

# Noura Howell

I teach all levels of user research, human centered design, tangible design, embodied design, and interaction design; physical computing with microcontrollers and circuits; and introductory computer science. I welcome students from a range of educational backgrounds including art, city planning, architecture, and the humanities, bringing the same enthusiasm for interdisciplinarity from my research to my teaching. With a project-centered approach, I challenge students to consider the social, aesthetic, technical, and political implications of their work.

My teaching experience consists of five semesters as a graduate student instructor for UC Berkeley courses teaching graduate and undergraduate students, one term teaching a creative immersive for artists, and two years volunteer teaching an after school high school program. I have also mentored several undergraduate research assistants. I have taught physical computing, creative programming, design, data science, and web development. These classes introduce theoretical and technical concepts and guide student group projects exploring these concepts.

## Tangible User Interfaces

This graduate course introduces the design of tangible, embodied, physical computing interfaces. Student work from this class has been published at top tier venues in human-computer interaction such as Human Factors in Computing Systems (CHI), Designing Interactive Systems (DIS), and Tangible Embedded Embodied Interaction (TEI). As graduate student instructor for this course for three years, I mentored student projects and led about a third of class sessions. I led design thinking exercises, electronics labs, and helped set final grades. I revamped the curriculum to include more hands-on design thinking exercises; design theories such as critical, speculative, and reflective design; and programming and electronic



Student work from Tangible User Interfaces: (left) Exploring how sounds influence perception of taste. (right) Tilting a box of marbles as a drawing interface.



Student work from Creative Code Immersive: Architectural lighting.

techniques such as communication protocols, sensors, and sound synthesis.

**I am passionately committed to welcoming students from any background.** The curriculum is carefully structured to have no prerequisites and support students getting started with Arduino and circuits. It is tricky to balance the difficulty level for students from many backgrounds, but having a range of students in the class makes for more interesting interdisciplinary final projects. Students from the arts and humanities tend to experience a steep learning curve in the beginning with the basics of programming, but excel later on in conceptual and aesthetic development of project ideas. Conversely, students from technical backgrounds find the earlier labs trivial but find challenge and growth in designing a project

that is conceptually compelling. Though structured like an introductory course, it provides avenues for growth in numerous directions beyond the minimum requirements. Many students tell me this was their first exposure to such an interdisciplinary arts, design, and engineering approach, and that they will continue pursuing this in their future courses and careers.

## **Creative Programming & Electronics**

This undergraduate course introduces programming in p5.js and Arduino, as well as circuits for physical interactive computing. I assisted during programming and electronics labs, mentored student projects, and graded assignment.

## **Creative Code Immersive for Artists**

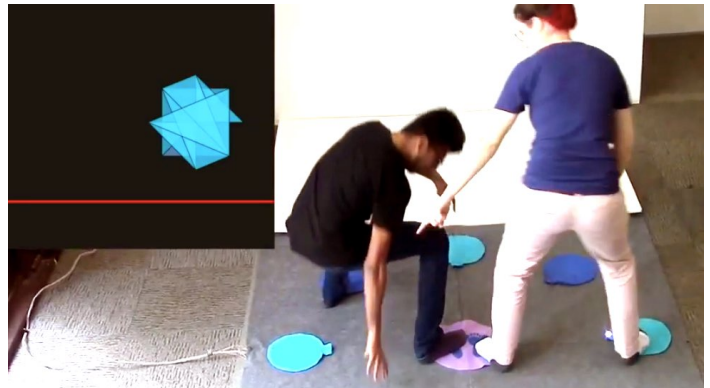
Gray Area Foundation for the Arts teaches a Creative Coding Immersive night class for adult artists. It introduces Processing, JavaScript, and Arduino programming and culminates in an well-attended art exhibition in their gallery. As volunteer teaching assistant for one term, I provided hands-on assistance during programming exercises.

## **After School Web Development Program**

This after school program for high school students provided a community hangout centered around student-driven web development projects. As a volunteer mentor for two years, I created curriculum and taught lessons in HTML, CSS, and JavaScript based on student interests, as well as providing hands-on programming assistance.

## **Deconstructing Data Science**

This course combines machine learning with critical social analysis of how these techniques can reinforce societal inequality. Algorithms are first introduced mathematically and then students are encouraged to use software packages such as pandas that implement these algorithms. Each assignment consists of both a coding section and a written analysis. As graduate student instructor, I graded student work, provided



Student work from Tangible User Interfaces: Geometris uses full-body play for learning about geometric shapes. It won Best Student Game award at CHI, a top tier international conference for human-computer interaction. It also became the thesis work of PhD student Leah Rosenbaum.



Student work from Tangible User Interfaces: Soundglove explores the sonic textures of everyday objects and was published at CHI.

programming and math tutoring outside of class, and encouraged students to critically reflect on the social implications of their final projects. In particular, I asked students to consider who or what might be excluded from their chosen data sets, and how this might influence their analysis and findings.

## **Mentoring**

Many undergraduate and graduate students reach out wanting to work with me, and many women from my classes come to me for advice outside of class. They are seeking a woman role model who shares their interests in both creative and technical pursuits. I consider these conversations to be equally if not more important than formal classroom instruction.

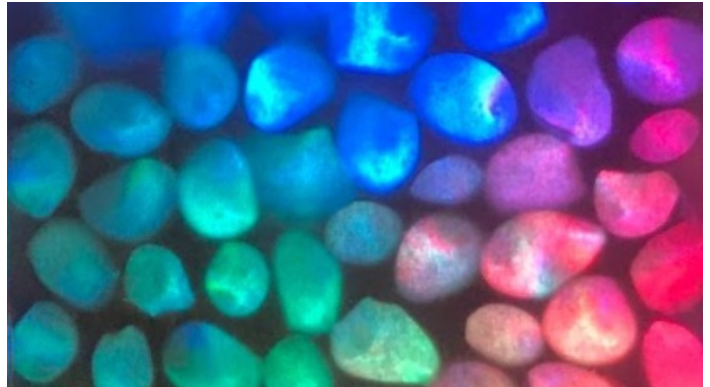
Over the years mentoring student projects, I have learned to encourage students to iterate and always push themselves to do better without getting

discouraged. For students just learning to code, this means making sure they understand that debugging is a normal part of the process even for experts. For design projects, this means learning to give and receive constructive critique and appreciate the process of continuing to iterate on their ideas.

I have worked with six undergraduate research assistants. They come from architecture, computer science, interdisciplinary studies, and mechanical engineering. My role as a mentor is to provide guidance and encouragement to help students nurture and pursue their own passion. While I leverage my experience to help them channel their efforts in ways that lead to academic and professional advancement, I also learn from the interests and perspectives of my students and mentees. I am inspired seeing them go on to do work I never could have imagined. I am excited to mentor emergent scholars and artists in my role as faculty.



Student work from Creative Programming & Electronics: Custom footpad sensors for a Twister-like exploration of circuit design.



Student work from Tangible User Interfaces: Creating a diffuser to soften the feel of LED lights.