SIST Project: ProtoDUNE Workflow Development and Analysis

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SIST 5 minutes, 5 slides 2020

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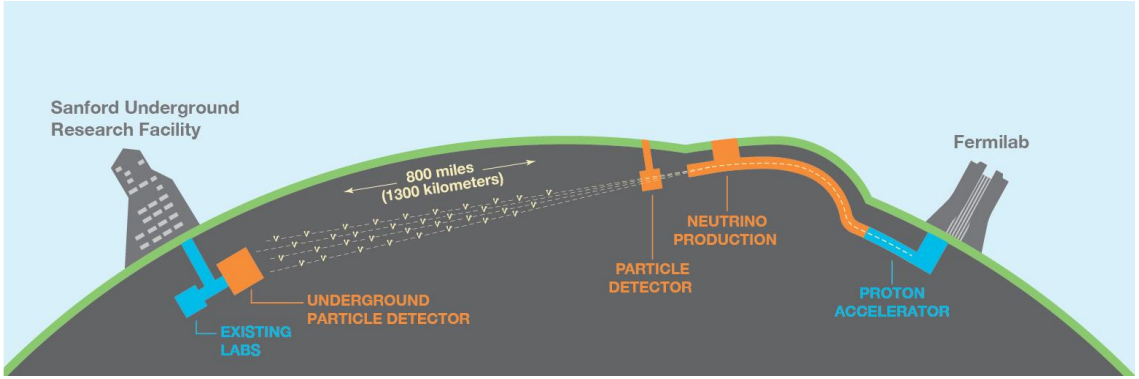
DUNE

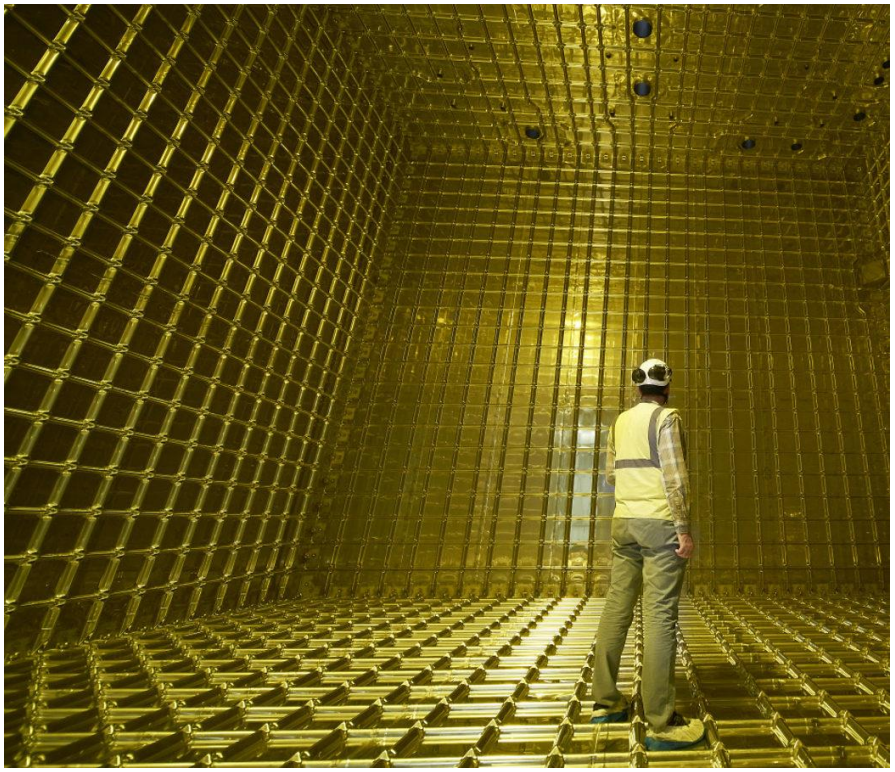
The Deep Underground Neutrino Experiment (DUNE)

- Will use 70,000 tons of Liquid Argon
  - MicroBooNE uses 170 tons
- An International collaboration
  - 1000 scientists
  - 180 Universities and Laboratories
  - 30 Countries
- Will take place in the Long-Baseline Neutrino Facility
  - Between Fermilab and Stanford Underground Research Facility in South Dakota (800 miles)



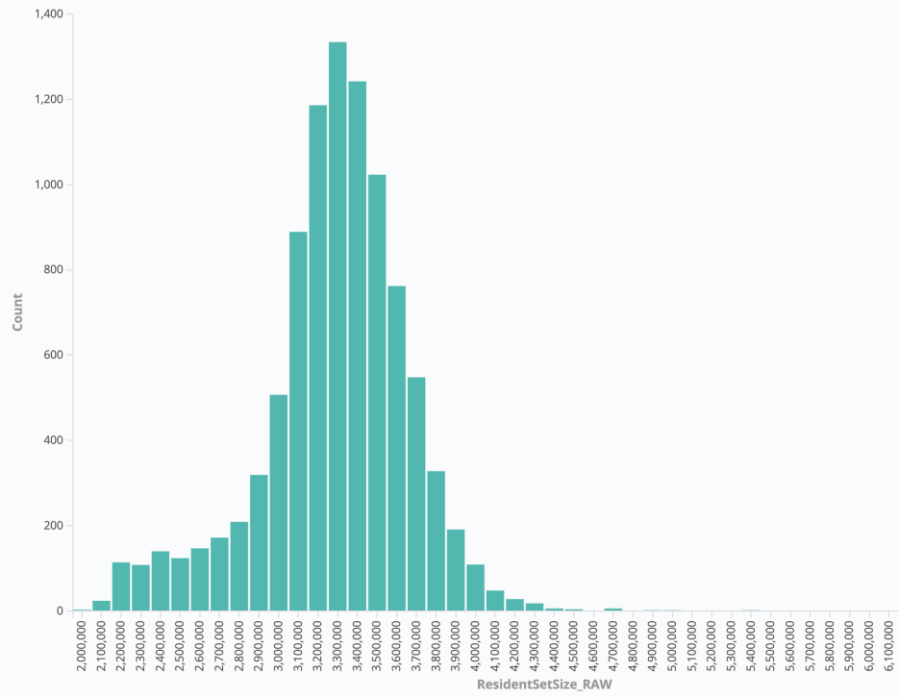
ProtoDUNE

- Large scale prototypes of DUNE at CERN
  - Single Phase
    - Liquid Argon Only
    - Ran for six weeks in 2018
  - Dual Phase
    - Liquid Argon and Gas
- In most recent ProtoDUNE Simulation, more memory was needed than in previous runs
- High memory consumption is resource intensive



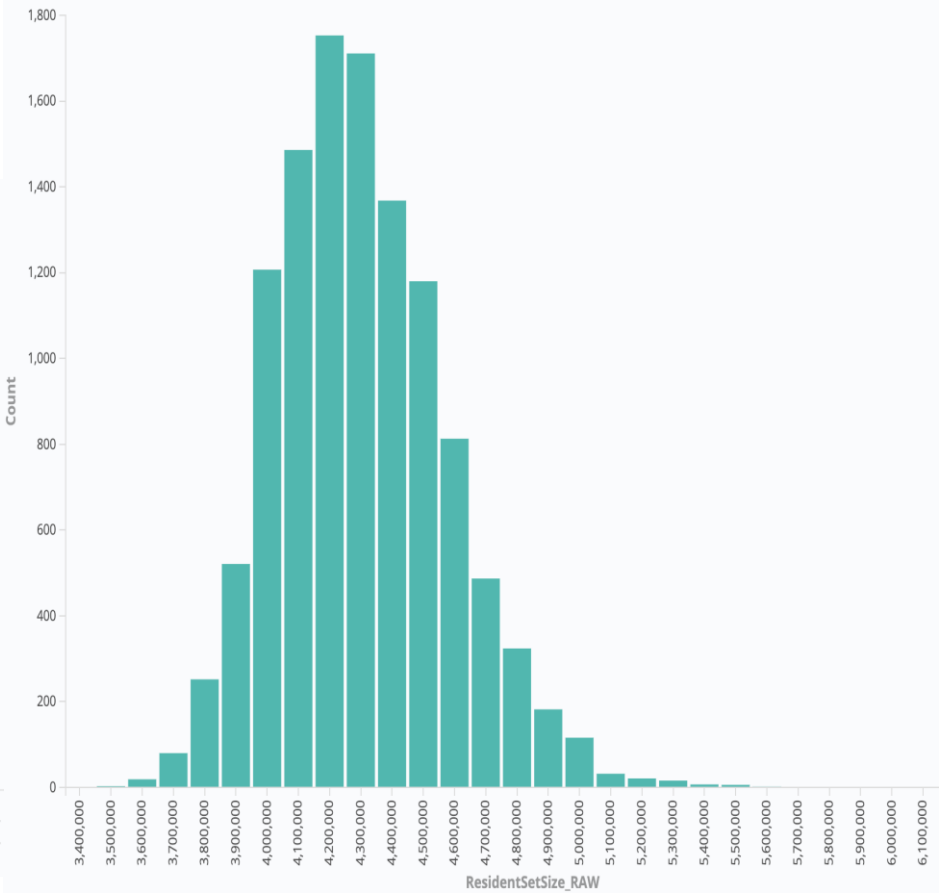
MC Memory Consumption

ProtoDUNE SP Production 2



Job count vs Memory

ProtoDUNE SP Production 3



Job count vs Memory

Fermilab

My Project

- Modify the existing ProtoDUNE (single phase) simulation workflow
  - Incorporate recently designed changes to reduce overall memory consumption
  - Test these changes on a large scale

- How can we consume less memory?
  - Split Geant4 into two stages (shown to the right)
    - This reduces how many subdetectors are in memory at the same time