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Research Statement

I began doing research at Brigham Young University with Steven Turley. We were building and operating a vacuum reflectometer to reflect extreme ultraviolet (EUV) light from thin films surfaces. Our goal was to be able to determine the roughness of thin films with more precision that existing methods such as atomic force microscopy. We did this by comparing EUV reflection measurements to calculations we had done on simulated surfaces where the roughness of the surfaces was known. From this research I was able to publish 2 papers in the Journal of the Utah Academy of Sciences, Arts, and Letters in addition to producing a senior thesis. I was also able to give seven talks on the subject including one at the Annual Meeting of the Four Corners Section of the APS. See my CV for details.

I spent a summer at Los Alamos National Laboratory as part of the Science Undergraduate Laboratory Internships program, working with Thomas Leitner. We used statistical methods to estimate HIV incidence based on serological data of diagnosed cases. This research resulted in a publication in the International Journal of Epidemiology which is a highly ranked journal in the field of epidemiology.

Since coming to Arizona State University I have been working with Kevin Schmidt using Quantum Monte Carlo (QMC) calculations to calculate the properties of nuclei and nuclear matter. I have been working to improve the trial wave function used to guide QMC simulations. Though I have not published yet on this subject, I almost have all the data I need for my first publication. I need to have a solid understanding of the QMC simulations and the nuclear physics involved in this research to continue making progress. This summer program would help me achieve the objectives that I have as a researcher in this field.