Shaun Kane: Teaching Statement

Since becoming faculty I have had the opportunity to teach a variety of courses in the areas of computer science, human-computer interaction, and accessible computing. I have also had the privilege to mentor many talented undergraduate, master’s, and Ph.D. students.

Teaching Background
Prior to coming to the University of Colorado Boulder, I taught several computing courses at my prior institutions, both as a student at the University of Massachusetts and the University of Washington, and in my previous faculty position at the University of Maryland, Baltimore County. These classes included an introductory programming course, and courses on web programming, interaction design, web programming, information architecture, and mobile human-computer interaction. While I have not yet taught any of these specific courses at CU, my prior teaching experiences have helped inform my teaching philosophy, and have served as the foundation for my teaching at CU.

Courses Taught at CU
To date I have taught a total of 5 courses in the Computer Science Department at CU: one undergraduate-only course, two graduate-only courses, and two combined undergraduate and graduate courses. These courses are described below:

*Human-Centered Computing Foundations* (CSCI 3002, Fall 2015, 65 students). This class is an introduction to human-centered computing and human-computer interaction concepts. Working from Clayton Lewis’s syllabus, I substantially revised this course in Fall 2015. This course was picked up by Tom Yeh, who taught the course in 2016-2017 based on the materials I created.

My primary goal in revising the course was to increase the emphasis on design practice. As this course is typically CS undergrads’ first (and often only) exposure to a human-centered computing perspective, I considered it important for students to spend significant time practicing design activities and learning through practice. To support this goal, I restructured the course using a flipped classroom model. In each class meeting, students practiced design activities such as sketching, storyboarding, and programming user interface prototypes. Class assignments integrated peer-to-peer feedback so that students could iteratively practice their design and quickly receive feedback. Using this structure, students were able to practice user-centered design through a combination of in-class activities and a semester-long course project.

A secondary goal was to integrate universal design concepts into all aspects of the course. It is commonly believed that the best way to engage students in creating accessible content is to consider extreme users, such as people with disabilities, throughout the design process, rather than isolating accessibility in a separate course module. The importance of integrating universal design concepts into the course was highlighted in this case, as one of the students in the course had a vision impairment that made all visual content in the course inaccessible. Throughout the class, students practiced the core ideas of human-centered computing and user-centered design using both visual and non-visual representations, for example developing audio user interfaces along with graphical user interfaces for their projects, and practicing tactile drawing in addition to sketching on paper. To my delight, all students were enthusiastic about making their work accessible, and integrated universal design concepts into their work throughout the course.
User-Centered Design and Development 1 (CSCI 5839, Fall 2014: 32 students, Fall 2016: 35 students). This course is the introduction to human-centered computing for graduate students. This course includes a mix of master’s and Ph.D. students from CS, ATLAS, and other departments.

Overall, the structure of this course is similar to CSCI 3002, although this course more strongly emphasizes human-centered computing research. This course also heavily emphasizes the semester-long group project, and encourages students to reach out into the community to find problems that can be addressed through technology. Students in this course have used the course project as an opportunity to explore a number of issues that affect their personal lives, including personal health, fitness, and other issues facing students at school and in their daily lives.

Physical and Tangible Computing (CSCI 4830/7000, Spring 2015, 35 students). I developed this course to teach CS students how to design, build, and evaluate “smart” physical objects. This course was inspired by research problems that my lab had begun to engage with, as many of our projects involve both software and hardware components. The focus of this course is primarily to design interactions with smart objects, and to implement prototypes that support this design.

This course covers a wide range of physical computing and fabrication technologies, including paper and foam-core prototyping, microcontroller programming, fabric-based soft circuits, and fabrication tools such as 3D printers and laser cutters. Each week, students learn a new technique for prototyping smart objects, and produce a prototype during the class meeting itself. This rapid pace is intended to teach students how to approach and quickly learn new prototyping tools. This course also heavily emphasizes peer learning: as the course covered many skills that some students had, but which not all CS students are expected to have, such as sewing, I set aside time and provided extra credit for students to teach the class mini-lectures on topics of their choosing. At the end of the course, students produced working prototypes of their projects, which included interactive musical instruments, wearable fitness trackers, and assistive technology devices, and demonstrated these projects at the ATLAS Expo.

Inclusive Design and Assistive Technology (CSCI 4830/7000, Spring 2017, 36 students). This course is my first course that focuses entirely on issues of disability and technology. This course covers a variety of issues, including perspectives on disability and technology, design approaches to creating accessible technology, and the use of assistive technologies such as eye trackers and switch control. As in my other courses, students produce a small prototype each week that demonstrates the course content, such as a voice-driven mobile application or a 3D-printed tactile graphic. This course also integrates the perspectives of people with disabilities themselves through guest speakers, and by engaging with films, articles, and other media written by people with disabilities themselves. This course also features a new service learning component, in which students are expected to go out into the local community and perform community service work.

The development of this course was supported in part by a CU Universal Design Fellowship. This course was offered as a special topics course in Spring 2017, but will be offered as a permanent course in Spring 2018.

Undergraduate and Graduate Research Mentoring
I have had the privilege of working with a number of amazing undergraduate and graduate students. To date, I have graduated two Ph.D. students, Dr. Halley Profita (CU CS, 2017) and Dr. Michele
Williams (co-advised with Amy Hurst at the University of Baltimore County, 2015, now at Pearson). My current research group consists of four Ph.D. students and four undergraduate RAs.

I am passionate about increasing representation from underrepresented groups in computing. Of my current students, 50% of the Ph.D. students and 75% of the undergraduates are female. I have worked with a number of students of color and students with disabilities. I am also dedicated to supporting undergraduates in research. Since coming to CU, I have supported four undergraduate RAs through the Discovery Learning Apprenticeship (DLA) program, and have recruited two new DLA students for the coming academic year.

**Outreach and Inclusion**

As a disabled faculty member in computing, I am dedicated to increasing the participation of people with disabilities in computing professions and in higher education. To this end, I have conducted a number of activities intended to support people with disabilities in computing careers. I am a partner of the AccessComputing Alliance, and have served as an informal mentor to AccessComputing students since 2011. I have participated in two panels at the ACM Richard Tapia Conference on Diversity in Computing that focused on participation by students with disabilities in computer science. At CU, I have mentored multiple students with disabilities, acting as a research co-advisor for an undergraduate with a visual disability, and hosting a summer DREU intern with a disability.

I have also worked to engage the broader community of people with disabilities in computing activities. I organized two workshops at the Colorado Center for the Blind that introduced blind high school students to computer science. I have also organized three courses for the National Federation of the Blind Youth Slam, a week-long science camp for blind high school students. I am currently working with Sarah Miller from the CU BOLD Center to create a scholarship program to support students with disabilities.

**Course Planning and Service**

Since Fall 2016 I have served as the lead for the human-centered computing track in CS. In this role, I have worked with other CS faculty to plan course offerings in the area of human-centered computing. This year, as a member of the Computer Science Graduate Committee, I co-created a course plan for a forthcoming professional master’s track on human-centered computing.

I am also an advisory board member for the ATLAS M.S. degree in Information and Communication Technology for Development. Although this degree was initially targeted at professionals working in developing regions, recent student cohorts have adopted a broader definition of development, including working with underserved communities in the developed world. I have been working with the advisory board to update the curriculum to support the interests of current students.

**Teaching Goals**

Looking forward, I see several goals for developing as a teacher. First, I hope to continue to integrate aspects of community engagement with my courses, so that students can practice their skills on real world problems, and can develop solutions that can help the local community. Second, I intend to work with CS, ATLAS, and Information Science faculty, to further develop the CS curriculum in human-centered computing, and to ensure that our curriculum complements other courses and programs on campus. Finally, I hope to continue to find ways to include underrepresented students and students with disabilities in computing, through community engagements, workshops, and other forms of outreach.