Progetto	Data Taking, Trigger system study and neutrino event reconstruction improvement in ICARUS
Esperimento / sigla proponente	ICARUS
Laboratorio ospitante	FNAL
Contact person presso il laboratorio	Lea di Noto
Periodo previsto:	01/06/23 - 31/08/23
Sezioni e tutor proponenti:	Padova / Alberto
Descrizione attività (max 1000 caratteri)	The ICARUS detector consists of a 760 tons Liquid Argon Time Projection Chamber (LAr-TPC) exposed to Fermilab Booster and NuMI intense neutrino beams within the Short Baseline Neutrino program with the aim of investigating the existence of sterile neutrinos as claimed by the several anomalies recorded in the experiments at nuclear reactors and accelerators. The data taking started in 2021 will extend over the next five years. The proposed activity is focused both on data taking, trigger system study and monitoring of the ICARUS sub-detectors both on data analysis and in particular on the selection of neutrino interactions and on the 3D reconstruction of tracks and showers. The collected data will be analysed reconstructing recorded events using the physical signals of the different sub-detector systems, including the TPC, photomultipliers (PMTs) and CRT a Cosmic Ray Tagger surrounding the ICARUS TPC. In particular the measurement of the efficiency and precision of the event timing and localisation of the Trigger system which is based on the signal recognition from 360 PMTs inside the beam spill will be studied. The student will be involved in the planned activities on the detector, in particular on the PMT signals calibration. Furthermore the exploitation of the especially designed Adder Modules which perform the analog sum of signals form 15 adjacent PMTs will also be addressed in view of a second level trigger system based on the energy deposition as measured by the PMTs. He will have the opportunity to work with the physicists who have developed the reconstruction software, contributing to the optimisation of the algorithms and the evaluation of the related performance
Altre indicazioni: (max 500 caratteri)	
Facility che il laboratorio ospitante mette a disposizione	Canteen and special accommodation for stay inside the FNAL Village will be available.
Note:	ICARUS has few Italian students preparing the graduation Thesis in the different INFN Units