

# Neutrino Oscillations with Long-baseline neutrino experiments at Fermilab

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I have been an active member of the intensity frontier experiments for many years. I have been a NOvA collaborator since 2008, and a MINOS(+) collaborator since 2000. I have held many leadership roles on both experiments, including a sixteen month stint as MINOS analysis coordinator. I served as one of the conveners of the MINOS electron neutrino appearance working group, and was instrumental in developing and implementing that experiment's first search for the subdominant oscillation mode. On NOvA, I am currently one of two conveners of the electron neutrino working group, charged with developing and executing the experiment's flagship analysis.

As an IF Fellow, I moved to Fermilab in October and plan to stay here for the academic year. My graduate student, Ji Liu, also moved to Fermilab in August and stayed through the Fall semester. My post doc, Alex Radovic, is resident at Fermilab. Initially, we are working on the installation and commissioning of the NOvA Detectors. Construction of that detector has already commenced. Data from the Near Detector is vital for the NOvA oscillation analyses, as that data is used to set a prediction against which Far Detector data is compared. My group and I will be contributing to a critical need within the experiment by working on the Near Detector installation.

Additionally, while at Fermilab, my group and I are working on the NOvA electron neutrino analysis. Based on my prior experience in the similar role on MINOS, I expect the rapid understanding of data collected with the newly constructed Near Detector will be crucial. Not only do we need to understand how to select quality events in that detector, we also need to understand how issues like containment and light levels might cause differences in the characteristics of events selected in the Near Detector compared to the Far. We also need to develop data driven techniques to determine the size of the components of each of the background event types selected in the Near Detector, as each event type will extrapolate to the Far Detector in a different way. Having the core of the analysis group based at Fermilab at this point in the experiment allows for easy exchange of information between the hardware experts and the analysis group, and among group members in general, promoting an accelerated development of the analysis.

While NOvA ramps up, my postdoc and I are also working on MINOS+. We look forward to updating our results on standard 3 flavor oscillations using the data taken in the medium energy beam, and updating our search for oscillations into a sterile neutrino state.