

Abstract for NPC Scholarship at Fermi National Accelerator Laboratory

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NOvA is a long-baseline neutrino oscillation experiment with two functionally identical detectors. The energy spectrum of the neutrinos produced by the NuMI beam at the Fermi National Accelerator Laboratory is measured by the Near Detector located 1km away from the NuMI target. The neutrinos are subsequently detected 810 km away in the Far Detector near Ash River, MN. Both detectors are sited off the central beam-axis. The Near Detector is positioned to maximize the similarity between the neutrino energy spectra observed at the two detectors. The data collected at the Near Detector will also be used to make precise measurements of various neutrino interaction cross-sections.

My research will aim to contribute in the ν_e appearance studies and reconstruction analyses, specifically in relation to oscillation studies and detector physics with the help of Fermilab experts.

My plans for the next step in my NOvA studies include: study Machine Learning techniques, apply them to the next round of ν_e energy reconstruction, and also in my subsequent studies in the reconstruction group by using neural network to identify 2D prongs in the detector. After this work, I also plan to contribute by getting involved with other aspects of NOvA analysis, including extrapolation, prediction, and systematics studies of ν_e appearance at FD, which requires joint studies with other groups as well.