

# N-Ways To GPU Programming Bootcamp and Beyond for NERSC



Apr 5, 2023

Helen He

# N-Ways To GPU Programming

- Thanks NVIDIA for bringing the N-Ways GPU Programming Bootcamp to NERSC!
  - Organizers, presenters, people worked on materials, and TAs
- Majority of the bootcamp attendees are NERSC/ALCF/OLCF users
- It covers GPU programming concepts and basic introduction of various programming models
- Users can continue to learn by using the bootcamp materials as guideline, while program and run your GPU codes on Perlmutter and other DOE systems.
- Users can explore more in-depth past and upcoming NERSC training materials on GPU programming models and profiling tools

# Perlmutter Supports Every GPU Programming Model

	Fortran/ C/C++ *	CUDA	OpenACC 2.x	OpenMP 5.x *	CUDA Fortran	Kokkos / Raja *	MPI	HIP	DPC++ / SYCL
NVIDIA	Vendor Supported	Vendor Supported	Vendor Supported	Vendor Supported	Vendor Supported	Vendor Supported	Vendor Supported	NERSC Supported	NERSC Supported
CCE	Vendor Supported	NERSC Supported	Vendor Supported	Vendor Supported	NERSC Supported	Vendor Supported	Vendor Supported	NERSC Supported	NERSC Supported
GNU	Vendor Supported	Vendor Supported	Vendor Supported	Vendor Supported	NERSC Supported	Vendor Supported	Vendor Supported	NERSC Supported	NERSC Supported
LLVM	NERSC Supported	NERSC Supported	NERSC Supported	NERSC Supported	NERSC Supported	NERSC Supported	NERSC Supported	NERSC Supported	NERSC Supported
Intel**	NERSC Supported	NERSC Supported	NERSC Supported	NERSC Supported	NERSC Supported	NERSC Supported	NERSC Supported	NERSC Supported	NERSC Supported

\* highest portability

\*\* available soon

Vendor  
Supported

NERSC  
Supported

# Selected NERSC GPU Training Events

- **NERSC Training Events and Archives (slides, recordings):**  
<https://www.nersc.gov/users/training/events/>
  - 3-part OpenACC Training Series, Apr-Jun 2020
  - 9-part CUDA Training Series, Jan 2020 - Oct 2021
  - 2-part Standard C/C++ and Fortran Training Series, Apr-May 2022
  - [OpenMP Offload Training](#), Aug-Sep 2022
  - [Nsight Systems and Nsight Compute Profiling](#), Aug 2022
  - [Nvidia HPC SDK Training](#), Jan 2022
  - [Using Perlmutter Training](#), Jan 2022
  - [New User Training](#), Sep 2022
  - GPUs for Science Day 2022, [Oct 2022](#) and [Jun 2020](#)
  - [Perftools and Reveal Tools for GPU Programming](#), Sep 2022
  - [GPU Debugging with Nvidia tools](#), Nov 2022
  - [HIP for CUDA Programmers](#), Jul 2022
  - [SYCL Training](#), Mar 2022

# Upcoming NERSC GPU Training Events

- [Codee training](#), Apr 25-26, 2023
  - A developer tool to help inserting OpenMP and OpenACC directives
- [NERSC Open GPU Hackathon](#), application due May 24
- Advanced SYCL Training, end of May 2023