

HPC Training Series - Course 22 "HPC Fundamentals, Slurm, Open OnDemand & XDMoD"

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Introduction to High Performance Computing

Monday, 13 July 2026 12:10 (40 minutes)

This talk introduces High Performance Computing (HPC) as a foundation for modern AI and scientific workloads. It explains how clusters combine CPUs, GPUs, nodes, memory, networking, storage, and job schedulers to run demanding computations efficiently. The session covers parallel computing concepts such as cores, threads, tasks, data and task parallelism, then moves into scaling, speedup, efficiency, strong and weak scaling, Amdahl's Law, and Gustafson's Law. It also presents key HPC programming models, including OpenMP, MPI, GPUs, and CUDA, before highlighting leading European supercomputers and EuroHPC access routes for researchers and industry. Practical examples help link theory to real workloads.

Presenter: BAKAS, Nikolaos (GRNET)