Intensity Frontier Fellowship **Summary of proposal**

The standard model of particle physics sets to describe the universe using a set of elementary particles and their interactions. While considered to be one of the greatest triumphs of modern physics, the standard model is still incomplete and therefore there has to be 'new physics' we have yet to detect. Specifically, neutrinos are one of the most promising tools to search for such new physics. The three types of neutrinos hold a great mystery. Unlike other elementary particles many of their properties are still unknown and may indicate the existence and nature of new physics. Thus, understanding their nature is one of the main focuses of current experimental particle physics research. Experimentally, Neutrinos are observed based on their interactions with atomic nuclei. Understanding the nuclear physics involved in these interactions is crucial to achieve the high accuracy required by current and next generation neutrino experiments.

I am therefore very excited for an opportunity to join the MicroBooNE experiment where I wish to study these interactions by analyzing data and compare it to a simulation which we intend to improve with time. We are currently testing the GENIE simulation code, vastly in use with in the neutrino community, by comparing its output to existing data from previous electron scattering experiments for the first time, and intend to keep improving it based on these comparison. We intend to study the nuclear response to a neutrino interaction and to validate the neutrino energy reconstruction procedure by studying events in which a cosmic muon with a known energy is interacting with an Argon nuclei inside MicroBooNE. In addition I have joined the MicroBooNE DAQ leading team and led the effort to compare SBND and MicroBooNE Photo Multipliers (PMTs) performances. This is a very exciting time in neutrino physics and it will be a great privilege to join the effort and extend the Israeli involvement in this rapidly growing field.