

As part of Fermilab's Intensity Frontier (IF) Fellowship scheme I will be based at Fermilab for one year from September 2015. During this period I will be contributing to a number of the lab's neutrino experiments, including MINOS, NOvA and DUNE. These experiments are all trying to understand how neutrinos interact and propagate, and what role this tiny particle may have played in the evolution of the universe. I have been a member of the MINOS (now called MINOS+) experiment for over 15 years and during my time as an IF Fellow the final MINOS+ data will be taken. Given its high statistics, for a long baseline neutrino experiment, MINOS+ has unique sensitivity to exotic physics beyond the three neutrino oscillation paradigm. Being based at Fermilab will enable me to ensure that the final results of the MINOS(+) experiment are produced and published in a timely fashion. The MINOS+ constraints on the mixing between active and sterile neutrino states are particularly interesting and relevant to the Fermilab short-baseline neutrino program.

The opportunity to spend a year at Fermilab has allowed me to join the NOvA experiment as it moves into a 100% exploitation experiment. Given my background I have extensive experience which I can bring to the NOvA experiment as it strives to overtake MINOS and T2K as the most sensitive long-baseline neutrino experiment. This is a great time to join the experiment and bring a fresh perspective to some of the challenges that must be overcome as we move into the precision era of long-baseline neutrino physics. In the short time that I have been on NOvA, the combination of my fresh perspective and the ability to interact with the local NOvA experts at Fermilab has proved to be enormously productive. The long term future of the US neutrino oscillation program is the DUNE experiment, which will utilize liquid argon time projection chamber detectors in a new powerful neutrino beam between Fermilab and South Dakota. At UCL we are relative newcomers to this detector technology, and so the opportunity to work with many of the world experts at Fermilab will be invaluable. The R&D work being carried out now will pave the future for the next 15-20 years of neutrino physics with the DUNE experiment.