

# Research Statement

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My research is constantly bringing me to the crossroads between various fields of science and the arts. Over my research career, I have enjoyed being an active collaborator on different National Science Foundation funded research projects: virtual peers that model the dialect and gestures of minority children, software interventions for children with high-functioning autism, tangible computing devices that support creative thinking, etc. I have also been a collaborator in multiple interactive dance productions and interactive arts exhibitions. All of these experiences have culminated into a research approach that includes bridging methodologies and theories from computing with other research fields as well as domains of reflective practice. Here I describe my approach to research through the lens of different research projects and then describe plans for future research.

## Technology and Dance

One hallmark of success in an interdisciplinary project is when the lines between the disciplines blur. In the NSF funded Dance.Draw project, I worked closely with three different choreographers on eight different interactive dance productions. Various sensing technologies were utilized to create real-time interactive visualizations that complimented dancers' sounds and motions.



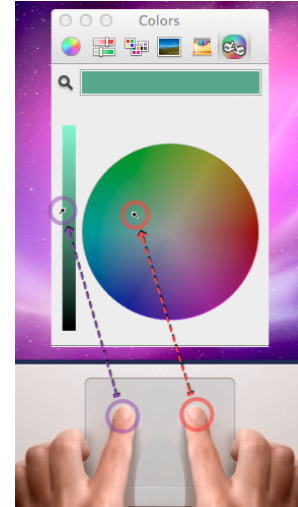
Early on, I recognized the value of genuine collaboration and avoided treating dancers as research guinea pigs. As a result, I was given the title of "Aesthetic Technologist," representing my ability to navigate and negotiate between the intentions of the dance, the aesthetic look of the piece, and the goals of the research. The choreographers (and dancers) saw me as active contributors to the dance and I saw the choreographers as experts in movement and how technology should respond to those movements. I took my experiences and published a paper at NordiCHI 2012 on six design principles for making interactive dance [2].

## Exploratory Satisficing

I believe successful research projects find gaps in the current research literature, base their solution in the research, and are highly generalizable. This is exemplified in my dissertation: *Explorability, Satisficing, and Satisfaction in Parameter Spaces*. The motivation for this topic comes from the *Tyranny of Choice*, a well-studied phenomenon where people can become overwhelmed by a large number of choices [7]. When there are more choices than can be feasibly explored, the user will go with the best option they have seen. I call this exploratory satisficing [1]. There are very few published studies on how interface design can influence exploratory satisficing behavior [5]. This is surprising given that research shows these behaviors influence people's sense of time [3], perceived tradeoff between cost and reward [4], and overall life satisfaction [6].

In my dissertation, I focused on the impact of interaction and design affordances in software applications where users need to explore fairly large parameter spaces (e.g., color, image settings) when generating creative content. Because measuring the success of creative content goes beyond typical usability measures, I employed metrics from behavioral economics (i.e., maximization scale), creative cognition (i.e., creativity support index), and exportability measures I developed for my research.

In one study, I varied the interaction technique (single vs. dual cursor) participants used to navigate a color space (see image on right). In a different study, I varied the search space and granularity of control (course vs. fine) available to my participants when adjusting image parameters (e.g., brightness) and filters (e.g., blur) with GUI sliders. Using a combination of quantitative and qualitative analysis techniques, my work demonstrates that a fluid interaction technique for parameter space exploration can positively impact participant satisfaction, but that in some contexts participants may desire a more constrained exploration of the parameter space.



### **Future Research**

I would like to deviate myself from my advisor's dual-cursor and creativity research by expanding on my dissertation work, looking at how the number of options available in interface prototyping tools (e.g., Balsamiq, Axure) can impact a user's satisfaction with their design process and finish products. I will also develop software that allows the user to control how they navigate parameter spaces. This could potentially reduce cognitive load in scenarios where users become overwhelmed by the number of choices available. I will also seek out students to help design, develop, and study hand-held applications that supporting creative content generation. I am looking forward to student driven project ideas and cross department collaborations. As a starting goal, I plan to fund my research by applying for the CISE's Division of Information and Intelligent Systems NSF Grant in Fall 2016 and the NSF Career Grant in Fall 2017.

### **References:**

1. Adams, A.T., Gonzalez, B., and Latulipe, C. SonicExplorer: Fluid Exploration of Audio Parameters. Proceedings of CHI 2014.
2. Gonzalez, B., Carroll, E., and Latulipe, C. Dance-inspired technology, technology-inspired dance. Proceedings of NordiCHI 2012.
3. Misuraca, R. and Teuscher, U. Time flies when you maximize—Maximizers and satisficers perceive time differently when making decisions. Acta Psychologica 2013.
4. Dar-Nimrod, I., Rawn, C.D., Lehman, D.R., and Schwartz, B. The maximization paradox: The costs of seeking alternatives. Personality and Individual Differences 2009.
5. Oulasvirta, A., Hukkinen, J.P., and Schwartz, B. When more is less: the paradox of choice in search engine use. Proceedings of SIGIR 2009.
6. Schwartz, B., Ward, A., Monterosso, J., Lyubomirsky, S., White, K., and Lehman, D.R. Maximizing versus satisficing: happiness is a matter of choice. Journal of personality and social psychology 2002.
7. Schwartz, B. The tyranny of choice. Scientific American 2004.