

LArSoft Steering Group meeting notes for September 13, 2018

Attendees: Erica Snider, Katherine Lato, Herb Greenlee, Tom Junk

a) Update on [LArSoft work plan](#) - went through the items, discussing progress. Notable changes and updates:

- On **Use of SIMD vectorization to optimize LArSoft algorithms**. A new project is being launched to investigate the gains of enabling x86 SIMD vector extensions in selected algorithms and libraries relevant to the DUNE and ProtoDUNE production workflows. The studies may include various types of modifications to some algorithms in order to optimize the gains achieved. We hope the results to be immediately applicable within a LArSoft production environment running on grid resources. The work will be carried out by Agathangelos Stylianidis under supervision of Nektarios Benekos, and in consultation with the LArSoft team and other members of DUNE / ProtoDUNE offline organizations. They will start by measuring the effect of building all of LArSoft with x86-based vector extensions enabled. They will then target specific pieces of algorithm code, where early targets are expected to be in the areas of hit-finding, Pandora tracking, PMA and embedded convolutional neural networks. There will be the first of many presentations at the 9/25/18 LArSoft Coordination meeting.
- We added **Migrate to GitHub and pull-requests** in June 14, 2018 to investigate moving the LArSoft central repositories from Redmine to GitHub, along with those collaboration services offered by GitHub that make the migration cost effective. There have been no objections so far, so the project plans to proceed with this transition.

b) Input to 2019 work plan -

- DUNE just started getting data from ProtoDUNE. They don't like a number of things about the Event Display - like color scale on raw digit has no numbers. But if the Event Display is being reworked, won't push on them. Suggested multi-threading the hit-finding as a way of accelerating the code.
- MicroBooNE had no specific input for 2019.

c) round robin sharing of things of interest to all

DUNE -

- They got data from ProtoDUNE on 9/12/18. Hit Finder could be multi-threaded as something that is naturally parallel. Discussion.
 - Have to be careful with intra-event multi-threading across cores. Could end up reducing throughput.
 - Giuseppe Cerati and Mike Wang have demonstrated large speed-ups by replacing Gaussian fitter with more efficient algorithm. Have known that for a while. Giuseppe and Mike Wang have the improved code that hopefully will be ported back to LArSoft.

MicroBooNE -

- The WireCell simulation takes an hour per event. Wondering if vectorizing could help? BNL team is working on this. Looks like its WireCell's issue, not LArSoft.
- MicroBooNE is not interested in radical innovations right now. LArG4 refactoring and moving to GitHub are necessary.

If you have any questions or comments, please let us know.

Katherine & Erica

