EURO
Greece

Introduction to EuroCC Greece

Dr Nikos Bakas

EuroCC@Greece

The overall objective of the Greek National Competence Center is to enable the efficient uptake of HPC technologies with the 3-fold goal to:

- advance competitiveness in **research**
- improve the effectiveness of **government** services and
- promote innovation in **industry**

EuroCC@Greece

Services

- Technological Support & Consulting
  - High-Performance Computing,
  - Artificial Intelligence, and
  - High-Performance Data Analytics
- Training and Skills Development
- Access to computational resources

Technologies

- Artificial Intelligence
- Machine Learning
- Computer Vision
- Large Language Models
- Scientific Simulations
- Digital Twins
- High-Performance Data Analytics

Sectors

- Life Sciences & Healthcare
- Biotechnologies
- Materials & Batteries
- Engineering & Manufacturing
- Climate Change & Meteorology
- Cybersecurity
- Robotics

https://eurocc-greece.gr/

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Consortium

The Greek National Competence Center “EuroCC@Greece”, is run by a consortium of 5 institutions, namely

1. National Infrastructures for Research and Technology (coordinator) - **GRNET**
2. National Center for Scientific Research - **Demokritos**
3. Institute of Communication and Computer Systems - **NTUA**
4. Aristotle University of Thessaloniki - **AUTH**
5. Foundation for Research and Technology Hellas - **FORTH**

EUROHPC JOINT UNDERTAKING

- 34 participating countries
- The European Union (represented by the European Commission)
- 3 private partners

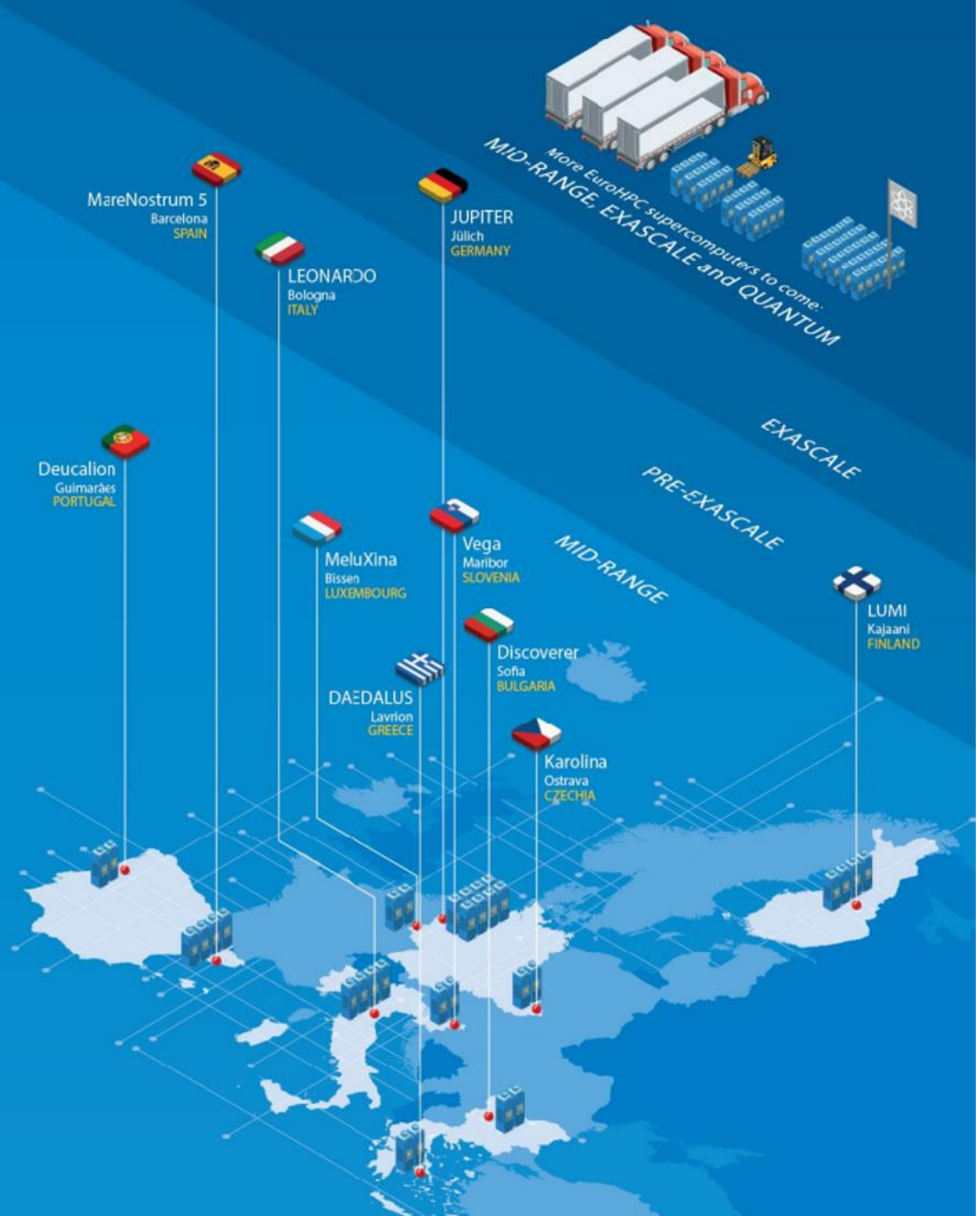
Each of our members is represented in the EuroHPC JU's Governing Board

The Governing Board also takes advice from the EuroHPC Industrial and Scientific Advisory Board (INFRAG & RIAG)

BDV BIG DATA VALUE ASSOCIATION

QIC European Quantum Industry Consortium

ETP 4 HPC EUROPEAN TECHNOLOGY PLATFORM FOR HIGH PERFORMANCE COMPUTING



8 operational systems, all ranking among the world's most powerful supercomputers:

1. LUMI in Finland #5
2. LEONARDO in Italy #6
3. MARENOSTRUM in Spain
4. VEGA in Slovenia
5. MELUXINA in Luxembourg
6. KAROLINA in Czechia
7. DEUCALION in Portugal
8. DISCOVERER in Bulgaria

Underway:

JUPITER in Germany

DAEDALUS in Greece

1	**Frontier** - HPE Cray EX235a, AMD Optimized 3rd Generation EPYC 64C 2GHz, AMD Instinct MI250X, Slingshot-11, HPE
2	**Aurora** - HPE Cray EX - Intel Exascale Compute Blade, Xeon CPU Max 9470 52C 2.4GHz, Intel Data Center GPU Max, Slingshot-11, Intel
3	**Eagle** - Microsoft NDv5, Xeon Platinum 8480C 48C 2GHz, NVIDIA H100, NVIDIA Infiniband NDR, Microsoft
4	**Supercomputer Fugaku** - Supercomputer Fugaku, A64FX 48C 2.2GHz, Tofu interconnect D, Fujitsu
5	**LUMI** - HPE Cray EX235a, AMD Optimized 3rd Generation EPYC 64C 2GHz, AMD Instinct MI250X, Slingshot-11, HPE
6	**Leonardo** - BullSequana XH2000, Xeon Platinum 8358 32C 2.6GHz, NVIDIA A100 SXM4 64 GB, Quad-rail NVIDIA HDR100 Infiniband, EVIDEN
7	**Summit** - IBM Power System AC922, IBM POWER9 22C 3.07GHz, NVIDIA Volta GV100, Dual-rail Mellanox EDR Infiniband, IBM

ARIS – HPC Infrastructure in Greece Compute Nodes

The ARIS infrastructure consists of a total of five computing system nodes based on Intel x86 architecture, interconnected into a single InfiniBand FDR14 network offering multiple options and processing architectures. More specifically, the infrastructure consists of:

- **Thin Nodes** island based on the IBM NeXtScale platform and on Intel Xeon E5-2680v2 processors. It has **426 computing nodes** and offers a total of 8,520 CPU cores.
- **Fat Nodes** island consisting of **44 Dell PowerEdge R820 servers**. Each server offers 4 Intel Xeon E5-4650v2 processors and 512 GB of central memory.
- **GPU accelerator** nodes comprised of **44 Dell PowerEdge R730 servers**. Each server contains 2 Intel Xeon E5-2660v3 processors, 64 GB of memory and **2 NVidia K40 GPU cards**, and
- **Xeon Phi** accelerator nodes consisting of **18 Dell PowerEdge R730 servers**, each containing **2 Intel Xeon E5-2660v3 processors**, 64 GB of memory and 2 Intel Xeon Phi 7120P co-processors.
- **Machine Learning** node consisting of 1 server, containing 2 Intel E5-2698v4 processors, 512 GB of central memory and **8 NVIDIA V100 GPU** cards

The way is open to building a EuroHPC world-class supercomputer in Greece

- A hosting agreement has been signed between the EuroHPC Joint Undertaking and the National Infrastructures for Research and Technology (**GRNET**) in **Greece**, where **DAEDALUS**, a new **EuroHPC supercomputer**, will be located.

- **30 petaflops** or 30 million billion calculations per second
- **Lavrion** Technological and Cultural Park (TCPL)
- https://eurohpc-ju.europa.eu/way-open-building-eurohpc-world-class-supercomputer-greece-2022-11-28_en
- June 11, 2024: GRNET S.A. conducts a Public Consultation on the Open Tender Announcement Issue https://grnet.gr/2024/06/11/public-consultation-lavrio-daedalus/


EURO
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HPC Training Series
Course 1
HPC for beginners: basic concepts, MPI and OpenMP
| PRESENTATION LANGUAGE: GREEK |
MARCH 29 | 09:45 EET | ONLINE

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HPC Training Series

Course 2

Introduction to accelerators: GPUs / CUDA

| PRESENTATION LANGUAGE: GREEK |

APRIL 19, 2024 | 10:00 EET | ONLINE

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HPC Training Series

Course 3

Large Language Models (LLMs) on High Performance Computing (HPC) Systems

| PRESENTATION LANGUAGE: GREEK |

APRIL 24, 2024 | 10:00 EET | ONLINE

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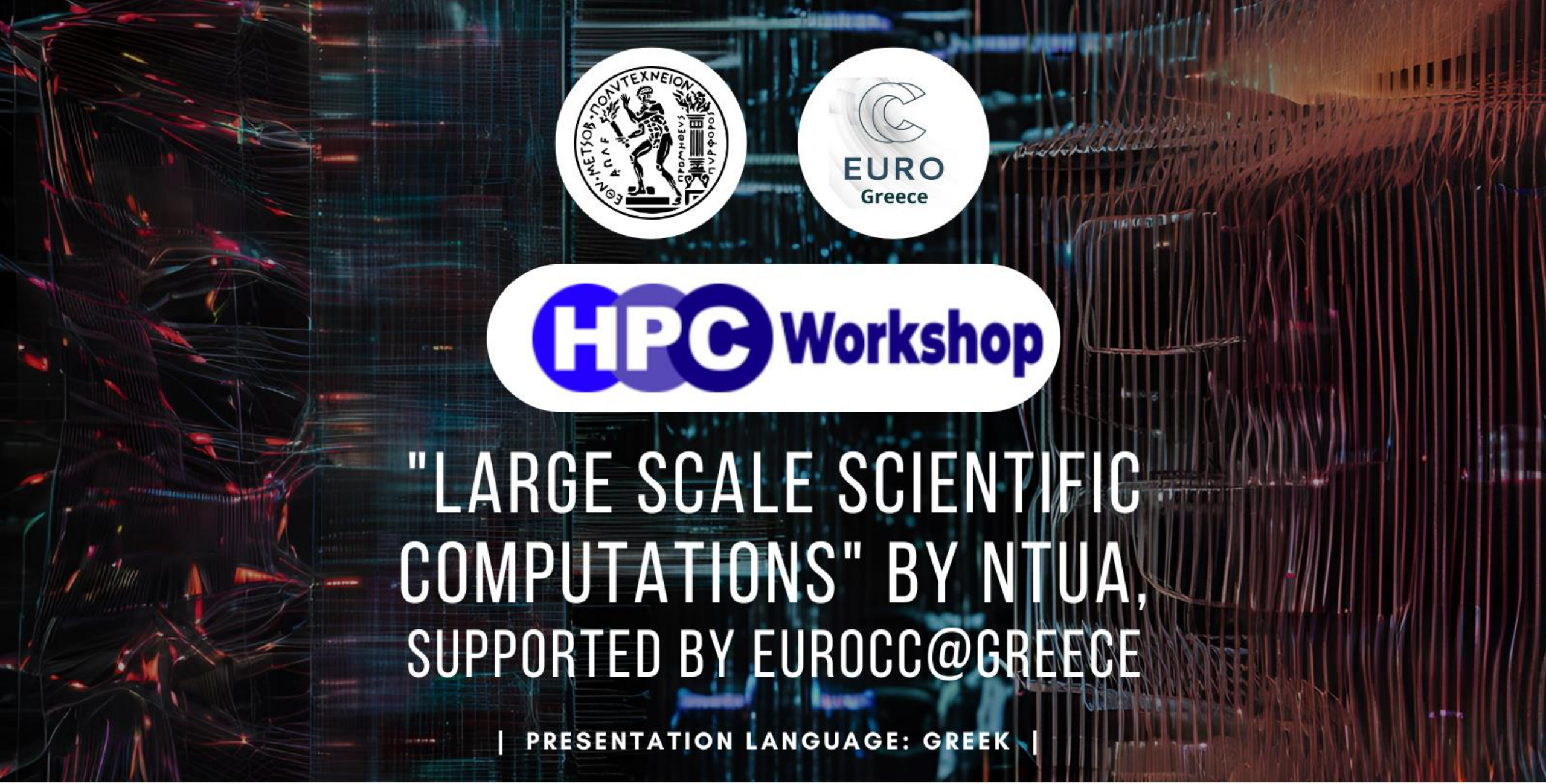
HPC Training Series

Course 4

Intermediate-level Programming for HPC using Python

| PRESENTATION LANGUAGE: ENGLISH |

MAY 29, 2024 | 10:00 EET | HYBRID



HPC Workshop

"LARGE SCALE SCIENTIFIC COMPUTATIONS" BY NTUA, SUPPORTED BY EUROCC@GREECE

| PRESENTATION LANGUAGE: GREEK |

JULY 11-14, 2024 | 10:00 - 16:00 EET | ON-SITE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HPC Training Series
Course 5
Computational Fluid Dynamics (CFD) using OpenFOAM
on High Performance Computing (HPC)
| PRESENTATION LANGUAGE: GREEK |
JUNE 14, 2024 | 09:30 EET | ONLINE

Computational Fluid Dynamics (CFD) using OpenFOAM on High Performance Computing (HPC)

09:30 → 10:00 **Setup and troubleshooting of the virtual HPC environment, to be used in the training** — 30m

Speakers: Dr Evangelos Papoutsis-Kiachagias (NTUA) , Mr Nikos Triantafyllis (GRNET)

10:00 → 10:15 **Introduction: EuroCC & the training events** — 15m

Speaker: Dr Nikos Bakas (GRNET)

10:15 → 10:30 **A virtual HPC environment for familiarization with the SLURM job submission system** — 15m

Speaker: Mr Nikos Triantafyllis (GRNET)

10:30 → 11:00 **Introduction to CFD: General concepts of CFD, compressible/incompressible fluid flows, modelling turbulence, parallelism** — 30m

Speaker: Dr Xenophon Trompoukis (NTUA)

11:00 → 11:15 **Break** — 15m

11:15 → 12:45 **Introduction to OpenFOAM: OpenFOAM's history, main features and case setup** — 1h 30m

Speaker: Dr Evangelos Papoutsis-Kiachagias (NTUA)

12:45 → 13:00 **Break** — 15m

13:00 → 14:00 **Job submission and management of CFD jobs in an HPC environment using SLURM. Hands-on examples using the virtual HPC environment setup in the attendees hardware. Demonstration of ARIS supercomputer.** ¶ — 1h

Speaker: Dr Evangelos Papoutsis-Kiachagias (NTUA)

Thank you!

Introduction to EuroCC Greece

Dr Nikos Bakas

EuroHPC
Joint Undertaking

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