Teaching statement

Maxwell W Libbrecht

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Experience During graduate school, I chose to take on teaching responsibilities to prepare myself for a career in academia. I was a teaching assistant for a computational biology course (Genome 540 2015) and twice taught a two-week unit on gene regulation and epigenomics as part of a computational biology survey course (Genome 541, 2015 and 2016). As a TA for Genome 540, I graded assignments, answered students' questions, and prepared and gave discussion sections. For this course, I also prepared a new lecture on supervised learning in biology and designed and assigned a new homework on this topic.

As an instructor for Genome 541, I developed a new two-week unit. I chose a topic, designed a syllabus on this topic to emphasize common computational and biological themes, gave four lectures, and developed two homework assignments. My teaching was evaluated by a professor, and I received very positive feedback in my student evaluations, including "Excellent lectures and homework," and "You could easily teach a course like this on your own." I have taught this unit for two years so far, and I was asked to teach it again in the coming Spring quarter. I was the first graduate student to be entrusted with teaching a unit of Genome 541.

I also served as a mentor for seven undergraduate students and three junior graduate students. One of these undergraduates, Oscar Rodriguez, has gone on to a PhD program; the rest are still in their current programs.

Interests I am interested in teaching courses on computational biology, machine learning, or core computer science topics such as algorithms or probability. I could adapt the unit I taught at UW on computational methods for gene regulation and epigenomics (GS 541), either as a unit of a survey course like I taught at UW or expanded into a full course. I could also develop new courses on introductory computational biology, statistical inference and machine learning, or practical data science.

Data science curricula I believe there is an opportunity to dramatically expand the data science curriculum at most universities. Facile use of data is increasingly a crucial part of many professions, including journalism, business, science and medicine. The existing data-related curricula—including statistics and computer science—cover some aspects of data science, but not others. For example, data visualization is often explicitly discussed only in specialized graduate courses, despite the central role that visualization plays in analysis. Moreover, most computer science curricula teach students to think like engineers, encouraging them to build large, robust programs like the ones they might build as a software engineer at a company. In contrast, data analysis is often best performed by thinking like a scientist, by quickly building small prototypes to test hypotheses and nimbly modifying the questions being asked in response to the results. As a professor, I will aim to design and teach new courses to satisfy this growing need.

MOOCs and data The coming transition to massive open online courses (MOOCs) will transform the teaching process at universities in two ways. First, the use of standardized teaching materials allows universities to focus on their most important competitive advantage: interaction with professors and other students. In my courses, I would focus class time interacting directly with the students and encouraging students to interact with each other, while using online materials for lectures and homework.

Second, computerized and standardized materials enable new opportunities to understand students' learning process. Each student action (such as answer to a homework problem) will be recorded and can be correlated against future outcomes, such as final exam grade, overall success at the university and future salary, to guide course development. I will use my experience in data analysis to apply this information with the goal of helping students to learn most efficiently.