this big picture understanding to be the main value that a teacher adds over a reference text. This perspective is particularly important in Statistics, where many students, even at the highest levels, only see the field as a collection of methodologies without a unifying thread to connect them[1].

To build this intuition, I frame material in terms of a small set of intuitive generating principles. Although the particular principles vary by subject matter, the axioms that I put forward in my research statement are where I usually start:

1. Statistical methods are a formalized extension of basic scientific and rhetorical logic.

2. Interfaces between methods and applications should be shaped by the logical argument underlying the

[1] In some cases, this can be more dangerous than no statistical education at all – time and again I have seen students and practitioners latch onto particular methodologies without the necessary framework to justify their usage in an applied setting or compare them to favorable alternatives.

problem rather than the format of the data.

3. The theoretical demands made of statistical methods should depend on the logical argument in which they are being deployed, rather than the argument being shaped by the properties of a standard model.

In many cases, this approach requires developing a novel approach to the material. In many classes for which I served as a Teaching Fellow at Harvard, I developed novel material that students found to be more informative than the source lectures. As a result, I was commended four times on the basis of my teaching evaluations, and named the Pickard Memorial Teaching Fellow in our department in 2014.

The time and energy that I have spent designing more intuitive paths through statistical material has also helped me as a researcher. One of my strengths is an ability to draw from disparate parts of the literature and combine or contrast ideas on an even footing. Often, I am able to do this precisely because of a unified representation that I have developed for teaching. As a small example, for a statistical computation class, I designed a visual representation of Hamiltonian Monte Carlo (implemented by the course instructor here: http://databits.io/bits/hamiltonian-hybrid-monte-carlo) that had not appeared before in the literature. This simultaneous representation of true and auxiliary parameters did not only build intuition for students in the class – it is also the basis of ongoing work to gather and jointly characterize Monte Carlo methods drawn from both the Statistics and Machine Learning literatures. Similarly, my main-line research on social networks was inspired by work I did to reformulate material for an intro-level Statistics class.

Of course, teaching is not only about framing, but also about engaging students. In the classroom, I strive to cultivate both a personal and intellectual rapport with students. As often as possible, I attempt to draw examples from applied examples that are relevant to the application areas in which my students work, or are of general interest (e.g., sports, politics, and health). I find that students become the most engaged when they are equipped with the tools to complete the "last mile" in taking ideas from class and applying them to the wider world. For this reason, I strongly believe in teaching courses with a programming component so students are able to design and perform data analyses from start to finish on their own.

Beyond classroom teaching, I also have a strong interest in creating scalable teaching materials in the form of textbooks or online courses. I believe that my background and intuitive approach are particularly useful in these contexts where the feedback loop between students and instructors is not as tight, so being able to preempt misunderstandings is critical.