

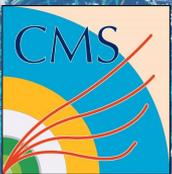
Training at the CMS LPC (LHC Physics Center) at Fermilab

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<http://lpc.fnal.gov>





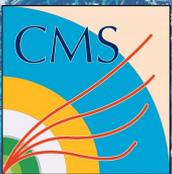
LPC Training Experience

▶ My job: User support for CMS at FNAL LPC

- Assist people with all sort of computing problems - one on one teaching
- We (this is a group effort) teach:
 -  CMS Data Analysis School (one week in January), other institutes also teach this, included Pre-Exercises students do on their own, we support with Mattermost
 -  Hands-on Advanced Tutorial Sessions (10-20 afternoon sessions/summer + twiki)
 -  LPC Computing Discussion (I run this: 1-2 hour bi-weekly)

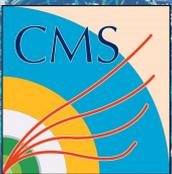
▶ Student levels:

- Undergraduate, Graduate, Professor for classes, have some high school students for the support
- Experience: from no command line to much better at Python/C++ than me
- Everyone can always learn something to optimize/improve their analysis



In your ROOT trainings, what material do you use?

- Material <http://lpc.fnal.gov/programs/schools-workshops/index.shtml>
 - ROOT is a tool within our analysis techniques, not taught separately, except perhaps pyROOT, uproot, etc.
 - Courses are all behind CMS CERN SSO
- How would you most benefit from sharing material with others?
 - Learn better teaching methods
 - Pointing people to version of document/course best for their level to they can teach themselves
 - I really like being able to answer people's questions by sending them to well written, complete documentation so they can answer the next question themselves
 - Note that our students are learning a lot of new things (some and maybe all):
 - ◆ ROOT, python, C++, analysis software, Linux, CMS data structure and handling, HEP analysis techniques



LPC Tools & Environment

- ▶ **FNAL Linux machines + cvmfs**
 - interactive; condor batch; CMS Remote Analysis Builder to access grid computing batch; CMS Connect to condor to same grid
- ▶ **Lxplus + CVMFS**
 - If the user doesn't have FNAL access
- ▶ **Some users utilize Docker for their work, we don't teach it**
 - I have been asked to teach a Docker setup and use tutorial
 - 1 LPC computing discussion: One user taught Docker within the context of loading cvmfs and xrootd tools
- ▶ **Jupyter notebooks + Vanderbilt ACCRE jupyterhub**