As a Navy child and the oldest of six children, I profoundly identify with the values of hard work, service, and leadership. After moving constantly as a kid, I didn't truly find my home until I was recruited to the University of Southern California. I was awarded both the merit-based, full-tuition Trustee Scholarship and the Viterbi Fellowship, a research grant worth $24,000. Despite my high school's lack of resources for advanced opportunities, I began to thrive in the unstructured collegiate environment and became a leader in a variety of impactful research projects.

I have had the privilege to work in interdisciplinary research laboratories across academia, industry, and government. I began my research career with the DoD at the Air Force Research Laboratory, where I developed a methodology for decoupling machine learning development and deployment. My work enabled serving of deep learning systems on AFRL's classified networks.

I then joined the DOE at Sandia National Laboratories, where I designed Bayesian convolutional neural networks for uncertainty quantification of CT scan segmentations. My research enabled materials scientists to ascertain bounds on physical properties of materials during computational simulations, contributing to the development of next-generation aircraft and spacecraft. My work resulted in publications submitted to WACV and Nature Communications.

My theory interests prompted me to become an undergraduate researcher with Prof. Jason Lee, where I characterized robustness of complexity measures used to bound generalization in deep learning. Understanding these complexity measures is fundamental to ensuring accuracy and trustworthiness of ML systems; the importance of this research inspired my Ph.D. topic.

As a machine learning research intern at Google X on the computational agriculture team, I developed a CNN-LSTM deep learning architecture for temporal identity preservation in multiple object tracking. By automatically analyzing phenotype development over time, my research contributed to breeding high-yield, disease-resistant crops—enabling farms to grow more food for less money. My work resulted in a publication under preparation for ICCV.

Currently, I am an undergraduate researcher with Prof. Shaddin Dughmi, where I am combining convex optimization and high-dimensional probability to investigate alternative oracles for solving the linear feasibility problem. My research will increase our understanding of fundamental optimization problems and could have important ramifications in algorithms and game theory. I aim to publish my work by the time I graduate.

These productive and impactful research experiences motivated me to pursue a Ph.D. in theoretical machine learning. My goal in graduate school is to reconcile theoretical understanding with empirical phenomena in deep learning by performing mathematical study and experimental analysis in tandem. My research will develop principled approaches to deep learning which enable prediction of model generalization in production environments, maximizing robustness to adversarial attacks and shifting data distributions.

After my Ph.D., I plan to pursue a career in academia as the leader of a cutting-edge research team, and I will work to scale research partnerships between academia, industry, and

government. The NDSEG Fellowship would have an enormous effect on my career by enabling me to pursue my most ambitious, impactful research ideas.