

# **Simulation and Reconstruction Timeline**

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- The current focus of Sim/Reco Group is to work on detector optimization studies.
  - Lisa Whitehead provided a task list and timeline for different working groups:
    - <https://indico.fnal.gov/getFile.py/access?contribId=0&resId=0&materialId=slides&confId=10446>

# Task List (Lisa)

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- Sim/Reco and Offline WGs
  - Implement and validate dual-phase simulation
  - Photon detector simulation (?)
  - High-level reconstruction for physics (LBL, supernova neutrinos, etc)
    - In progress
  - Structure of analysis ntuple
    - Discussions with LBL group have started
  - Geometry for different FD configurations (single and dual phase)
    - In progress for single-phase
  - Provide assistance to physics WGs for producing small simulated and reconstructed (low-level) samples for validation
    - LBL – done, sample exists
    - Supernova neutrinos
    - Proton decay
    - Atmospheric neutrinos
  - Large scale production of simulated samples (with different geometries)
    - I assume large-scale production will be handed by FD sim/reco WG and not individuals?

**We need WGs to help developing/testing generators.**

# Timeline for Sim/Reco Group

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- November 2015
  - Provide (single-phase) geometries for each detector optimization study
    - Done
  - Begin work for dual-phase simulation
- December 2015
  - Analysis ntuple ready for use, quick-start documentation in place
  - Assist in training new physics WG members to run LArSoft simulation

# Timeline

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- January 2016
  - Dual-phase simulation in place, validation begins
  - Photon detector simulation ready
- February 2016
  - Validation of dual-phase simulation complete
  - Provide dual-phase geometries for each detector optimization study
  - Provide large simulated samples for different detector geometries, single/dual-phase, for each physics WG
- April 2016
  - High-level reconstructed algorithms validated and ready for use.

# Prepare for MCC5

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- We will produce a new MC sample soon- MCC5.
- New flux ntuples (Dom Brailsford)
- Different geometries: 5 mm vs 3 mm, 36 deg vs 45 deg.
- Initial shower reconstruction
  - Two algorithms in rapid development (Dorota Stephan, Mike Wallbank)
- We will get help from FNAL OPOS group on grid job submission and monitoring.

# Samples

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- Basic geometry: workspace geometry, 4 APAs, 8 TPCs. x: [-3.6, 3.6], y: [-6, 6], z: [0, 4.6]
- Beam neutrinos: beam events, nue events, nutau events.
- Single particles:
  - electron, muon: 0.1 - 5 GeV, isotropic
  - gamma, pi0, proton, K+, pi-: 0.1 - 2 GeV, isotropic
- Cosmogenics (MUSUN)
- Timeline - 2-4 weeks?
- We will also produce other samples in the future with the help of WGs
  - Atmospheric neutrinos - need test/validation
  - Supernova neutrinos - a generator needs to be ported to LArSoft
  - Proton decays