

Abstract
Neutrino Physics Center Fellowship Award
November 2017
Rachel Carr

With the support of the Neutrino Physics Center Fellowship, I will work on characterizing detector-related systematic uncertainties on neutrino measurements in a liquid argon time projection chamber (LArTPC). In particular, I will quantify detector-related systematic uncertainties in the first deep learning-based analysis of low-energy electron neutrino-like events in the MicroBooNE detector. Understanding and minimizing these uncertainties is important to the MicroBooNE effort to explain the anomalous excess of low-energy events observed in MiniBooNE, with implications for sterile neutrino searches and other physics models. More broadly, developing a detailed framework to treat detector-related systematic uncertainties in a LArTPC is a step toward extracting precision oscillation and cross section results from this new technology. This project will involve several rounds of Monte Carlo production, analysis of data and Monte Carlo in various channels, feedback to analysis algorithms, and construction of a covariance matrix to cover detector-related uncertainties for one of the first MicroBooNE physics results. The fellowship will facilitate collaboration with the large group of MicroBooNE physicists and other LArTPC experts based at Fermilab.