3 goals during my stay at RCNS

- Test and refine neutrino direction tool

- Develop neutrino ID discriminator

- Energy calibration at high energies

Direction tool status

Before

- Could not use good atmospheric neutrino spectrum for testing directionality tool with MC

- Did not test tool with T2K energy range MC (although test with real T2K data seems good)

Now

- Doing more refined test with each target nucleus and energy range 100 MeV ~ 5 GeV.

Neutrino ID

Idea: deep neural network

Pro
- Used in industry for image recognition
- Example code already exists

Con
- Need large sample of training/testing MC data (10,000 ~ 100,000? events)
- Discrepancy between real/MC events (charge, scintillator absorption/reemission, BO scintillation)

High Energy Calibration

Idea: use cosmic ray muon