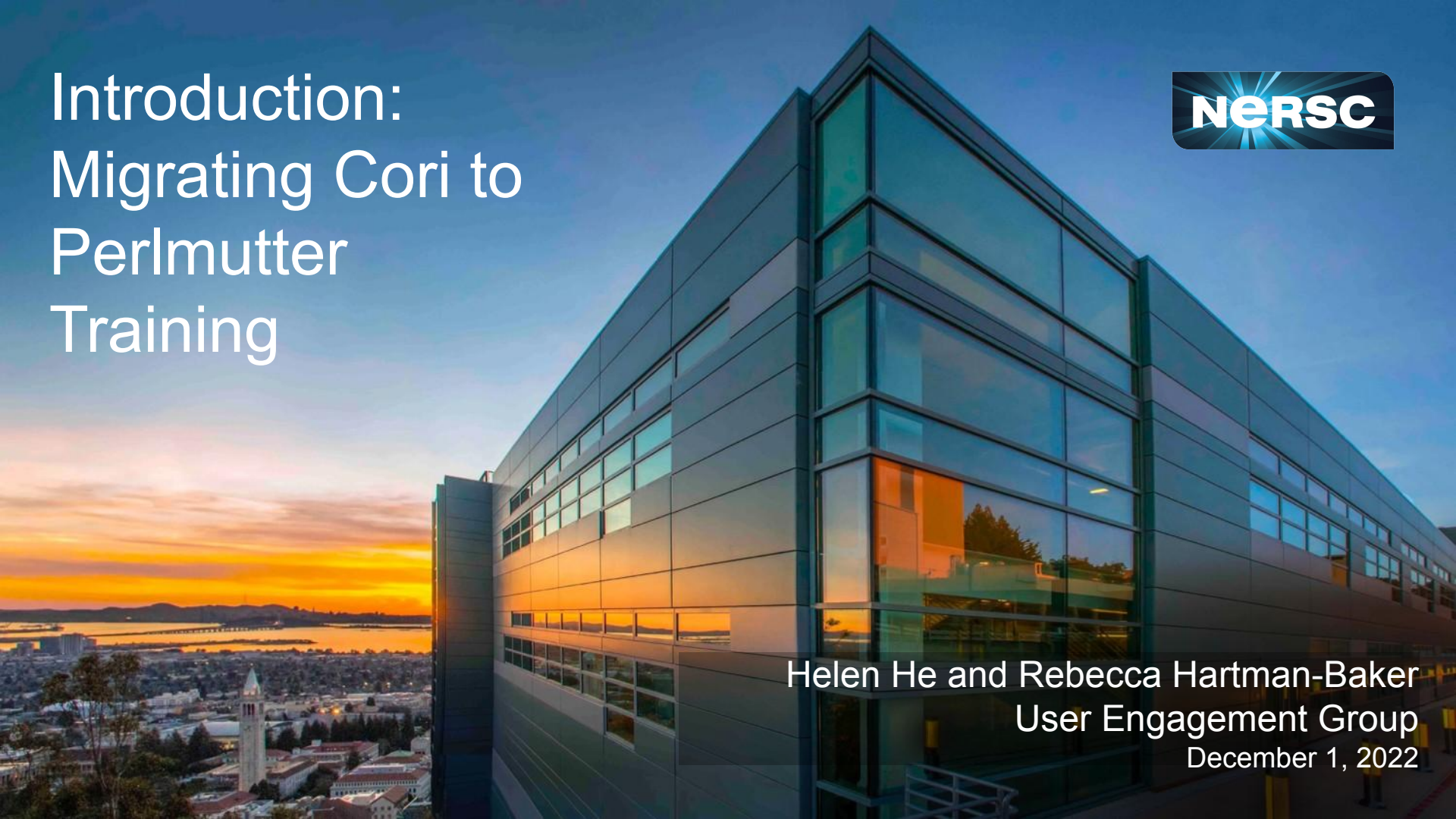
Introduction: Migrating Cori to Perlmutter Training



Helen He and Rebecca Hartman-Baker
User Engagement Group
December 1, 2022

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
- Slides to be uploaded soon. Videos available in a few days after split/trim
  - https://www.nersc.gov/users/training/events/migrating-from-cori-to-perlmutter-training-dec2022/
- Please ask your questions in GDoc (preferred over Zoom chat)
  - https://tinyurl.com/bdf8ezfb
  - NERSC staff standing by to answer questions

Agenda

Time (PDT)	Topic	Presenters
9:00 - 9:10 am	Introduction: Migrating from Cori to Perlmutter Training	Helen He, Rebecca Hartman-Baker
9:10 - 9:50 am	Intro to Perlmutter and GPUs	Jack Deslippe
9:50 - 10:35 am	Migrating from Cori to Perlmutter: CPU Codes	Erik Palmer, Helen He
10:35 - 10:55 am	Break	
10:55 - 11:40 am	Migrating from Cori to Perlmutter: GPU Codes	Muaaz Awan, Steve Leak, Helen He
11:40 am -12:15 pm	Hands-on and help with users' own codes	All
12:15 - 13:00 pm	Lunch Break	
13:00 - 3:00 pm	Hands-on and help with users' own codes (cont'd)	All

Hands-on Exercises

- Feel free to use some NERSC prepared CPU and GPU examples at https://github.com/NERSC/Migrate-to-Perlmutter

  or bring your own applications codes today.

- Perlmutter Compute node reservations, 10:00 - 15:00:
  - CPU: #SBATCH --reservation=pm_cpu_dec1 -A ntrain2 -C cpu
  - GPU: #SBATCH --reservation=pm_gpu_dec1 -A ntrain2 -C gpu
  - Existing NERSC users are added to the ntrain2 project to access node reservations

Cori Will Be Retired in March 2023

- Cori was installed in 2015, and at 6+ years may be NERSC's longest lasting system
- AY2023 allocations are based on Perlmutter's capability, and NERSC hours allocated can be used on Cori
- We will give users more time to transition from Cori to Perlmutter
- Cori will be retired in **March 2023 (as T in next slide)**

Cori Retirement Timeline

- **Oct 2022:** Software freeze (no new user-facing software installed by NERSC)
- **AY 2023:** All allocations based on Perlmutter's capacity only
- **Nov-Jan:** Cori to Perlmutter transition training focus & office hours
- **Late Jan or early Feb:** Announce **final date (T)** for decommissioning
- **T - 1 week:** Implement reservation, preventing new jobs from running effective T
- **T:** Delete all jobs from queue, no new jobs can be submitted; continue to allow login to retrieve files from Cori scratch
- **T + 1 week:** Close login nodes permanently
- **T + 1 month:** Disassembly begins

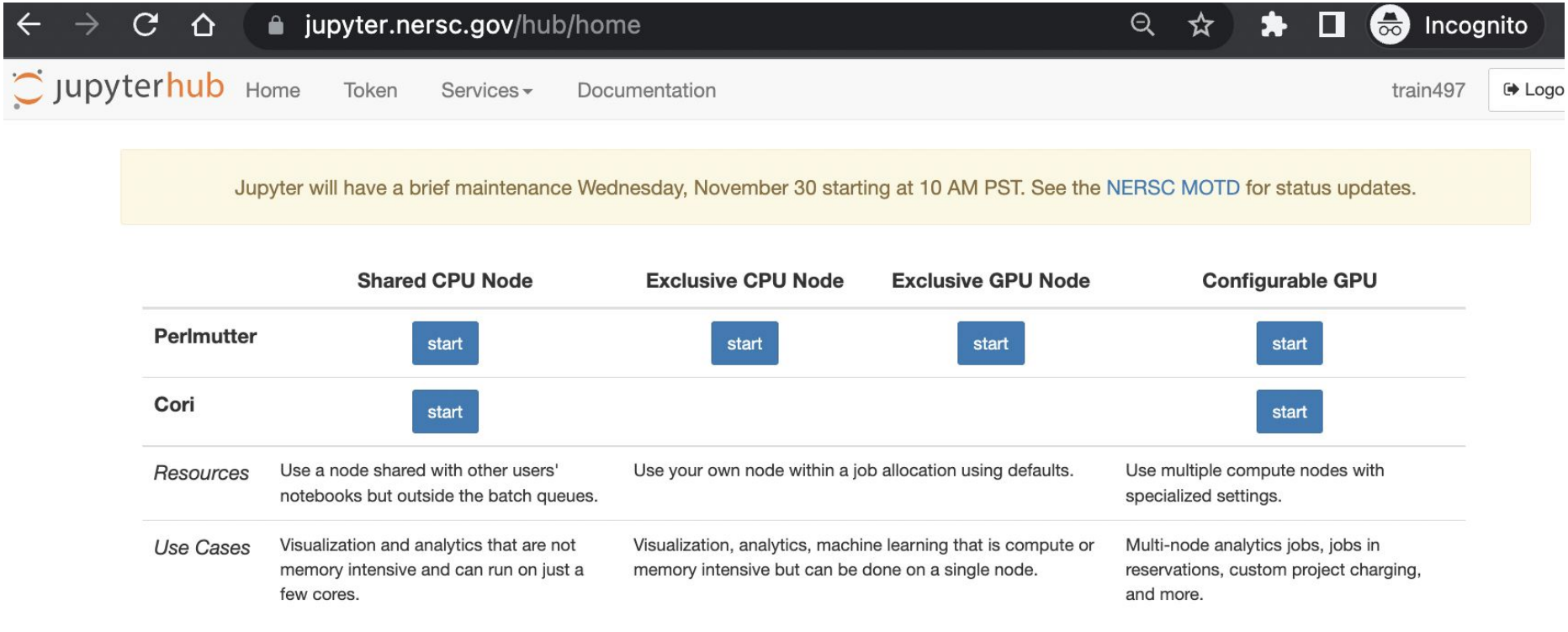
Access Perlmutter via SSH

- **ssh elvis@perlmutter-p1.nersc.gov**

  or **ssh elvis@saul-p1.nersc.gov**

  (substituting your username for **elvis**)
- Use MFA (password + one-time password) in same way as Cori
  - Can use sshproxy to reduce frequency of authentication

Access Perlmutter via JupyterHub



Can open a “terminal” as well as choosing many other JupyterHub kernels (such as Python, PyTorch, etc.)

File Systems and Data Considerations

- Files/data in your global home and CFS directories on Cori are available on Perlmutter
  - The old symlink /global/project/projectdirs to CFS on Cori does not exist on Perlmutter; be sure to remove this from old scripts!
- Files/data on Cori scratch not accessible on Perlmutter
  - Perlmutter has its own scratch file system
  - Cori scratch will be retired with Cori
  - Can migrate Cori scratch data onto CFS or HPSS via Globus or scp first, then access on Perlmutter (details)

Cori / Perlmutter Comparison: Similarities

- Cray user environment
  - Compiler wrappers (cc, CC, ftn)
  - PrgEnv modules
- Slurm
  - Similar queues set up (regular, premium, overrun, shared, etc.)
- CPU nodes
  - AMD instead of Intel, but standard CPU architecture with no major surprises
  - Similar to Haswell in clock speed, similar to KNL in number of cores per node

Cori / Perlmutter Comparison: Differences

- Lmod *vs* modules
  - Many similarities, but some major differences
  - Modules may not be initially visible due to dependencies; using **`module spider`** will find hidden modules
- GPU nodes
  - Substantially different programming models required to exploit GPU nodes
  - Codes may have different GPU-compatible and CPU-only versions
- Compiler/PrgEnv versions
  - No Intel compiler (no plans to support)

Some Existing Training Materials

- NERSC Training Events and Archives (slides, recordings): https://www.nersc.gov/users/training/events/
  - Using Perlmutter Training, Jan 2022
  - New User Training, Sept 2022
  - GPUs for Science Day 2022, Oct 2022
  - Data Day 2022, Oct 2022
  - OpenMP Offload Training, Aug-Sep 2022
  - 9-part CUDA Training Series. Jan 2020 - Oct 2021
  - 3-part OpenACC Training Series, Apr - Jun 2020
  - SYCL Training, Mar 2022
  - Codee Training, Apr 2022
  - Nvidia HPC SDK Training, Jan 2022
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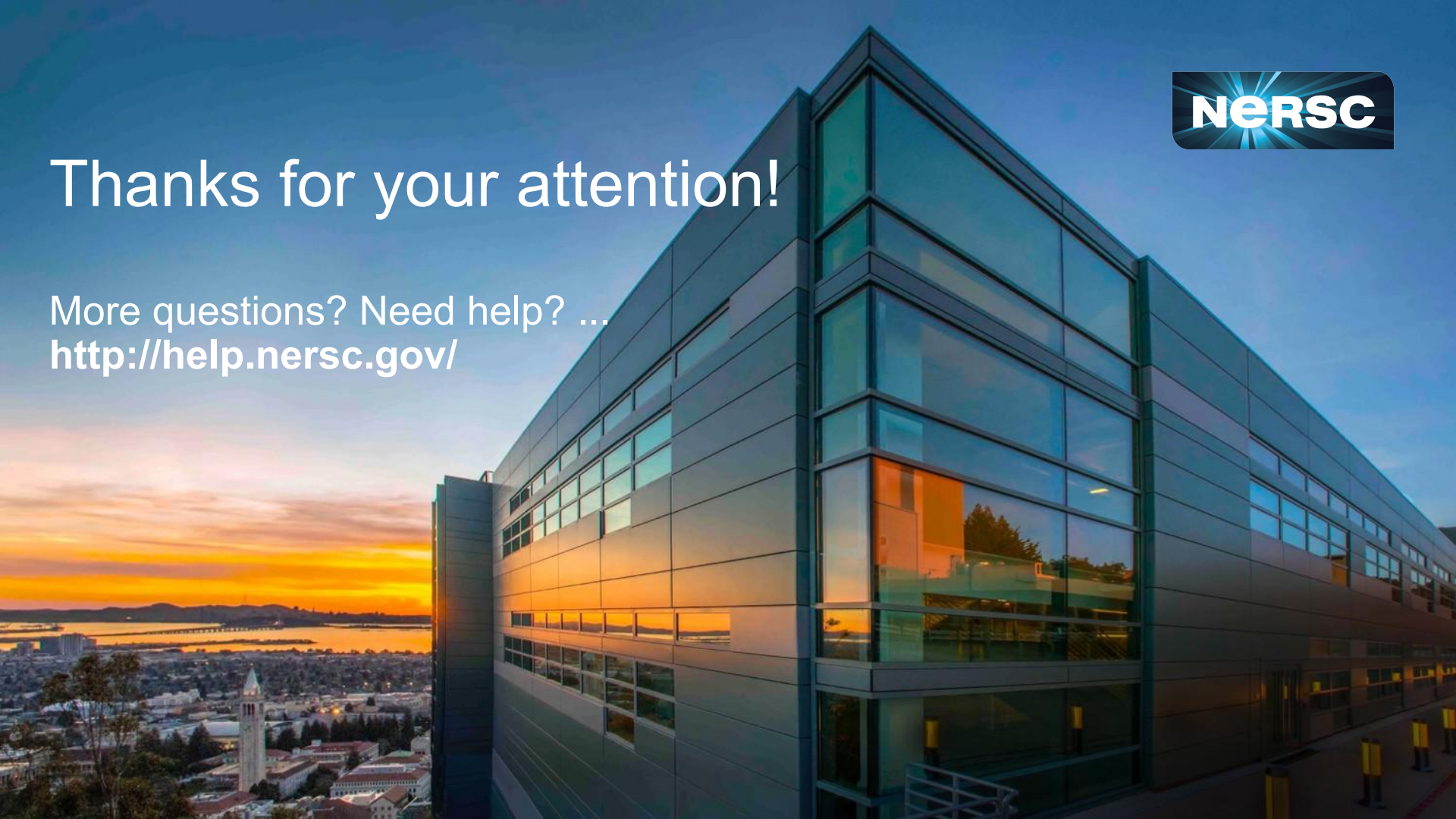
More Training Opportunities

- **Cori to Perlmutter Transition Office Hours**
  - We've held 3 office hours this month, met with 50+ users
  - Additional Office Hours scheduled for
    - **Fri, Dec 2 (tomorrow!)**; Thur, Dec 8; Fri, Dec 16
    - Fri, Jan 6; Thur, Jan 12
- Codee training (under planning)
  - A developer tool to help inserting OpenMP and OpenACC directives
- N-Ways for GPU Programming Bootcamp (under planning)
  - OpenMP Offload, OpenACC, CUDA, Standard Language Parallelization, etc.


NERSC
Thanks for your attention!
More questions? Need help? ...
http://help.nersc.gov/