Teaching statement

1 **BACKGROUND**

In addition to my bachelor's of Computer Science, I completed a minor in Fine Arts, which shaped much of my teaching and advising philosophy. A core technique to teaching art is **critique**, a process of clear, considered, constructive feedback on an artifact. Effective critique requires the ability to articulate what works and does not about a solution and to be able to give actionable suggestions for improvement—it is not just a laundry list of criticisms. Learning how to give and receive effective critique was a fundamental part of my undergraduate education and is a set of skills that are also essential in research. I have continued to develop these skills through formal and informal mentoring of other students. I also put these skills to regular use during peer review of publications, and have received Special Recognitions for outstanding reviews for three top-tier HCI conferences: UIST 2015, CSCW 2016, and CHI 2016. Having implemented critique in the classroom myself, I believe it also can form the foundation of effective teaching.

2 **TEACHING EXPERIENCE**

I have been a teaching assistant in courses on human–computer interaction and user interface implementation at both the University of Waterloo (during my Master's) and at the University of Washington. Waterloo's course on user interface implementation is an assignment-based course primarily centered on software engineering skills: the software design patterns and conceptual background needed to implement robust and complex user interfaces and interaction. I TAed that course twice, much of which involved tutoring students one-on-one and in small groups during office hours. This process helped me hone my ability to break down abstractions into understandable examples. The HCI classes at Waterloo and Washington both involved regular feedback to student project groups on ongoing design problems, which drew heavily upon—and helped refine—my skills in critique. Teaching engineering students about design has also honed my ability to communicate across this gap: I have developed a toolbox of analogies for explaining design concepts to computer science students in terms they are familiar with and receptive to.

I strongly believe in the value of critique, both as a tool for giving high-quality feedback to students from instructors, and as a skill that students should learn. Apart from being a common task in design fields, critique is an important part of real-world software engineering in the form of code review, and is an essential skill for researchers. I assisted James Fogarty in redesigning the curriculum for Washington's fourth year HCI course, and in that process advocated for more critique in the classroom. Weekly sections as well as portions of scheduled lecture time were allocated to critique, with one staff member per group of ~10-15 students facilitating critique. This allowed us to give frequent, high-quality feedback to students on their projects throughout the quarter and reduced our reliance on less-regular feedback through project milestone reports. As a teacher I would continue to experiment with methods beyond the traditional lecture-style course.

I look forward to teaching courses in human–computer interaction, user interface implementation, information visualization. In addition, I have spent a significant portion of my graduate career advocating for improved practices in experimental statistics in human–computer interaction and would like to teach a course on modern statistics for the analysis of experimental data. I have given informal tutorials to other graduate students on this and related topics, such as the effective use of the R programming language for statistical analysis. I have also co-authored a book chapter with Jacob Wobbrock in an upcoming book (due 2016), *Modern Statistical Methods for HCI* (eds. Judy Robertson and Maurits Kaptein). Part of my broader agenda for educating the next generation of researchers is to give them the tools to answer richer questions about the studies they run, like "how big are my effects?" and "should I care?", not just binary questions of statistical significance. To that end, I have also been an

advocate for improved statistical methods (including Bayesian analysis) in the community, most particularly in my paper "Beyond Weber's Law", which received a Best Paper Honorable Mention at InfoVis 2015. Finally, my strong software engineering background gives me the experience to introductory classes such as programming, software engineering, and algorithms.

3 **ADVISING AND MENTORSHIP**

I have been fortunate to advise three undergraduates and one Master's student on various projects over the course of my Ph.D., as well as informally advising junior graduate students. One of these students, Jesse Shepherd, engineered portions of the Lullaby sensing system that resulted in our Best Paper award at UbiComp 2012.

In my experience working with undergraduates and junior graduate students, I have found that they often possess excellent technical skills, but may not have as strong a sense of how to prioritize problems in research. It is easy to get lost in the fun of solving a particular technical problem without asking if the cost of time / resources developing that solution serves broader research objectives, particularly in an engineering-focused field. Learning how to decide what problems matter, and which to punt on, is fundamental to research. Thus, I often advise students in strategies for the process of identifying interesting questions, and I take time to step back and ask why they should pursue some particular alternative solution. It is important for students to learn how to answer that question, sometimes moreso than learning how to develop the solution pursued (technical skills they often already possess). At the same time, I always make myself available for deep dives into specific problems—for example, in software engineering, design, visualization, or experimental statistics. On the topics of design, visualization, and statistics, I have given numerous impromptu tutorials to other graduate students, and I pride myself on being known as someone always willing to give detailed feedback on a visual design or statistics problem.

Finally, I consider it paramount in research for students to develop an independent work ethic and process. I typically meet with students weekly and try to give them ownership over projects. Besides learning how to make considered choices about research priorities, I also consider it part of my duty to provide mentorship on skills for time and project management. Part of the joy of graduate school is the relative freedom to set one's own schedule; the trap students can fall into is that because they can work nearly whenever they want, they feel guilty whenever they are not working. I want students to be well-rounded—with rich lives outside research—without living under a cloud of guilt whenever they aren't working. Part of my responsibility in that as an advisor is to communicate not only research goals and expectations, but also how much time I *do not* expect them to work so that they do not feel pressured to overwork and burn out.

4 **DIVERSITY**

I am strongly committed to increasing diversity in Science, Technology, Engineering, and Mathematics (STEM). Throughout my graduate career, I have participated in outreach events for underrepresented populations in STEM. For example, while at Waterloo I had the opportunity to run introductory tutorials in HCI for an outreach program exposing high school girls to Computer Science. At Washington, I gave a lecture on my research at the Summer Academy for Deaf and Hard of Hearing Students, another high school outreach event. This past summer, along with professors Jessica Hullman and Sean Munson, I advised an undergraduate student, Tara Kola, through the Computing Research Association's Distributed Research Experience for Undergraduates (DREU). That program aims to give undergraduate women valuable research experience, encouraging them to continue in STEM. Tara spearheaded a project to redesign the presentation of realtime transit data to convey probabilistic predictions to users in a way they can understand, leading to a paper submission for CHI 2016 (currently under review). I have also made diversity a part of my research agenda; my paper examining gender biases and unequal representation in image search results for occupations received a Best Paper Award at CHI 2015. This paper also garnered broader press attention, including articles in *The Washington Post* and *The Atlantic*.