

**CARPENTRY**

# **HPC Carpentry**

*A scalable, peer-reviewed training program  
to democratize HPC access*

**BPHTE Lightning Talk — Nov. 13, 2023**

**Presenters:**

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# HPC Carpentry

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## Outline

**This is necessarily a brief introduction to our effort**

- General overview of the Carpentries
- How HPC Carpentry fits into and builds upon the Carpentries
  - Briefly history of the HPC Carpentry effort
  - Inventory of lessons and strategic plan

# The Carpentries

Motivated by a common problem in research practice – increasingly foundational computational research work was done by a variety of practitioners, often short-timers, with a variety of skill sets, and a variety of practices.

Founded by Greg Wilson starting in the late 1990s, with various structural changes in response to feedback over the years – current umbrella organization (2018) encompasses several sub-organizations – software carpentry, library carpentry, and data carpentry.



Central idea: The skills necessary to demonstrate the value of better practices can be taught in a workshop setting working hands-on with the actual systems – learners build “muscle memory” of having done key steps in the process, and come away with the power to move themselves forward.

- Pedagogically sound – relies on peer-reviewed educational literature
  - Formal instructor training
- Open-source – uses instructor and learner feedback to modify lessons
- Inclusive – anyone can contribute feedback, pull-requests



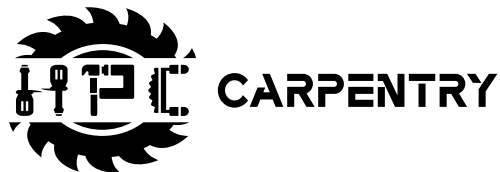
# HPC Carpentry

Common challenges with HPC environment:

- Researchers with HPC requirements often do not have adequate training in operating HPC systems, and struggle to effectively scale up/out their operations even when the hardware resources are available.
- HPC facility operators are frustrated by non-knowledgeable users making inappropriate use of shared resources, disrupting other users, and requiring significant hand-holding before they can become effective.

⇒ Candidate solution: Use Carpentries techniques to build the bridge for HPC users.

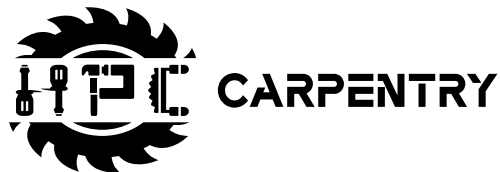
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# HPC Carpentry

## Some Important Contributions

- Peter Steinbach, “HPC In A Day”
- ComputeCanada contributions
- SC17 BoF
  - Andy Turner, Christina Koch, Tracy Teal, Bob Freeman, Chris Bording
- CarpentryCon 2018 discussions
- SC18 BoF
  - Andy Turner, Christina Koch, Peter Steinbach, Alan O’Cais, Jeffrey Stafford, John Simpson, Daniel Smith, Bob Freeman
- Well-attended informal session at SC19
- CarpentryCon 2020@Home
  - Trevor Keller, Christina Koch, others?
- SC21 BoF – high-value feedback from HPC operators
- Present in the Carpentries Incubator, Winter 2021
- Begin working towards Lesson Program Incubation
- CarpentryCon 2022
  - Lightning talk, sprint, breakout session
- June 2023 – formal acceptance into Lesson Program Incubation



# HPC Carpentry

## Our Current Lessons

- HPC Intro (Queuing system basics) (Carpentries Incubator)
- HPC Shell (Deprecated in favor of the Carpentries lesson)
- HPC Parallel Novice (Parallelization using Python)
- HPC Workflow<sup>†</sup>
- HPC Chapel<sup>†</sup>

## Strategic Plan

- Build two two-day workshop tracks
  - UNIX Shell<sup>\*</sup>, HPC Intro, and HPC Workflow<sup>†</sup> lessons, with Admahl's Law application, for HPC users
  - UNIX Shell<sup>\*</sup>, HPC Intro, and HPC Development<sup>††</sup> lessons, for coders to learn parallel frameworks
- Continue to curate and host additional material across a spectrum of candidate users

• Notes: \* Software Carpentry. † Under development. †† Planned.

Our principal audience is novice HPC users. Where possible and practical, we are also interested in serving less-novice HPC users, as well as HPC facility operators. The more community participates, the better we can do together!



# HPC Carpentry

## Getting Involved

The GitHub Project Page:  
`github.com/hpc-carpentry`

The Slack:  
`#hpc-carpentry` on `swcarpentry.slack.com`

The Topicbox E-mail List:  
`carpentries.topicbox.com/groups/discuss-hpc`

The main website:  
`hpc-carpentry.org`

