

# MicroBooNE Analysis Tools (uBAT)

## Priorities, Plans, and Progress

Phase I: Establish Monte Carlo truth output for physics studies  
⇒ Goal for completion in 2 months

1. Establish framework (FRMWK)
  - Initial version now available
2. Put in Monte Carlo geometry for MicroBooNE
  - Initial (draft) geometry has now installed by Brian
3. Get GENIE event generator working
  - Start with 1-d neutrino energy flux histograms for neutrino events and CRY package for cosmic rays
  - Installation of GENIE package just beginning
4. Set up Monte Carlo truth info block
  - Parent hadron info, incident neutrino info, interaction type, vertex, outgoing particle info

## Phase 2: Provide digitized data block

⇒ Goal for completion in 6 months

### 1. Develop software for voxelization (3-d pixelization) of outgoing particle ionization

- Bill Seligman starting to work on this
- Define a voxel information block

### 2. Develop software for ionization drift to the wire planes

- Use parameterized function
- Build on work done by Bruce and others

### 3. Develop software parameterization of pulses induced by drifted ionization

- Again hope to build on work of others
- Define a wire pulse information block

### 4. Develop electronics digitization simulation

- Add noise and other electronics effects
- Define digitized data block

## Phase 3: Longer term projects

⇒ Ongoing but need some initial work done over next 6 mo.

### 1. Need to get BooNEG4Beam (MiniBooNE Beam Monte Carlo) into MicroBooNE framework

- This will allow hadron parent information and neutrino vector information to be propagated with the events
- Need to develop MicroBooNE “experts” and expertise

### 2. Develop reconstructed event building from raw data

- Hit analysis, clustering, and space point determination

### 3. Track reconstruction

- Investigate and compare multiple methods and algorithms
- Track reconstruction is first step towards particle ID

### 4. PMT simulation

- Need light production and propagation model
- Need light collection and PMT parameterization model