Advances in computing are enabling physicists to tackle previously unanswerable questions about our universe, and my deep desire to leverage and help build these technologies to contribute to our cosmic understanding motivates my application to your graduate program.

My undergraduate experience uniquely prepared me to succeed in graduate studies—the intimate instructional setting in the Boise State Physics Department enabled me to develop close and supportive relationships with my professors in both my academic and research pursuits. I have had a productive research experience with my mentor, Prof. Daryl Macomb, whose interests involve the search for and analysis of accreting x-ray binary pulsars using archival CHANDRA and XMM Newton data. For that work, we’ve analyzed likely x-ray time-series observations of putative pulsar sources in the Small Magellanic Cloud to search for changes in period (using Fourier analysis) over many years driven by accretion. The trickiest problem for us has been trying to eke out detections from lower power sources that have thus far gone unnoticed, and my largest individual contribution has been developing an algorithm to test the statistical significance of finding lower-power pairs from a large background observation map I created and thus strengthen our detection confidence. For this project I’ve learned Linux, the command line and shell-scripting, learned a new programming language—Julia, have been exposed to deeper languages like Perl and Fortran, and learned to process and reduce datasets with tools like HEASOFT and SAS. Our careful analysis contributes new details to our understanding of high-energy accretion events involving dense stellar objects, as well as putting forward new candidates for further study by the astronomical community—we are writing a paper on our results that we hope will be submitted by early spring.

I could fit well into nearly any project at UCLA, but the two groups that especially interest me are Prof. Malkan’s and Prof. Furlanetto’s given their focus on cosmology and the evolution of large scale systems. Tackling such fundamental questions about our universe is one thing that makes UCLA attractive to me, but the way the department presents itself as a supportive and inclusive place—something I’ve already seen evidence of in my limited communication with Prof. Furlanetto and Prof. Malkan—is also of great importance to me. I hope to use the knowledge and skills I gain in graduate school not only to advance our cosmic quest but to uplift and inspire others to follow suit—especially those whose privilege hasn’t been as great as mine. I’ve been fortunate to have a wealth of opportunities to practically demonstrate these ideals, from working with inmates in prison to designing and teaching STEM programs for financially challenged youth through the YMCA. I hope to continue to help advance a more welcoming astronomy and physics culture throughout my future career, and to that end I humbly submit my application to your astrophysics program, that together we might gain some new understanding of the cosmos while simultaneously making it a little better for everyone along the way.