Title: “IceCube: A ν-window into the Universe”

Abstract:
The IceCube Neutrino Observatory, a cubic-kilometer in-ice detector at the South Pole, offers a unique window into the smallest and largest scales of our universe. Over the past several years, IceCube has detected the first high-energy neutrinos of astrophysical origin, measured atmospheric neutrino oscillations, and performed searches of neutrino sources throughout the sky. As more data is collected, a reduction of systematic uncertainties becomes ever more important for neutrino astronomy and neutrino property measurements in IceCube. These two paths are connected as, at the highest energies, the angular resolution of events without an observable muon is limited primarily by ice-property uncertainties. To pave the road forward, in this talk I will explore improvements to event reconstruction and systematic treatment in the high-energy starting event (HESE) analysis. I will discuss a new high-energy cross-section measurement using the HESE sample and a novel calculation of the atmospheric neutrino background.