Research Statement
Alexandra To

I am a qualitative human-computer interaction (HCI) researcher, designer, and social justice activist. In my work I use qualitative research methods to explore and study experiences of marginalization. I then utilize design methods to empower people in marginalized positions lenses of both critical race theory and intersectionality.

Marginalization describes a process where individuals or groups are unjustly relegated to positions of lower status, power, and importance. My work produces new models and theories connecting experiences of marginalization with technology. As someone who specializes in a qualitative approach, I use methods such as interviews to develop relationships with my participants that give space for sometimes difficult emotional self-disclosure (e.g., conducting narrative episode interviews with targets of racism). I additionally design artifacts and interactions that illustrate and disrupt those pre-existing relationships that perpetuate oppression. As a designer, I then create interactions that productively disrupt these situations to uncover the underlying assumptions and dynamics at play (e.g., conducting workshops and playtests in low-income community centers to co-design educational STEM board games). My approach is informed by a critical race and social justice perspective - my work is aimed not at "fixing" people in marginalized positions, but shedding a light on their existing strategies for coping and providing tools for empowerment.

Studying and Designing to Empower People from Marginalized Groups

My thesis integrates these methods to explore and disrupt how people in vulnerable and marginalized contexts experience uncertainty. In my thesis I studied two contexts of marginalization: STEM learning environments for female students and/or students of color in the SCIPR (Sensing Curiosity in Play and Responding) project as well as social coping with racist experiences amongst adults in the CARE (Coping After Racist Experiences) Project. The initial stages of both projects involved need-finding with key stakeholders to get an understanding of their existing environments and experiences. In SCIPR I performed in-class observations to understand the dynamics, curriculum, and physical set-up of typical middle-school science classrooms in both typical and low-resource contexts. In CARE I performed narrative episode interviews to discuss experiences of seeking social support following racist encounters. In both projects as part of my thesis I followed-up needfinding with co-design methods to iteratively create interactions and experiences including educational games and an interactive narrative vignette platform. These designs are meant to allow people from marginalized groups to process and communicate emotional responses to experiences that trigger negative emotions associated with their marginalized identities. For example, for SCIPR I designed a tabletop board game, *Outbreak*, to increase comfort feeling uncertainty as a way of promoting curiosity skills and

engagement with STEM topics (Figure 1). For CARE, I am currently designing interactive narrative vignettes that introduce tools for socially coping with racist experiences.

Figure 1. Middle school-aged students play Outbreak, a game designed to increase comfort with STEM by encouraging curiosity skills.

Broadly I have found that being in a marginalized position greatly amplifies the risks and concerns associated with being uncertain and relatedly amplifies negative emotions related to feeling uncertain. In SCIPR, uncertainty occurs in the context of science learning and not knowing enough or feeling confident enough in a science learning environment. I found that one way to disrupt the connection between negative emotion and uncertainty was to reframe the emotional experience of uncertainty as being exciting, challenging, and approachable. The main contribution of this project was theoretical, identifying ways to design for curiosity by leveraging uncertainty. (To et al., 2016a). To give one example of a theoretical contribution, I found that I could use the game context to encourage comfort with failure by increasing the likelihood of experiencing failure in-game, but reframing that failure as an opportunity to learn and succeed in the future (i.e., utilizing a growth mindset). After playing the game we found that players' emotional responses to failure were more favorable (To et al., 2018a). The project additionally generated methodological contributions in designing educational games (To et al., 2016b) and an award-winning educational board game, *Outbreak* (To et al., 2018a).

However, in more "serious" or higher stake contexts such as experiencing racism, simply reframing uncertainty as being positive is likely an inappropriate intervention. In the context of racist interactions, uncertainty may entail serious immediate and long-term threats to safety. In these situations, empowering and providing easier access to coping mechanisms for managing and resolving uncertainty are more desirable. For the CARE project, I am currently exploring designs that empower social support-seeking as a way of coping with uncertainty and racism. In ongoing work to complete my dissertation, I have created new participatory design methods for sensitive subjects (Carey, 2020) using Twine, an interactive narrative platform, to create interactive vignettes that introduce participants to racial microaggressions in a safe context and eliciting reactions to designs that empower coping with uncertainty (Figure 2).
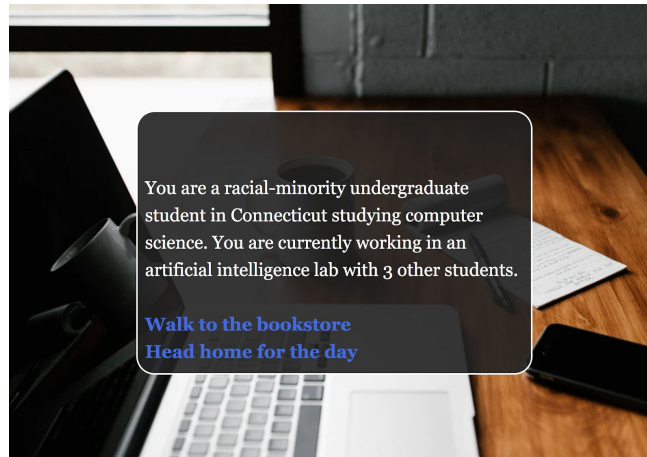
Figure 2. An opening screenshot of an interactive narrative written in Twine. Participants will be able to select responses for a character in a "choose-your-own-adventure" style interaction.

One thing that makes STEM threatening to marginalized youth is that at the middle school level, failure can feel like a reflection on your ability and identity (Spencer et al., 1999). This work is aimed particularly at adolescent female students and/or students of color. In addition to two game design awards from an educational games conference, *Outbreak,* has also generated 10 peer-reviewed research publications in HCI and games venues. Our team also developed a teacher's guide that instructs teachers both on how to run the *Outbreak* game in their classroom, as well as incorporate our philosophy on curiosity and failure into their pedagogical practice. Beyond the students and teacher's the game directly impacts, the SCIPR project has also had greater impacts for game designers and game design instructors. The Tandem Transformational Game Design process has been used in several game design courses around the United States to teach educational game design that emphasizes iteration, playtesting, and connecting game design mechanics to research theory.

Experiences with racism impact a much more broad and diverse population. In my work I provide the first understanding of successful and unsuccessful social coping with racism from the perspective of people who experience it. For example, my team and I learned that uncertainty around racism is experienced during nearly every aspect of the interaction and that it is the main motivator for a person to seek social support. To this end, social technologies have the potential to play a huge role in promoting healthy coping. However, many people who experience racism avoid online social technologies due to issues of trust and agency. As we move into design work, our contributions will be aimed towards sharing insights and best practices for coping back with affected communities. The aim is to build on the success of people who are already living with

and dealing with racism. This work unpacks how marginalization amplifies the negative impacts of uncertainty and identifies entry points for people in power to disrupt oppressive systems.

Integrating Social Justice into Research

One of my goals as an activist and researcher is to pave a path for my colleagues to incorporate a social justice perspective in their work. One form this has taken has been in conducting work aimed at helping game designers incorporate diversity in their design practice. In my project on Character Diversity in Games, I examined how both digital and non-digital games represent diverse characters along a wide range of facets of identity (e.g., religion, body, citizenship, gender, sexuality, race, language, neurodiversity, ability, etc.). Having interned at Schell Games I was able to connect with both industry and academic games partners to generate a list of games. My team and I then used qualitative coding to categorize and assess types of representation. This project resulted in a workshop presentation, an invited publication to the ToDiGRA journal (To et al., 2018b), a shareable list of games that experts in the games field feel represent diverse characters, and five representational strategies for game designers to create diverse characters.

Another way I have incorporated my activism in my work is by sharing prominent social justice theory with the HCI community. One of my ongoing projects connects Critical Race Theory and Human-Computer Interaction. This project, which is performed in collaboration with researchers at the University of Michigan and Northwestern University, involves a review of how literature in the CHI conference engages with race, ethnicity and marginalization, analysis and mapping of core tenets of critical race theory in connection to HCI, and use of storytelling as a critical reflection method to describe my personal experiences as a woman of color in HCI research. This project has resulted in a Best Paper and virtual workshop at CHI 2020 and next steps include a systematic review of HCI research in relation to race and racism. I aim to produce new methods for engaging with race and marginalization in HCI research and design as well as for applying a critical race lens to one's prior and current work.

Future Directions

My current work focuses on empowering people in racially marginalized and vulnerable positions. My goal in focusing on affected groups has been to center the people that my work impacts. My most recent project focuses on how people experience interpersonal racism, but as we know racism and other forms of bias and prejudice are experienced in structural and institutional contexts. My vision for my career is to broaden the scope of my work to include designs and interventions that impact the individuals and systems that enact racial bias. How does messaging about diversity and inclusion impact students at predominantly and historically white institutions? How might design to encourage meaningful, productive, and non-harmful

discourse about race and racism for people in the majority? How might we do this with digital social systems? How might we do this with playful interactions and games?

In my career I plan to perform collaborative, interdisciplinary work focused on integrating social justice and technology. I use qualitative methods because they are ideal for situations where the phenomenon at play are understudied or unclear (e.g., Birks & Mills, 2015), as is the case with social coping techniques for racism. I then utilize design methodology to disrupt and complicate those contexts where the processes at play marginalize (e.g., Zimerman et al., 2007). My background has trained me in bridging divides across disciplines and subjects both within and outside academia through industry collaboration and activism. I have a commitment to grounding my research and its outcomes in communities. I will use critical race theory as a lens while designing and exploring systems and artifacts that disrupt oppression and empower people from marginalized and vulnerable groups.

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