IRIS-HEP
SSC (Software Sustainability Core)
News/Status/Plans

Sudhir Malik (Univ. of Puerto Rico Mayaguez)
Peter Elmer (Princeton University)
Dan Katz (University of Illinois - UIUC)

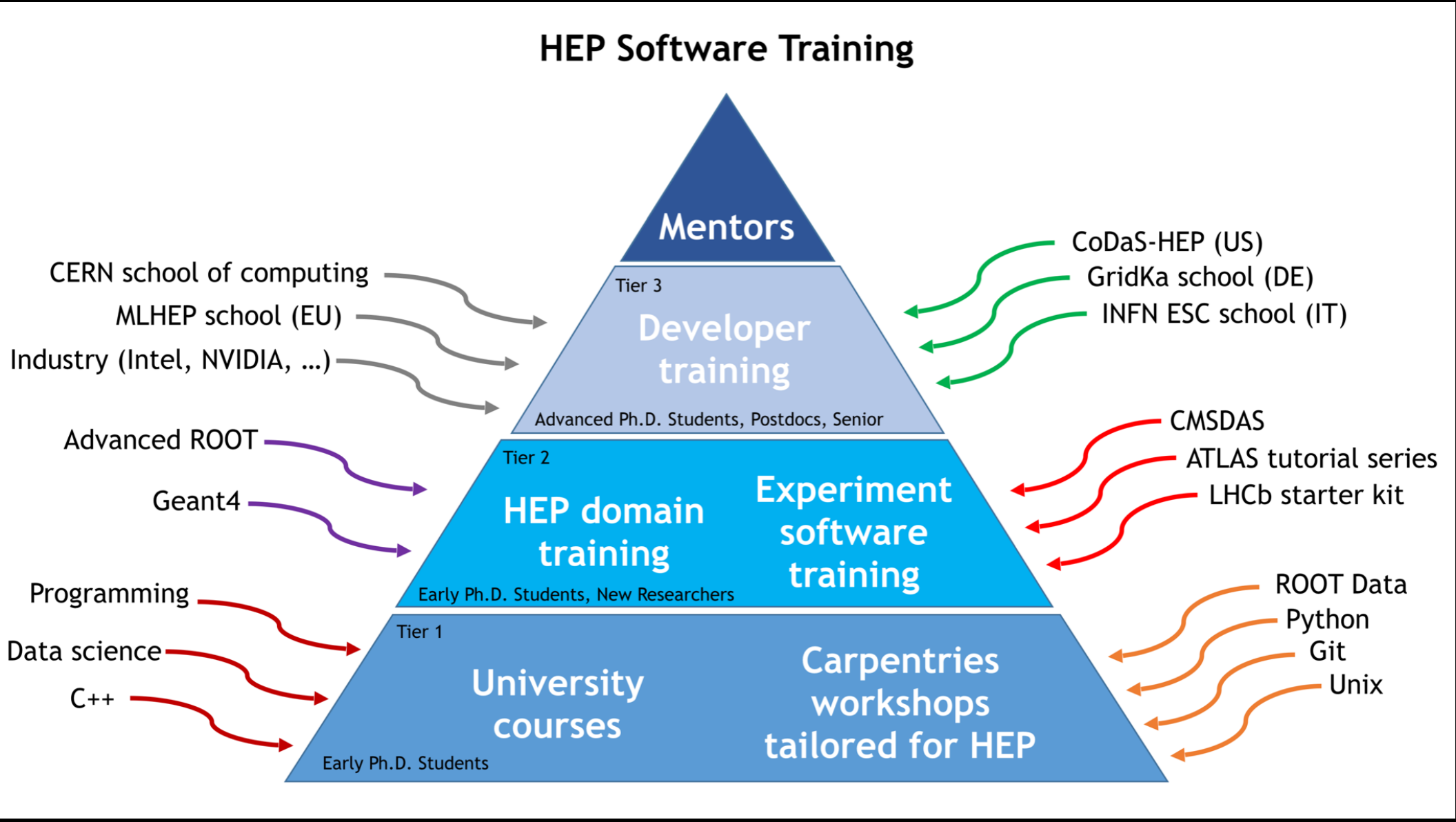
Mailing lists
hsf-training-wg@googlegroups.com
full-team@iris-hep.org

IRIS-HEP Retreat Fermilab, 9-13 Sep 2019

Goals

- Establish a *community framework for software training* in order to prepare the scientific and engineering workforce required for the computing challenges of HEP experiments
- For sustainability , *build "users" community* as well as *"developer" community*
- Instead of new curriculum development *leverage and build upon existing material* from the HEP and larger research community
- *Build training activities and material into a "common good"* with a strong community of both instructors and participants, and with a feeling of *community ownership*

Vision


HEP Software Training
Mentors
Tier 3
Developer training
Advanced Ph.D. Students, Postdocs, Senior
Tier 2
HEP domain training
Experiment software training
Early Ph.D. Students, New Researchers
Tier 1
University courses
Carpentries workshops tailored for HEP
Early Ph.D. Students
CERN school of computing
MLHEP school (EU)
Industry (Intel, NVIDIA, …)
CoDaS-HEP (US)
GridKa school (DE)
INFN ESC school (IT)
Advanced ROOT
Geant4
CMSDAS
ATLAS tutorial series
LHCb starter kit
Programming
Data science
C++
ROOT Data
Python
Git
Unix

SSC session - IRIS-HEP retreat

10:45 → 12:15 **SSC:Blueprint etc**

B327 (CDF Big Room) (FNAL) ... Join

Conveners: Daniel S. Katz (University of Illinois), Peter Elmer (Princeton University (US)), Sudhir Malik (University of Puerto Rico (PR))

google doc

10:45 **Breakout A: Training** 45m

IRIS-HEP_RetreatAd...

ATLAS carpentries - feedback 10m

Speaker: Samuel Ross Meehan (CERN)

LBNL Computing Boot...

11:30 **Breakout B: Sustainability** 45m

Speaker: Daniel S. Katz (University of Illinois)

sustainability.pdf sustainability.pptx uk-ssi.pdf

Milestones and Deliverables at a glance (Software Carpentry/ Training Events)

Institute for Research and Innovation in Software for High Energy Physics

Type	Time	Description	WBS task	Risks	Metrics
M	3-9	**G5.1:** Co-organize (with FIRST-HEP) introductory level Software Carpentry (bash/git/python) workshop at Fermilab combined with topical discussion on interoperability of ROOT for advance PhD students	5.1		M.5.1, M.5.5
M	3-9	**G5.2:** Introductory level Carpentry session for CMS/ATLAS at CERN	5.1		M.5.1, M.5.5
M	0-6	**G5.3:** Invite LHCb/ALICE to showcase Starterkit on pre and first analysis steps	5.1	R5.1	M.5.6
D	6-9	**G5.4:** Carpentries curriculum for HEP for newcomers at a LHC/ FNAL Experiments	5.6		M.5.1, M.5.3, M.5.6
M	6-9	**G5.5:** Post-training co-survey with FIRST-HEP on better assessing training needs			M.5.7
M	6-9	**G5.6:** Retune next Carpentry workshop benefiting from above participant survey			M.5.7
M	9-12	**G5.7:** Organize and run CoDaS-HEP School (Parallel Programming, ML, Big Data Tools) at Princeton	5.1	R5.2	M.5.[illegible] M.5.[illegible]
M	6-9	**G5.8:** First brainstorming workshop in conjunction with CoDaS-HEP school to re-visit software and data challenges and correspondingly design future training material and workshops	5.3	R5.1	
M	6-9	**G5.9:** Summer Outreach Workshop (s) on building software skills at US universities	5.3	R5.1	M.5.3, M.5.[illegible]
M	6-9	**G5.10:** Second HEP Software Carpentry Workshop at a US university/Lab	5.3	R5.1	M.5.[illegible]
D	9-12	**G5.11:** Carpentries curriculum for HEP using best practices for HEP	5.6	R5.1, R5.2	
M	12-15	**G5.12:** Co-organize (with FIRST-HEP) boot camp on domain specific topics like advanced ROOT, Geant4 and other HEP-specific tools	5.3	R5.1	M.5.2, M.5.4
M	12-15	**G5.13:** First Data Carpentry Workshop catered to HEP needs (expert input from CoDaS-HEP tutors and IRIS-HEP Fellows and field experts)	5.3	R5.2	M.5.1, M.5.5
D	12-15	**G5.14:** Software and Data Carpentry Workshops for HEP community by IRIS-HEP program, IRIS-HEP Fellows form a community of tutors for workshops and future domain specific topics	5.3, 5.6	R5.1, R5.2	M.5.3, M.5.5
M	18-21	**G5.15:** Summer Outreach Workshop(s) on building software and data analytical skills at US universities supported by IRIS-Undergrad Fellows and IRIS-Fellows in their own community, "Hack week" as a model for data science education and collaboration	5.3	R5.1	M.5.3, M.5.5
M	18-21	**G5.16:** Organize and run CoDaS-HEP at Princeton	5.3	R5.1, R5.2	M.5.2, M.5.5
M	18-21	**G5.17:** Second brainstorming workshop in conjunction with CoDaS-HEP school to re-visit software and data challenges preparedness in terms of training material	5.3	R5.1	M.5.7

✔ Software Carpentry Workshop (1-2 April 2019, Fermilab)
https://indico.fnal.gov/event/20233/
Survey: pre-workshop: https://www.surveymonkey.com/results/SM-X7BFPFY3V/
Survey: post-workshop : https://www.surveymonkey.com/results/SM-9LFC6FY3V/

✔ Software Carpentry at CERN (27-29 November 2019)
https://indico.cern.ch/event/834411/

✔ HEP Software/Computing Training Survey (Feb, 2019)
LINK to the survey

✔ CoDaS-HEP (22-26 July, 2019, Princeton)
http://codas-hep.org

★ Brainstorming - IRIS-HEP Institute Retreat (12-13 Sept. 2019 Fermilab)
https://indico.cern.ch/event/840472/

✔ An introduction to programming for STEM teachers (3-4 June, UPRM)
https://indico.cern.ch/event/817539/
Machine Learning Workshop/Hackathon (24-26 April 2019, UPRM)
https://indico.cern.ch/event/809812/

~ 180 people trained

More info on events: https://iris-hep.org/

IRIS-HEP Fellows Program

- Promote the development of advanced research software skills by providing opportunities for undergraduate and graduate students to connect with mentors within the larger HEP and Computational/Data Science community

- Preparing for a more formal/organized call soon for projects and proposals for a round of fellows in the fall

- More info: http://iris-hep.org/fellows.html

Current IRIS-HEP Fellows

Raghav Kansal
University of California, San Diego

IRIS-HEP Fellow
Jun-Aug 2019

Pratyush (Reik) Das
Institute of Engineering & Management (Kolkata)

IRIS-HEP Fellow
Jun-Sep 2019

Software Sustainability

- What is it?

Software sustainability: the capacity of the software to endure, i.e., that the software will continue to be available in the future, on new platforms, meeting new needs

- Who needs it

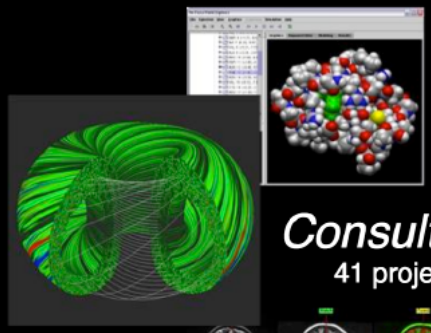
Should be everyone

And people who want their software to be more sustainable

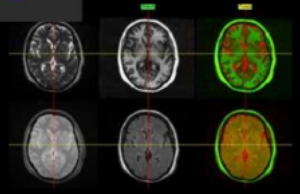
- In IRIS-HEP, both infrastructure/processing developers (project teams) and analysis developer/users (PIs, postdocs, students)

Sustainability spectrum

Software



Consultancy
41 projects



Training

Courses
33 UK SWC workshops
1000+ learners

Advice

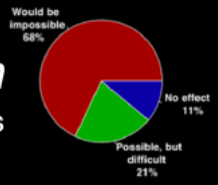
92 evaluations
4 surgeries

Guides
50,000 readers

Communication

Website & blog
150+ contributed articles
19,000 unique visitors per month

Research
740 researchers
50,000 grants analysed



Campaigns

272 RSEs engaged

BETTER SOFTWARE BETTER RESEARCH

1700 signatures

13 issues highlighted

Workshops

20+ workshops organised

Fellowship
41 domain ambassadors

Policy

Community

From Neil Chue Hong, Software Sustainability Institute (UK)

Plans

- Carpentries Instructor training
- Build a standard carpentry curriculum, scale the activities
- Expand activities (other labs/experiments/non-HEP) and cover the f
  training pyramid
- Prepare for a blueprint meeting about training/sustainability

Summary

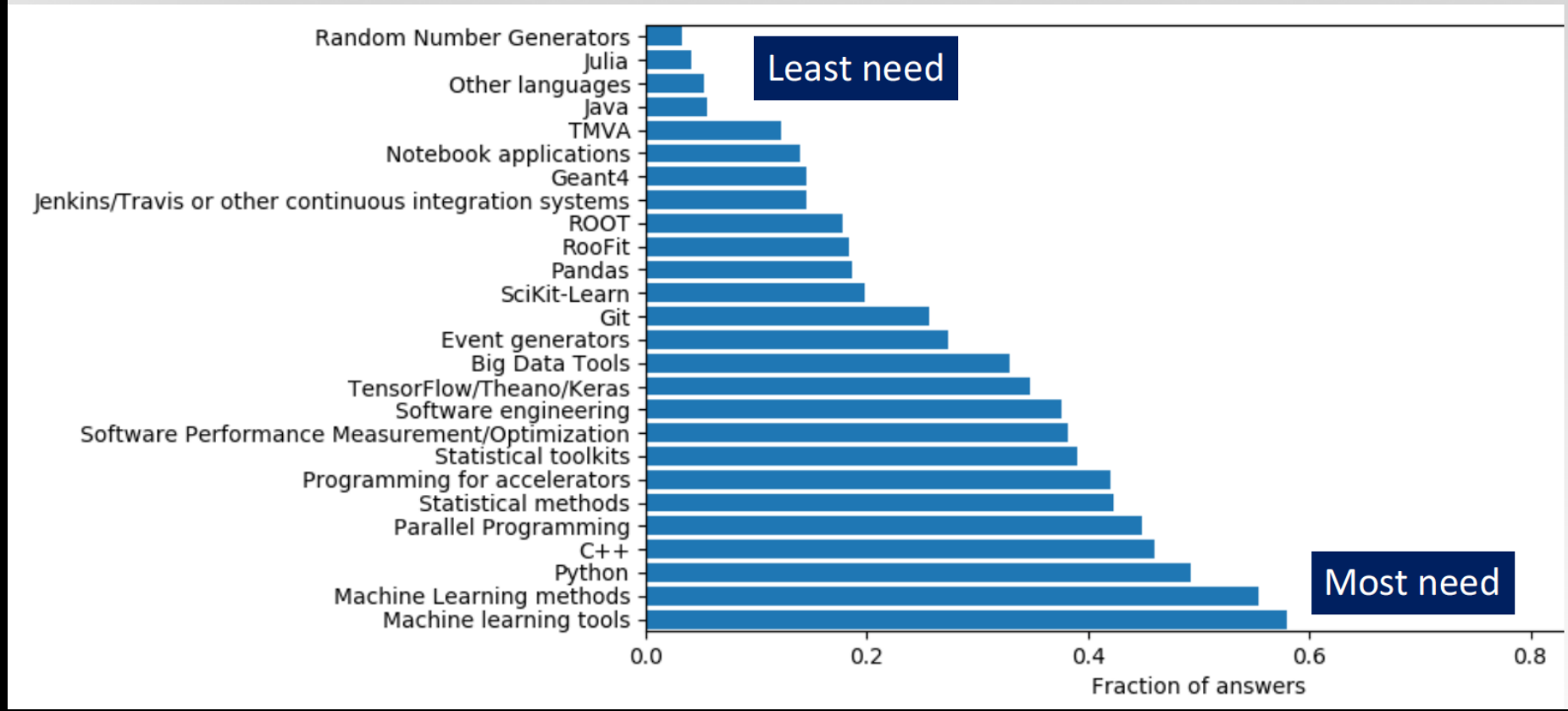
- Training has picked up momentum
- Partnership with Software Carpentries: https://software-carpentry.org/
- First training event outside US (at CERN) 27-29 Nov
- Ideas to bring sustainability effort together - See slides by Dan Katz

Backup slides - with info in events, links

Training Survey (Jan-Feb 2019)

- Input on training needs and current training practices for various topics in HEP related to software/computing and related software centric areas
- ~ 350 users (mostly postdocs, students, mostly LHC

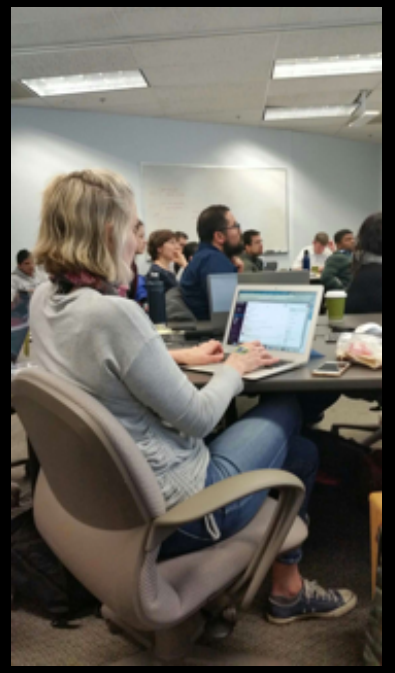
Areas that need for more training materials/courses to help your research

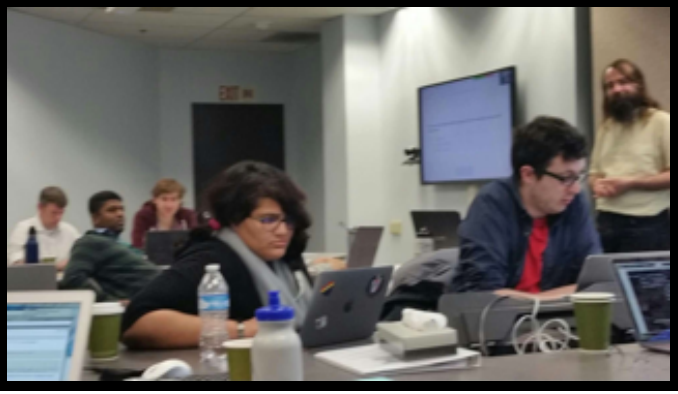


For more info - HSF Training survey - by David Lange

Software Carpentry Workshop (Fermilab)

(1-2 April 2019)





- Agenda: https://indico.fnal.gov/event/20233/
- Version Control with Git
- Python Foundations
- Building Programs with Python
- Data analysis - Numpy, Pandas
- Data analysis Cont. and Graphs
- Advanced Python and PyROOT, uproot
- Post-workshop Survey

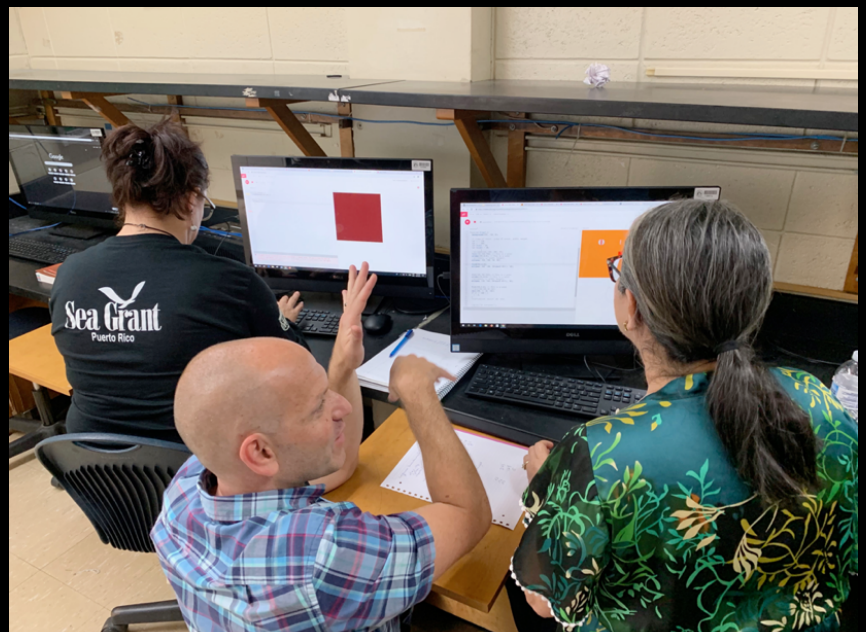
ML Hackathon (Puerto Rico)

(24-26 April, 2019)

https://indico.fnal.gov/event/20233/

- Agenda: https://indico.cern.ch/event/809812
- Talks ML/Data science Applications - Physics, Computer Science, Math, Engineering
- Machine Learning, Deep Learning, ANN
- Hands-on exercises
- Hackathon on LHC Physics

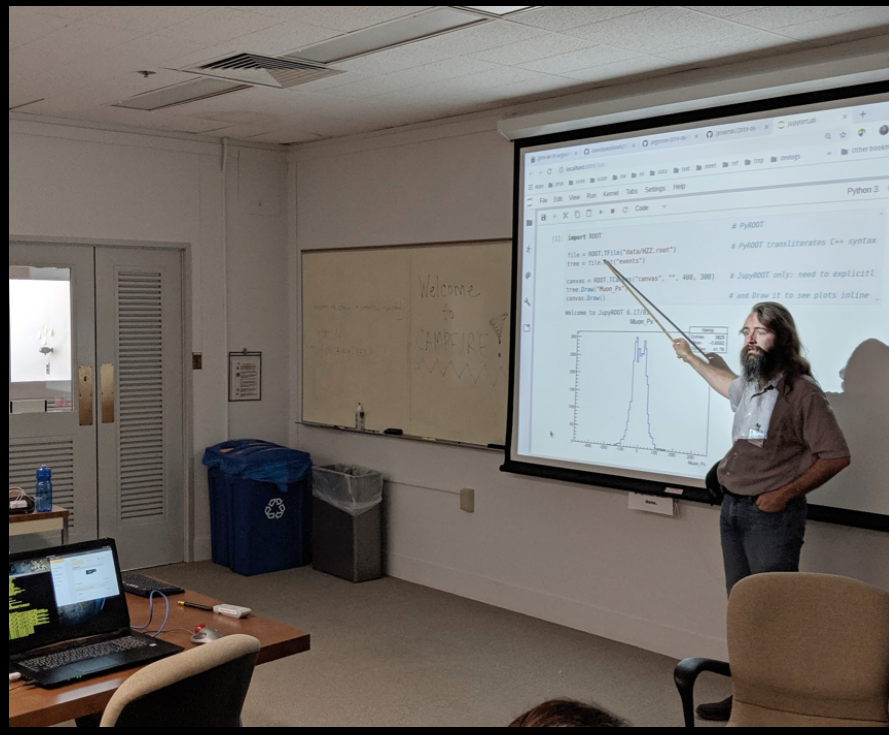
An introduction to programming for STEM teachers (Puerto Rico) (4-5 June, 2019)



- Agenda: https://indico.cern.ch/event/817539
- Introduction to Processing and p5js
- Python and Colab
- Basics of python, Jupyter notebooks, and Colab (hands-on)
- Data analysis with python

FIRST-HEP/ATLAS Training (Argonne)

(10 June, 2019)



- Agenda: https://indico.cern.ch/event/827231/
- A little Unix
- A lot of Git
- Numpy introduction
- PyROOT
- uproot

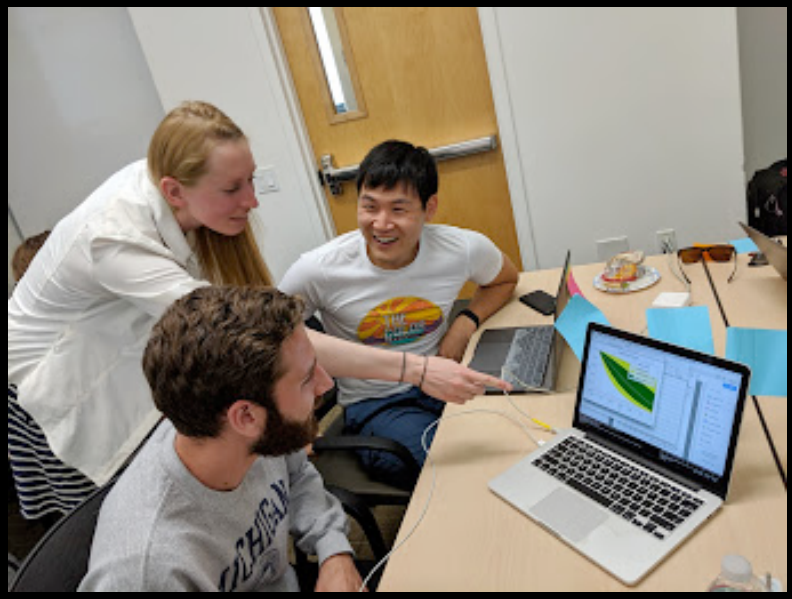
3rd CoDaS-HEP School (Princeton)

(22-26 July, 2019)

- Agenda: https://codas-hep.org/
- Parallel Programming
- Scientific Python Ecosystem
- Big Data Tools and Techniques
- Machine Learning
- Practical skills like performance evaluation, use of git

FIRST-HEP/ATLAS Training (LBNL)

(19-21 August, 2019)



- Agenda: https://indico.cern.ch/event/816946/
- Version Control Essentials
- Jupiter
- Build Systems : From gcc to cmake
- Continuous Integration : Why and how?

Related Links/Info

- IRIS-HEP website http://iris-hep.org/
  - Jobs on IRIS-HEP and Collaborating Projects http://iris-hep.org/jobs
  - General public announcement mailing list for IRIS-HEP events, talks, meetings, workshops, opportunities for training and job opportunities (subscribe to)
  - announcements@iris-hep.org

- HSF (HEP Software foundation) - https://hepsoftwarefoundation.org
  - General Information about HSF (subscribe to): hsf-forum@googlegroups.com
  - Discussions and activities in the HEP Software Foundation mailing lists can be found here (General and Dedicated Forums): https://hepsoftwarefoundation.org/forums.html
  - You can contribute https://hepsoftwarefoundation.org/cwp/cwp-working-groups.html
  - HSF Events/Workshops - https://hepsoftwarefoundation.org/events.html

- FIRST-HEP website http://first-hep.org
  - Funding for participants and lecturer support for Training