A better understanding of neutrino interactions with nucleons and nuclear targets is crucial in order to achieve the precision goals in neutrino oscillation studies, which are the key to a precise determination of neutrino properties, our first window to the physics beyond the Standard Model. At the same time, neutrino cross section measurements are a source of valuable information about hadron properties such as the the axial structure of the nucleon and baryon resonances, and the strangeness content of the nucleon spin. Modern neutrino experiments are performed with nuclear targets. For nuclear physics this represents a challenge and an opportunity. A challenge because the above-mentioned prospects for more precise knowledge of neutrino and baryon properties require that nuclear effects are under control. An opportunity because neutrino-nucleus cross sections incorporate a richer information than electron-nucleus ones, providing an excellent testing ground for nuclear structure, many-body mechanisms and reaction models. In this context, the joint efforts of theoretical and experimental physicists to meet these needs are necessary. Fermilab where some of the current and future neutrino experiments are located and developed is an ideal site to pursue these goal