

Department of Physics and Astronomy



Summer 2017— Colin Burke

Dr. Peterson's Group

The characterization and distribution of dark matter is one of the largest outstanding problems in modern physics. Our group focuses on the development of photon-by-photon simulations of optical telescopes and their instruments to better understand systematic errors in gravitational lensing measurements. In my work, I have collaborated with astronomers at the University of Arizona to create simulations for NASA's James Webb Space Telescope. The model we developed will be calibrated and used during in-orbit testing in 2019 to help us better understand the telescope's optics and final images. I am also working on simulations of the WIYN telescope to compare with observations of weak lensing in clusters of galaxies. These observations and analyses with my model will help inform future studies upon completion of the Large Synoptic Survey Telescope in Chile. Our work is a combination of computer science, astrophysics, and optical engineering. We are a small group, but I get to be a part of large, multi-national projects that will enhance our understanding of the Universe for years to come.