The ultimate goal of research is to make a positive impact on society. This motivates me to pursue a PhD in Economics and Computation (EC) following my Undergraduate degree, and eventually research as a professor of Computer Science. Specifically, I hope to research randomized approximation algorithms and fair division.

When I first began my undergraduate degree at the University of Texas at Dallas, I researched efficient text entry in virtual and augmented reality(VR/AR) under Professor Jin-Ryong Kim, submitting two papers to top-tier venues. Designing efficient, practical, and acceptable text entry systems in virtual reality is still an open problem. Indeed, it suffers from many mobility and perceptual constraints. My first paper studied perceptual issues in the near field by assessing thumb-typing in VR. We further proposed strategies to reduce inaccuracy and increase performance in such an environment. This paper gave insights into thumb-typing in Virtual reality, and the inherent limitations of the medium due to lack of physical feedback and. The second paper addresses this issue, by studying mobility and efficiency in AR typing by enabling text-entry on everyday objects. We found that this not only gave relatively high WPM, but also made typing more enjoyable for users. In the paper, I designed and conducted experiments, helped extract findings and based on this, propose future research directions. This paper will be published in CHI 2025. By doing so, I learned the basic skills required to research. Above all, it gave me the opportunity to test my limits as a researcher, and made grew my love for pushing the frontier of knowledge. It was at this point that I change my focus.

I have been involved in competitive programming since my first semester, and have participated in ICPC Regionals and the Meta Hacker Cup. I enjoyed working with others to solve algorithmic problems, which motivated me to pursue research further in theoretical CS. Additionally, I enjoyed the applied nature of my research in Human Computer Interaction, and want to continue to study theoretical problems with the same pragmatism. This drew me to Fair Division and Economics and Computation at large. I found to be both theoretically interesting and had widespread societal applications, like resolving political conflicts, item distribution, and estate division. I began an independent study with Professor Emily Fox at UTD to study this, ultimately writing a survey of discrete fair division. This helped me confirm my interest in algorithms and theoretical CS. In the future, I hope to take a more foundational approach to CS, while still working with real-world problems.

Beyond research, I am also interested in education and outreach. In the past, teaching helped me reinforce my knowledge while making a direct personal impact. It is for this reason that I started the UTD EC Club: to make current research accessible to like-minded students. In the club, I gave regular lectures and offered tutoring to students. I also had the opportunity to teach research while working on VR/AR text entry to new students joining the lab. It is the same interest in education which has motivated me to work on writing a children's mathematics book, and to become a grader at my university.

Currently, I am researching submodular function optimization, advised by Professor Fox, and intend to continue researching theoretical computer science. Studying theory has been a deeply enriching experience, and I have loved learning about and pushing the frontiers of knowledge. I want to pursue a Ph.D to grow as a researcher and to further EC and algorithms. I look forward to researching at the Max Planck Institute. Through the internship, I hope to develop knowledge across theoretical computer science and build connections with other top researchers in my field who can collaborate with me in future research.