Contribution ID: **380**                                                                 Type: **Presentation**

# Automated proton track identification in MicroBooNE using gradient boosted decision trees

*Thursday, 3 August 2017 11:51 (24 minutes)*

MicroBooNE is a liquid argon time projection chamber (LArTPC) neutrino
experiment that is currently running in the Booster Neutrino Beam at Fermilab. LArTPC technology allows
for high-resolution, three-dimensional representations of neutrino interactions. A wide variety of software
tools for automated reconstruction and selection of particle tracks in LArTPCs are actively being developed.
Short, isolated proton tracks, the signal for low-momentum-transfer neutral current (NC) elastic events, are
easily hidden in a large cosmic background. Detecting these low-energy tracks will allow us to probe interesting regions of the proton's spin structure. An effective method for selecting NC elastic events is to combine
a highly efficient track
reconstruction algorithm to find all candidate tracks with highly accurate particle identification using a machine learning algorithm. We present our work on particle track classification using gradient tree boosting
software (XGBoost) and the performance on simulated neutrino data.

**Primary author:**   WOODRUFF, Katherine (New Mexico State University)

**Presenter:**   WOODRUFF, Katherine (New Mexico State University)

**Session Classification:**   Computing, Analysis Tools, and Data Handling

**Track Classification:**   Computing, Analysis Tools and Data Handling