CINECA Summer HPC School for HPC + AI workload

VIA MAGNANELLI 6/3 40033 CASALECCHIO DI RENO, BO, ITALY

June 29th - July 10th 2026

CINECA and Italy's Leadership in HPC

CINECA: A Pioneering Institution

Founded in 1969, CINECA has evolved into one of Europe's most influential high-performance computing consortia, serving academic and industrial research needs for over five decades.

Leonardo: Italian Computing Excellence

Deployed in 2022, Leonardo represents Italy's commitment to computational leadership, providing unprecedented resources for scientific breakthroughs and industrial innovation. It ranks as the 10th most powerful supercomputer globally.

Strategic European Partnership

Italy's HPC infrastructure forms a crucial component of EuroHPC, positioning the country as a key player in Europe's digital sovereignty initiative.

Objectives and Goals of the Summer School

Simplify HPC Learning

Comprehensive training in heterogeneous computing principles and architectures designed for the next generation of computational scientists.

Engage with Trending Topics

Equipping participants with essential skills to leverage artificial intelligence and high-throughput accelerators in research and industrial contexts.

Practical Intensive Sessions

Hands-on practical training covering different programming models and specialized HPC tools for optimized workloads.

Clear Educational Goals

Ensuring participants gain a deep understanding of the effort and technical mastery required for modern HPC environments.

Visit our repository: gitlab.hpc.cineca.it/cinecasummerschool/hpc25cineca

Selection of 25 Participants: Our Competitive Process

Our rigorous selection process ensures we identify the most promising candidates from our extensive applicant pool. We evaluate each application through multiple criteria to create a balanced, diverse cohort.

25

Total Participants

Demonstrated Motivation

We assess each applicant's personal statement for genuine enthusiasm, clear academic objectives, and commitment to maximising this opportunity.

Programming Proficiency

Candidates must demonstrate basic knowledge in at least one programming language, providing evidence through previous projects or coursework.

Research Diversity

We select participants across varied research disciplines to foster cross-pollination of ideas and collaborative innovation.

Gender & National Balance

Our selection committee employs blind review techniques to ensure gender equality and geographic diversity, enriching the learning experience.

Agenda: June 29th - July 3rd

Schedule	Monday	Tuesday	Wednesday	Thursday	Friday
9:15 - 10:30	**Intro HPC** Andrew Emerson	**MPI** Alessandro Marani	**OpenMP** Alessandro Romeo	**Intro GPU** Nitin Shukla	**Profiling Techniques** Laura Bellentani
10:30 - 11:00	**Coffee Break**				
11:00 - 12:30	**HPC Systems** Alessandro Marani	**MPI Continue** Alessandro Marani	**OpenMP Continue** Alessandro Romeo	**CUDA** Nitin Shukla	**Introduction to OpenACC** Laura Bellentani
12:30 - 14:00	**Lunch Break**				
14:00 - 15:30	**CMAKE** Mandana Safari	**MPI Continue** Alessandro Marani	**OpenMP Continue** Alessandro Romeo	**CUDA Continue** Nitin Shukla	**Advanced OpenACC** Laura Bellentani
15:30 - 16:00	**Coffee Break**				
16:00 - 17:30	**Introduction to GIT** Michael Redenti	**MPI Continue** Alessandro Marani	**OpenMP Continue** Alessandro Romeo	**CUDA Continue** Nitin Shukla	**Advanced OpenACC** Laura Bellentani

Agenda: July 6th - July 10th

Daily schedule includes expert-led lectures and hands-on workshops.

Schedule	Monday	Tuesday	Wednesday	Thursday	Friday
9:00 - 12:30	**SYCL** Alberto Guarnieri, Filippo Barbari	**Introduction to containers** Leonardo Salicari	**Pre-trainings LLMs** Domitilla Brandoni, Riccardo Scheda	**Project closing**	**Project presentations and Visit to Leonardo and Bologna Technopole**
12:30 - 14:00	*Lunch Break*				
14:00 - 17:30	**SYCL** Alberto Guarnieri, Filippo Barbari	**Introduction to LLMs** Gianluca Carlini	**Adding knowledge to LLMs and Inference** Michele Visciarelli, Filippo Festa **Social Dinner (h 20:00)**	**Project closing**	

Visit to Leonardo HPC System

World-Class Facility

Exclusive guided tour of the Tecnopolo Data Manifattura in Bologna, one of Europe's most advanced computational research centers.

Supercomputing Power

Up-close view of Leonardo's specs: **240 PetaFLOPS**, 3,500 CPUs, and **14,000 GPUs** with innovative energy-efficient cooling.

Research Impact

Presentation on groundbreaking projects in climate simulation, protein folding, quantum chemistry, and large-scale LLM training.

Bologna TECNOPOLO Location

Strategic Hub

The Tecnopolo is located close to the Bologna city center at the historic Manifattura Tabacchi site, serving as a focal point for Italian and European research.

Key Partners

ECMWF - European Centre for Medium-Range Weather Forecasts

INFN - National Institute for Nuclear Physics

CINECA - High Performance Computing Consortium

Tecnopolo di Bologna: Logistics

⚠ Important Arrival Note

Please be advised that there is **no bus service** offered by CINECA for transportation to the facility.

Required Arrival: around 09:30

Leonardo Supercomputer

A visual representation of the massive hardware infrastructure supporting European research and industrial innovation.

14,000
NVIDIA GPUS

3,500
INTEL CPUS

240
PETAFLOPS

10th
GLOBAL RANK

Code of Conduct

The CINECA Summer School is committed to providing a harassment-free, inclusive, and professional learning environment for everyone, regardless of background or identity.

- Active respect for diverse backgrounds and perspectives
- Zero tolerance for discrimination, intimidation, or harassment
- Professional and constructive communication at all times
- Prompt reporting of any concerns to organisers

Community Standards

All participants must adhere to CINECA's institutional guidelines and professional conduct expectations to ensure a productive environment for all.

Collaborative Spirit

We foster an environment where everyone can learn and contribute freely, encouraging the exchange of ideas across different research disciplines.

Summary & Expected Outcomes

Technical Mastery

Comprehensive understanding of heterogeneous computing principles, architectures, and programming models for cutting-edge HPC applications.

Professional Network

Valuable connections with leading researchers and industry practitioners, forming a lasting community of practice in advanced computing.

Career Advancement

Enhanced employability in high-demand fields like AI, climate modelling, biomedical computing, and industrial optimisation.

Practical Experience

Hands-on skills with world-class systems and software tools that translate directly to research and industrial computing challenges.

Participants will receive an official certificate of completion from CINECA, recognised across academic and industrial institutions.

75% attendance is required