Building a Global HEP Software Training Community

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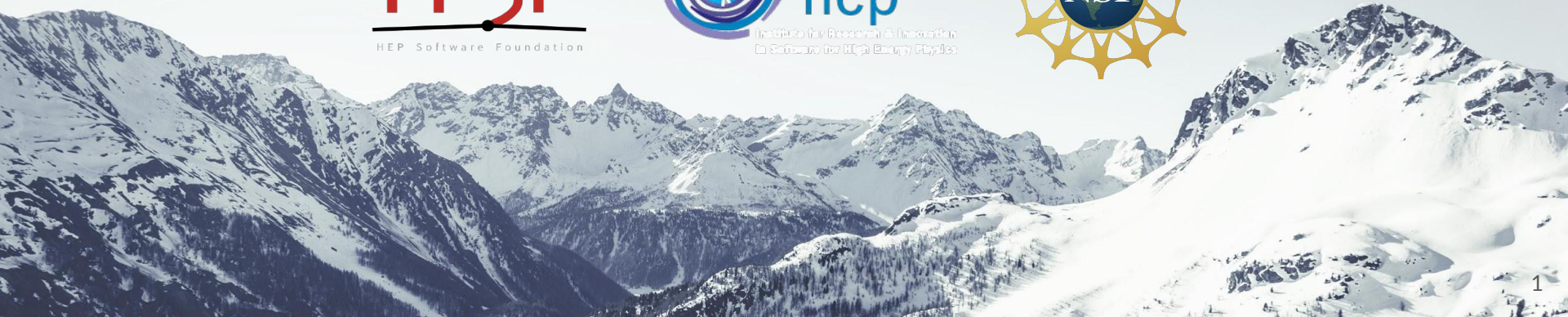

O(10k)

HEP people worldwide

O(6k)	O(3k)	O(1k)	O(depressing)
Undergrads	Ph.D. students	Postdocs	Faculty

need to be trained in software engineering & computing

to tackle the computing challenges ahead

This should be a community effort!

Why not leave everything to the experiments?

- General software skills matter as much as experiment-specific training
- Experiments share a lot of software topics
- Software topics are vast & evolving! (e.g., ML, GPUs, FPGAs, …)
- **We can cover more ground together** instead of reinventing the wheel…

O(6k)	O(3k)	O(1k)
Undergrads	Ph.D. students	Postdocs
⬇	⬇	⬇
Teach prerequisites & **Democratize science**	**Impart best practices**	Put in touch with **most recent developments**
⬇	⬇	⬇

We need a unified, scalable, and sustainable software training framework

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Unified

- Material and events should be **centrally listed** & **discoverable**
- Concentrate efforts by developing **cross-experiment** content
- A **community** must guide, support, and coordinate

Scalable

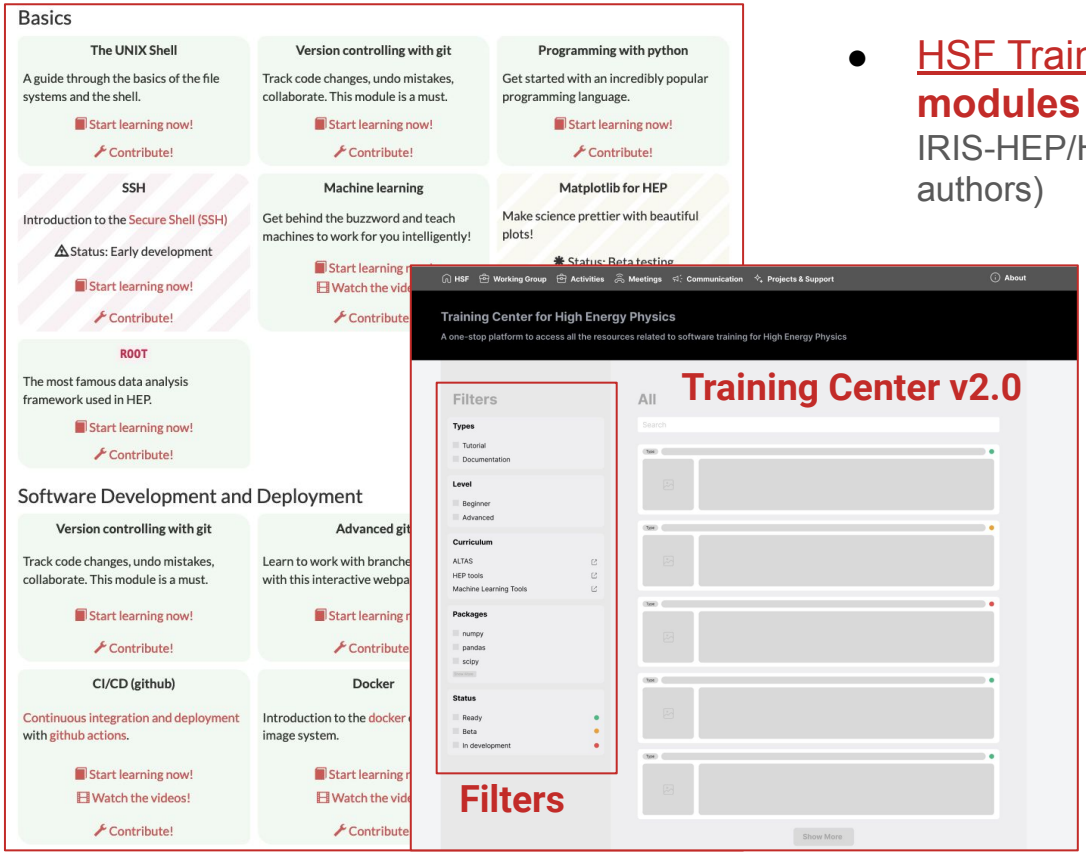
- Material must be teachable by **multiple instructors**
- **Self-study** must not be an afterthought

Sustainable

- Material must be **open source** and **maintained collaboratively**
- **Incentives & recognition** important motivators

The IRIS-HEP/HSF Training group is building a community around these principles

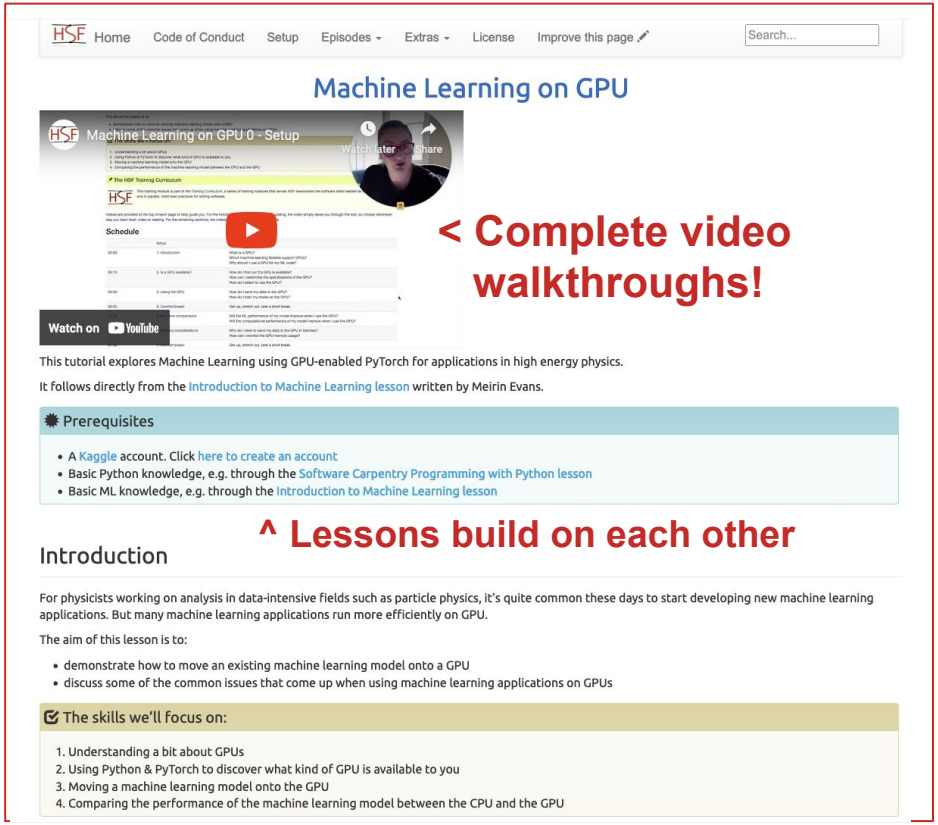
A unified Training Center for HEP



- HSF Training Center currently lists **21 training modules** (including material developed by IRIS-HEP/HSF, The Carpentries, and individual authors)
  - Goal: Training Center as a **focal point for all HEP Training activities**
    → Needs to list more
    → Add filters & dynamic sorting
  - Central **list of training events** (everyone can add)

Mockup by Aniket Rana,
(aniumbott @ github)
Inspired by learn.astropy.org

Training Modules

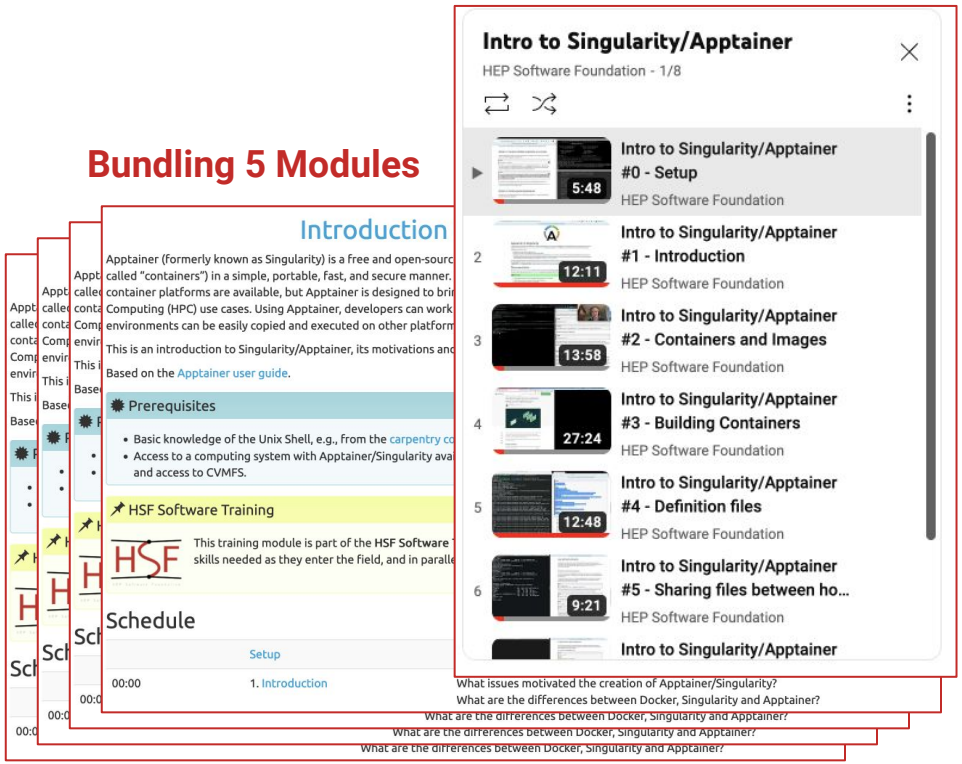


Most of our modules embrace the framework of The Carpentries

- Built from **markdown** files
- Rendered as a **webpage** with Jekyll (interesting discussion topic: The Carpentries have changed their framework recently)
- Verbose and **self-study ready**

Other training material written with LaTeX, sphinx, JupyterBook.

Example Workshop: Analysis Preservation



- Teaching Docker, Singularity/Apptainer, CI/CD with github/gitlab, REANA (soon)
- Emphasis on **self study with videos + live lectures**
- **Small-group virtual mentoring sessions**
- 24h support on slack

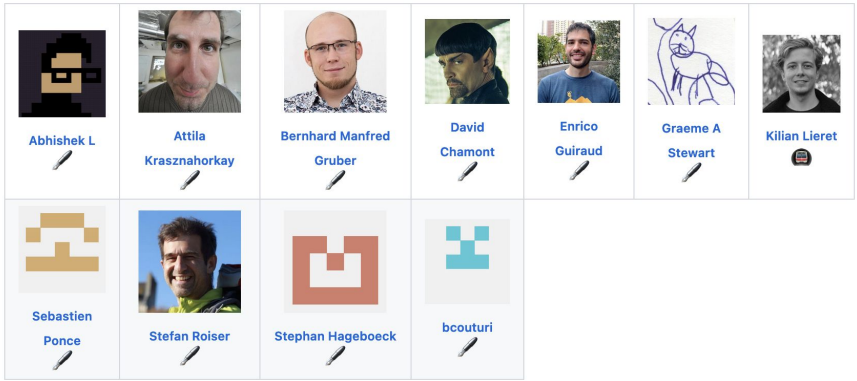
Example Workshop: C++ Training

SIDIS
Software Institute for
Data-Intensive Sciences

CERN

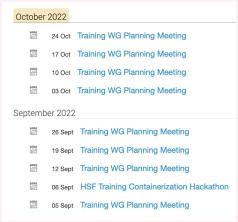
- Has been taught **in-person, virtual and hybrid**
- **Life lectures and exercise sessions**
- Full videos available
- Next events:
  - 7th: May 15-19 @ JLAB
  - 8th: Aug 28 - Sep 1 @ Manchester
  - ...

Originally developed by **S. Ponce**, now community effort



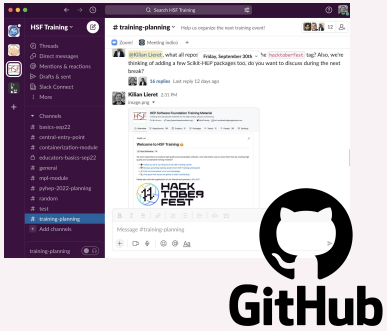
Building a community

Weekly meetings



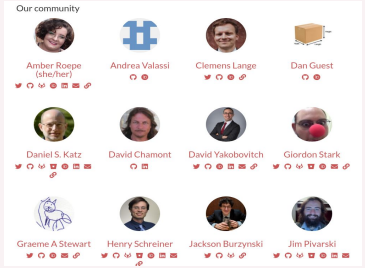
Monthly Hackathons

Platforms

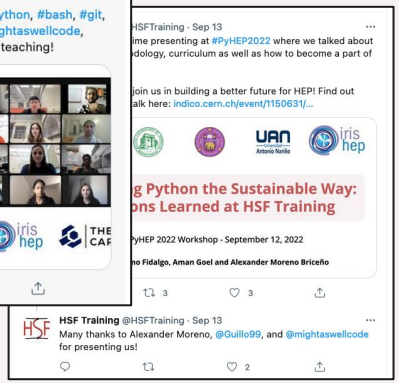


GitHub

Community pages

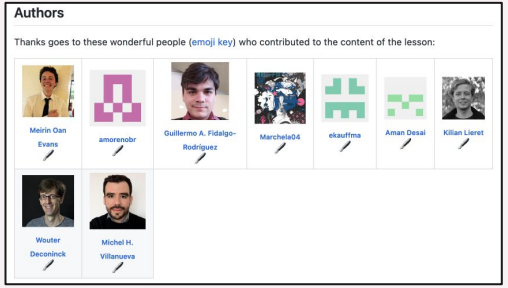


Increasing our reach



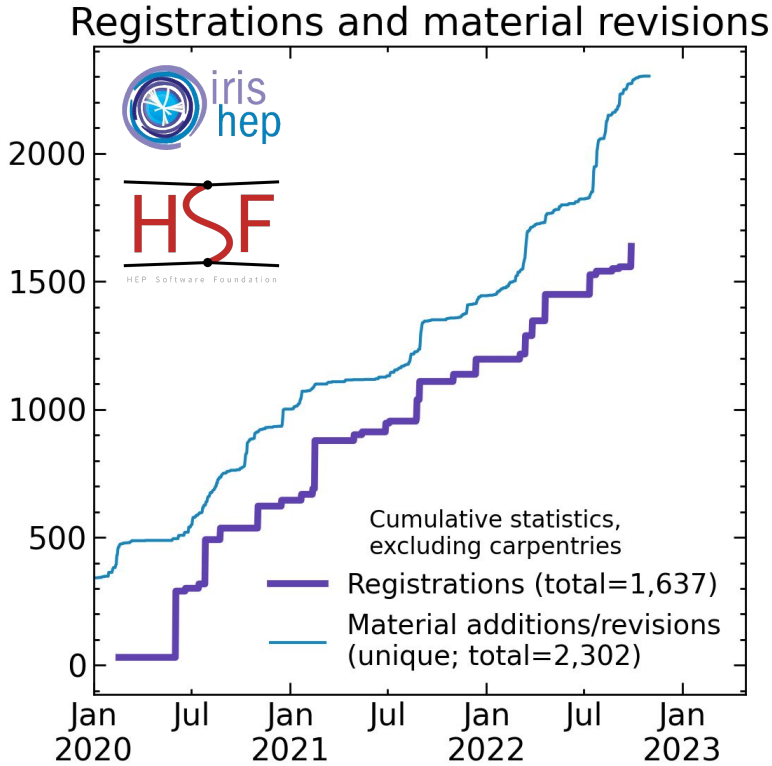
@hsftraining

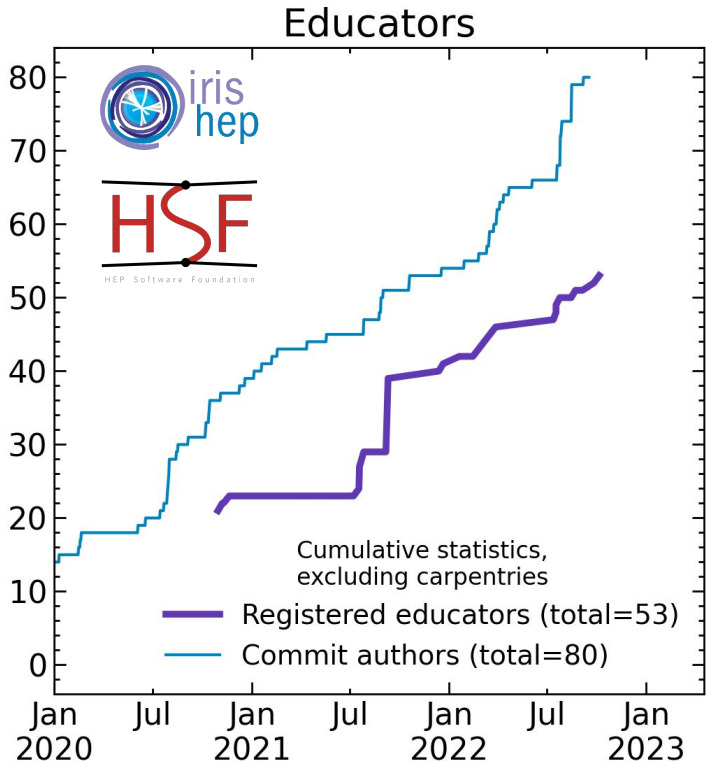
Recognition



How-to guides

We scale!

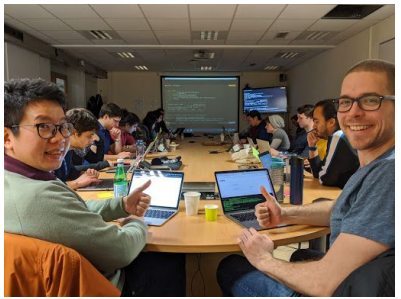

Registrations and material revisions
2000
1500
1000
500
0
Jan 2020
Jul
Jan 2021
Jul
Jan 2022
Jul
Jan 2023
Cumulative statistics, excluding carpentries
Registrations (total=1,637)
Material additions/revisions (unique; total=2,302)


Educators
80
70
60
50
40
30
20
10
0
Jan 2020
Jul
Jan 2021
Jul
Jan 2022
Jul
Jan 2023
Cumulative statistics, excluding carpentries
Registered educators (total=53)
Commit authors (total=80)

Conclusion

- We have established a **community of educators** working on cross-experiment training material
- **Join us** to
  - Make your training **discoverable**
  - **Avoid reinventing the wheel**
  - Ensure **sustainable maintenance**
  - Get help with **logistics & advertisement**

- Covering most basics/intermediate needs, now aiming at expanding intermediate/advanced training
  → **Seeding small groups to develop it**
- **Fill our survey to participate: bit.ly/state-of-training**



Join us!

Take the survey: bit.ly/state-of-training

 @hepsoftfound

 @hsf-training

 hepsoftwarefoundation.org