# Ryan Louie *Teaching Statement*

As I mentor, I provide students opportunities for authentic practice in self-directing work on open-ended human-computer interaction (HCI) projects in design, technology, and research. To build their capacities to lead all aspects of their research, I explicitly train my students in *the regulation skills* to reflect on their project risks, plan their next steps, and seek help from others in the learning community and *effective representations* for critically thinking about aspects of a design research project. To scale coaching on these critical thinking skills, I develop *learning modules* for these representations of HCI design research projects, as well as *scaffolding tools* for finding modules matched to their project risks and level of knowledge on the topic which students can do as self-contained activities on their own, or with the guidance of a mentor. As my students learn these regulation skills and effective representations for directing open-ended work, they need the support from others to effectively do this. I develop learning communities that provide social support to make it easier to learn this complex work by incorporating various social structures that support the formation of peer support networks and reinforce a culture of seeking and receiving help. Implementing my teaching philosophy, I have (1) mentored 25 students on self-directed HCI systems research projects; (2) co-created a novel open-ended HCI curriculum and (3) created collaborative activities and social practices to build supportive learning communities.

## Mentoring students in Design Technology Research (DTR) to self-direct design-research projects

Since Fall 2017, I have advised 25 students on independent research projects. **Rather than assigning them specific tasks in a research project collaboration, I provide my students the opportunity to lead all parts of an HCI systems research project**, such as uncovering user needs, specifying system requirements, prototyping, planning and conducting studies, and communicating research through conference submissions. I have advised students on advancing three branches of research**,** much like how a P.I. advises PhD students in project directions that align with a broader grant vision. **My students have won a cumulative $10000 through undergraduate research funding** from their proposed projects, resulting in **two papers to the ACM undergraduate student research competition** that have been awarded 2nd place (CHI ’18, CHI ’22) and another **two papers in the late-breaking work tracks at premier HCI venues** (CHI ’20, CSCW ’21).

I can effectively train students at scale through being a graduate student mentor in Design, Technology, and Research (DTR), a research program and learning environment that seeks to develop students’ potential in developing novel technological solutions for human-centered design problems. In repeated 10 week-long studio sessions, I coach students to identify a research direction, explore and iterate over designs, prototype at varying fidelities, build working systems, conduct evaluative studies, and report findings through conference publications and research competitions.

**To develop their capacities for independent research, I train students in the regulation skills in reflection, planning, and help seeking required to lead their work**. Through weekly special interest group (SIG) meetings, I coach them in reflecting on risks in their projects, planning achievable goals that will advance their understanding, and seeking help from others in their work community. During SIG, I foster a social learning space between the undergraduate and master students working on different projects related to a common research theme. Since students might have faced similar challenges to their peers, I encourage students in the audience to provide their own perspectives for addressing the problems being presented by their peers. Furthermore, I highlight shared points of struggle on regulation skills so that students across projects feel a sense of shared growth as they work on developing these complex skills.

## Developing Learning Activities and Tools for DTR’s Open-Ended Curriculum

Beyond my involvement as a project mentor in DTR, I also served as a teaching assistant in DTR during Winter and Spring 2022, where I co-developed an open ended curriculum of *learning modules* and *scaffolding tools* for helping students select modules that best meet their immediate project risks and learning needs. Unlike other project-based courses where all students learn the same stage of the design process (e.g., a week on needfinding, followed by a week on prototyping), the students in DTR have different risks in their project on any given week, which motivates the need for an open-ended curriculum. Because coaching needs to be different for each student who is working on a specific risk, individual coaches cannot always be with students to guide them. However, when students try to work on their own, they may not have effective representations in order to critically think about aspects of their projects, such as problem statements, design arguments, or study plans. **To help students to learn**

**effective representations for design research projects, I co-developed an open-ended curriculum of learning modules that students could do as self-contained activities on their own, or with the guidance of a mentor.** I created materials that taught foundational materials about a cognitive representation, examples of how existing research papers use the representation, and activities for applying the cognitive representations to their own projects. I used these materials in office hours with new DTR students; **student feedback from these sessions helped me improve the final versions of the learning modules that have been incorporated into the current curriculum for the DTR course.**

Beyond creating learning modules for this open-ended curriculum, I also developed scaffolding tools that help students with selecting the most helpful learning module for self-guided practice sessions that occur during studio and office hours. Unlike other project-based courses where all students follow and learn the same stage of the design process (e.g., a week on needfinding), the students in DTR have different risks in their project on any given week, which requires them to learn a different representation than their peers during studio sessions. Additionally, because DTR students often stay over multiple quarters to advance their skills and projects, this creates a learning environment in which students have asymmetric knowledge about topics (e.g., where some have never conducted user testing, while others are doing it for the third time). **To scale the teaching of these representations in a way that is tailored to students' unique needs, I developed a scaffolding tool that helps students match learning modules to their project risks, and find the level of the learning module that is appropriate for their current knowledge.** The scaffolding tool helps students choose a learning module for an hour-long practice session, in cases when either it is their first time learning a representation or their goal is applying the effective representation to address risks in their project understanding. Starting in Fall 2022, DTR students have been using the open-ended curriculum and scaffolds to self-direct their learning of effective representations. Through the guidance of the learning modules and scaffolding tool, new students have started learning the foundations of representations for design and research together in peer study groups, and all students are more independent in applying the representation to critically think about their own projects. Excitingly, my fellow mentors and I have noticed spending less time on getting students started with using an effective representation to think about an aspect of their project, and more on helping them critique and iteratively improve their arguments after they've written them.

## Fostering Collaborative Learning Environments for Lecture-based HCI classes

In Winter 2021, I served as a TA for "Technology and Human Interaction", a lecture based course offered online to 60+ students from CS and Communication Studies, where we taught core theories and methods from HCI and user experience (UX) work and helped students apply them to better design new technology applications. To overcome challenges with active student engagement in the online classroom, I took the initiative to foster a collaborative learning environment by co-leading the development of breakout room activities that tasked students to apply HCI theories and methods to real-world examples in collaboration with their peers. One activity I really enjoyed developing was one where student teams brainstormed on how to apply a "Design Justice" framework to redesigning popular mobile applications — from guided meditation apps to dating apps — in a way that centers the needs and voices of traditionally marginalized users. When forming these virtual breakout groups, I recognized that instead of using random groups for each class session, we could maintain the same groups over multiple weeks to support the formation of a cohort amongst peers. Through mid quarter feedback surveys, students commented that the breakout groups created a more collaborative atmosphere, and helped them to form a network of peers they could turn to for help on assignments and forming projects groups later in the quarter. **In course evaluations, I was happy to receive 'Very High' (6 out of 6) remarks from 75% of students,** where they commented on **how I was "very good at facilitating interactions, guiding them to an idea or concept, and explaining concepts clearly".**

## Teaching Plans

My past teaching experiences have prepared me to teach lecture-based and studio-based courses in *HCI* and *Design, Technology, Research for Interactive Systems.* Through my research background developing human-AI interfacing technologies and HCI systems in academia and industry, I am equipped to teach courses in *Human-AI Interaction, Scalable Web Architectures,* and *Designing Social Computing Systems*. In addition to providing students with authentic opportunities to work on interdisciplinary computing projects, I seek to teach (1) regulation skills for leading such projects; (2) effective representations for guiding thinking in design and research on technology; and (3) sensitivity to ensure the values of all stakeholders are reflected in the systems my students build.