


# Welcome to OpenMP Training Series, May - Oct 2024

The NERSC logo is located in the top right corner. It consists of the letters "NERSC" in a bold, white, sans-serif font, set against a dark blue rectangular background with a glowing, starburst effect behind the text.

**NERSC**

The background of the slide is a photograph of a modern, multi-story building with a glass and metal facade. The building is illuminated by the warm, golden light of a sunset or sunrise, which is reflected in the windows. In the background, a cityscape and a body of water are visible under a clear blue sky.

Helen He, NERSC  
May 6, 2024

# OpenMP

- The OpenMP API is the de facto standard for writing parallel applications for shared memory computers supported by multiple scientific compilers on CPU and GPU architectures
- MPI+OpenMP for CPUs and OpenMP device offload for GPUs are recommended portable programming models on Perlmutter, Frontier, and Aurora
- OpenMP Training Series, May-Oct 2024
  - <https://www.nersc.gov/openmp-training-series-may-oct-2024/>

# OpenMP Training Series

- Part of the NERSC/OLCF/ALCF Performance Portability Series
  - <https://www.nersc.gov/performance-portability-series-2023-2024/>

Session	Date
<a href="#"><u>Advanced SYCL Techniques and Best Practices</u></a>	May 30, 2023
<a href="#"><u>HIP Training Series</u></a>	August - October 2023
<a href="#"><u>OpenMP Offload 2023 training, Part 1: Basics of Offload</u></a>	September 29, 2023
<a href="#"><u>OpenMP Offload 2023 training, Part 2: Optimization and Data Movement</u></a>	October 6, 2023
<a href="#"><u>Raja</u></a>	October 10, 2023
<a href="#"><u>Performance Portability for Next-Generation Heterogeneous Systems</u></a>	February 26, 2024
<a href="#"><u>AMReX</u></a>	March 14, 2024
<a href="#"><u>Kokkos</u></a>	April 25-26, 2024
<a href="#"><u>OpenMP Training Series</u></a>	May - October, 2024
Other solutions	TBD

**SYCL:** June 20  
**Julia:** June 18, 21  
**HPX:** TBD

# Introduction of Speakers

- Both Michael Klemm and Christian Terboven
  - OpenMP Language Committee members
  - Among a group of experts who regularly give technical talks and tutorials on OpenMP, at SC, ISC, IWOMP, and other HPC centers, etc.
- Dr. Christian Terboven
  - Leads HPC group at RWTH Aachen University as a senior scientist
  - Co-chair of OpenMP Affinity Subcommittee
  - Co-author of book "Using OpenMP - The Next Step", published by MIT Press
- Dr. Michael Klemm
  - Principal Technical staff in the Compilers, Languages, Runtimes & Tools team of Machine Learning & Software Engineering group at AMD
  - CEO of the OpenMP Architecture Review Board
  - Lead author of book "High Performance Parallel Runtimes: Design and Implementation"

# Sessions and Topics

- Session 1: OpenMP Introduction (May 6)
- Session 2: Tasking (Jun 10)
- Session 3: Optimization for NUMA and SIMD (Jul 8)
- Session 4: What Could Possibly Go Wrong Using OpenMP (Aug 5, guest session from Ruud van der Pas)
- Session 5: Introduction to Offloading with OpenMP (Sept 4)
- Session 6: Advanced OpenMP Offloading Topics (Oct 7)
- Session 7: Selected / Remaining Topics (Oct 28)

Homework assigned for each session will be reviewed at next session

Follow-on sessions will become more advanced over time

# Some Logistics

- Users are muted upon joining Zoom due to large number of attendees
- Please change your name in Zoom session as “first\_name last\_name (nersc\_user\_name)”, such as “Helen He (yunhe)”
  - Click “Participants”, then “More” next to your name to rename
- You can click the CC button to toggle captions and view full transcript
- Trainings are recorded. Feel free to unmute and ask questions
  - If prefer not to record your voice, please type questions in Slack
- Slides have been uploaded. Recording to be available in a few days
  - <https://www.nersc.gov/openmp-training-series-may-oct-2024/>
- Please join [OpenMP-series-2024 Slack](#)
  - **#general**: Q&A and discussions
  - **#perlmutter-accounts**: training accounts issues
- Please take our [survey](#) to help us improve!

# NERSC Code of Conduct

As NERSC collaborators, we are all bound by the Code of Conduct:

**Team Science**

**Service**

**Trust**

**Innovation**

**Respect**



■ We agree to **work together professionally and productively** towards our shared goals while respecting each other's differences and ideas.

■ We should all feel free to speak up to maintain this environment and remember there are resources available to **report violations** to foster an inclusive, collaborative environment.

Email [nersc-training@lbl.gov](mailto:nersc-training@lbl.gov) for any concerns

<https://www.nersc.gov/nersc-code-of-conduct> or search “NERSC Code of Conduct”