Day 1

8:00 AM – 8:30 AM	**Check-In & Breakfast**	30 min
8:30 AM – 9:25 AM **(NDA)**	**NDA: Introduction to Frontier Architecture (Joe Glenski, Cray)**	55 min
9:25 AM – 10:10 AM **(NDA)**	**NDA: AMD GPU Evolution (Nicholas, Malaya, AMD)**	45 min
10:10 AM – 10:40 AM **(NDA)**	**NDA: Frontier Programming Environment (Heidi Poxon, Cray)**	30 min
10:40 AM – 11:10 AM	**Break**	30 min
11:10 AM – 11:40 AM	**Welcome & Application Readiness Overview (Bronson Messer, OLCF)** • Expectations, schedule, measuring success	30 min
11:40 AM – 12:00 PM	**Introduction to Cray CoE (Noah Reddell, Cray)** • Cray and AMD staffing/resources • Organization and key points of contact • Existing engagements • How to get help	20 min
12:15 PM – 1:05 PM	**Introduction to Frontier System (Joe Glenski, Cray; working lunch)** • Non-NDA system overview • OS, batch scheduler/job launcher **Overview of Programming Models for Frontier (Noah Reddell, Cray)** • OpenMP 5.1 • Kokkos (HIP backend) • HIP • Communication options on the GPU architecture • Guidance for porting applications to Frontier 1. Porting existing directive-based OpenMP or OpenACC 2. Porting existing kernel-based GPU code (e.g. CUDA) 3. Porting (homogeneous) MPI	50 min
1:15 PM – 2:15 PM	**Introduction to CAAR Teams (Participants)** • 1 slide ONLY (2 MINUTES MAX!) quick team intro	60 min
2:30 PM – 5:00 PM	**Collaborative Time with Application Teams**	150 min

Day 2

8:00 AM – 8:30 AM	**Check-In & Breakfast**	30 min
8:30 AM – 9:30 AM	**AMD GPU Basics (Rene van Oostrum, AMD)** • Hardware hierarchy: node, GPU, shader engine, compute unit, simd (compare to CUDA terminology) • Execution hierarchy: stream, kernel, workgroup, wavefront, thread (compare to CUDA terminology) • Memory hierarchy: registers, local memory, cache, HBM, DDR, UVM, NVM • Simd and thread divergence • Impact of memory access patterns • Interplay of scarce resources: registers, local memory, workgroup size, occupancy • Discuss implementation details (assembly/gcn)	60 min
9:30 AM – 10:15 AM	**HIP and Kokkos (Noel Chalmers, AMD)** • HIP Programming model • Kokkos (HIP backend)	45 min
10:15 AM – 10:45 AM	**Experiences using HIP (Phil Roth, OLCF)**	30 min
10:45 AM – 11:15 AM	**Break**	30 min
11:15 AM – 12:15 PM	**Cray Compiler & OpenMP Offloading (Jeff Sandoval, Cray)** • CCE basics • Loop mark listings • Mapping of OpenMP directives to hardware • Directives best practice • UVM (pros and cons) • Expanding scope of data blocks • Overlap with nowait and depend • Hierarchical parallelism • MPI with GPU buffers and nowait synchronization • Reductions and atomics • Debugging (printf approach, CRAY_ACC_DEBUG, etc) • What works today	60 min
12:30 PM – 1:15 PM	**Using the Frontier CoE Systems (Noah Reddell, Cray; working lunch)** • Overview of systems • New account request procedure • Point to HOWTO guide • Login and module setup • Launching jobs (Slurm)	45 min
1:15 PM – 2:15 PM	**Cray Compiler Breakout (Jeff Sandoval, Cray)**	60 min
1:15 PM – 5:00 PM	**Collaborative Time with Application Teams**	225 min

Day 3

8:00 AM – 8:30 AM	**Check-In & Breakfast**	30 min
8:30 AM – 9:45 AM	**Introduction to Cray Programming Environment (Heidi Poxon, Cray)** • Compilers • Programming Environment and modules setup • Environment setup • Overview of Performance Tools • Overview of Porting Tools (Reveal, CCDB) • Overview of Debugging Tools (gdb4hpc, STAT/ATP) • Overview of Message Passing (MPI)	75 min
9:45 AM – 10:30 AM	**AMD Tools Overview (Damon McDougall, AMD)** • HIPify tools • Rcprof • Rocprof • codeXL	45 min
10:30 AM – 11:00 AM	**Break**	30 min

11:00 AM – 12:00 PM	**Scientific Libraries (Austin Harris, OLCF; Heidi Poxon, Cray; AMD)**
	• Cray Libraries (20 min)
	  ○ What is available now and where?
	  ○ What is expected?
	• AMD Libraries (20 min)
	  ○ What is available now and where?
	  ○ What is expected?
	  ○ Mapping of CUDA to HIP libraries
	• Discussion (20 min)
	  ○ What is missing?
	  ○ What do you need to succeed?
		60 min

12:15 AM – 1:15 PM	**Proxy Applications (John Levesque, Cray; Nicholas Malaya, AMD; working lunch)** • 2-3 apps that demonstrate current functionality • Functional status • Links to successful recipes	60 min
1:15 PM – 2:15 PM	**Performance and Debugging Tools Breakout (Heidi Poxon, Cray)**	60 min
2:15 PM – 5:00 PM	**Collaborative Time with Application Teams**	165 min