

Through a PhD in Computer Science focusing on theory and algorithms, I seek to research the structure of discrete optimization problems and design algorithms for them.

I began research in my first semester at the University of Texas at Dallas when I joined the Multimodal Interactions Lab headed by Professor Jin-Ryong Kim. I worked on two papers on text entry using thumbs in virtual and augmented reality. In the first paper, we investigated virtual reality thumb typing in the air, developed techniques to address its challenges and measured their impact on performance. I ran studies and created new evaluation strategies. This paper is currently under submission. Additionally, we worked on *Protype: Everyday Props as Typing Surfaces in Augmented Reality*, which allows users to type on the surfaces of everyday objects. I designed and conducted user studies to evaluate the interface, and wrote the portions describing the studies and methodology. This paper was published in ACM CHI 2025 and received an Honorable Mention. These projects taught me to read and apply existing research and introduced me to writing academic content and the research process.

While I enjoyed researching human computer interaction, I realized that I wanted to contribute to more fundamental, broadly applicable problems. As I gained more exposure to discrete mathematics, data structures, and algorithms, I developed a deeper interest in theoretical computer science. To explore this further, I undertook an independent study with Professor Emily Fox and wrote a survey paper on fair division. This experience helped me become comfortable reading theory papers while introducing me to broader themes in optimization problems.

Building on this, I began a project with Professor Fox on algorithms for symmetric submodular function minimization, which generalizes undirected global minimum cut

beyond hypergraphs. This work strengthened my mathematical foundations and introduced me to the process of theory research: I designed potential solutions, and helped prove and disprove conjectures. I loved the open-ended nature of working on these problems and the creative thinking needed. These experiences confirmed my desire to pursue graduate study.

Beyond research, I sought opportunities to teach and share my enthusiasm for theory. I founded the UTD Algorithms Club, where I taught students the foundations of discrete mathematics and algorithms and hosted guided paper readings. Currently, I teach high school mathematics at KD College Prep. These opportunities have given me appreciation for teaching and mentoring, and have reinforced my desire to pursue a career in academia.

At Waterloo, I am excited to work with Professors Joseph Cheriyan and Peter Nelson on graph connectivity and matroids. Their work is aligned with my undergraduate coursework and research in combinatorial optimization, and I am eager to deepen my understanding of the field.

Through graduate school and an academic career, I hope to be exposed to and challenged by new ideas from diverse perspectives, and to mentor the next generation of students.