



Summer CINECA School: dive into the World of HPC

Feel free to reach me out
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July 1-12 2024

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Ten days
Main
Goal of
Summer
School

1. Introduction to HPC

- ▶ All About HPC
- ▶ Compile and run C/Fortran code
- ▶ Git CLI

- ▶ Code Optimisation
- ▶ Profiling and Debugging
- ▶ Vectorisation
- ▶ Case Study

2,3 Parallel Computing

- ▶ OpenMP
- ▶ OpenMP + SIMD
- ▶ OpenMP Task
- ▶ OpenMP offloading

- ▶ Message Passing Interface (MPI)
- ▶ MPI Point-to-Point
- ▶ MPI collectives Communication
- ▶ Hybrid Programming with OpenMP and MPI

4. Accelerated Computing

- ▶ Basic to Advanced OpenACC
- ▶ Basic to Advanced CUDA
- ▶ Advanced OpenACC + CUDA
- ▶ Basics: CUB-Libraries, Kokkos and SYCL

5. Final project

Week-1: Agenda

Schedules	Monday	Tuesday	Wednesday	Thursday	Friday
09:00 - 09:15	Welcome Adress	Today's Agenda	Today's Agenda	Today's Agenda	Today's Agenda
09:15 - 10:00	Introduction to HPC	Introduction to GIT CLI SB + TZ	OpenMP	Introduction to MPI	MPI+OpenMP Hands-On
10:00 - 10:15			Hands-On	Hands-On	
Cafe break 10:15-10:30					
10:30 - 10:45	Job Launcher/ Batch Scheduler	Hands-On SB + TZ	OpenMP	MPI continue	Profiling tools
10:45 - 12:30			Hands-On	Hands-On	
Lunch break 12:30 - 14:00					
14:00 - 15:30	Compilation C/C++ / Fortran	Introduction to OpenMP	Introduction to MPI	MPI continue	Hands-On
Cafe break 15:30 - 16:00					
16:00 - 16:45	Optimisation	Introduction to OpenMP	Introduction to MPI	Hands-On	Benchmarking Jube
16:45 - 17:30		Hands-On	Hands-On		Hands-On

NS: Nitin Shukla
TG: Tommaso Gorni
LB: Laura Bellentani

SB: Simone Bna
AE: Andrew Emmerson

AR: Alessandro Romeo
MC: Marco Celoria
AM: Alessandro Marani

Week-2: Agenda

Schedules	Monday	Tuesday	Wednesday	Thursday	Friday
09:00 - 09:15	Welcome Adress	Today's Agenda	Today's Agenda	Today's Agenda	Today's Agenda
09:15 - 10:00	GPU Computing Overview Guest Lecturer	NVIDIA Profilers	Introduction to CUDA	CUDA (continued)	SYCL
10:00 - 10:15		Hands-On			
Cafe break 10:15-10:30					
10:30 - 10:45	Introduction to OpenACC	OpenACC Advanced	CUDA (continued)	CUB - Library	Hands-ON
10:45 - 12:30				Hands-On	
Lunch break 12:30 - 14:00					
14:00 - 15:30	OpenACC (continued)	OpenACC Advanced	CUDA (continued)	Kokkos	Final Project
Cafe break 15:30 - 16:00					
16:00 - 17:45	OpenACC (continued) Hands-On	OpenMP offloadings	CUDA (continued)	Kokkos	Final Project
16:15 - 17:30				Hands-On	

Guest Lecturer

NS: Nitin Shukla

LB: Laura Bellentani

AR: Alessandro Romeo

MR: Michael Redenti

AM: Alessandro Massini