



EURO
Greece

HPC **Training** Series

Course 6

**Gradient-based & gradient-free Optimization,
with applications to CFD & beyond**

| PRESENTATION LANGUAGE: GREEK |

OCTOBER 4, 2024 | 10:00 EET | ONLINE



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**

The Greek Competence Center for High Performance Computing and Artificial Intelligence

Enhancing innovation capacity in Business, Industry and Science
by utilizing advanced High Performance Computing services



EuroCC@Greece

Services

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

<https://eurocc-greece.gr/>

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



EuroCC@Greece

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**



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.
- **60 petaflops** or 60 million billion calculations per second
<https://grnet.gr/en/business-directory/grant-for-the-development-of-a-new-national-hpc-system-daedalus/>
- **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/>



EuroHPC Access Modes

[EuroHPC JU Call for Proposals – Extreme Scale Access Mode](#)

For applications with high-impact, high-gain innovative research

[EuroHPC JU Call for Proposals – Regular Access Mode](#)

The expected impact in the application's domain should justify the need for large allocations

[EuroHPC JU Call for Proposals – AI and Data-Intensive Applications Access Mode](#)

To support ethical artificial intelligence & machine learning

[EuroHPC JU Call for Proposals – Development Access Modes](#)

To develop, test and optimise applications

[EuroHPC JU Call for Proposals – Benchmark Access Modes](#)

To test or benchmark applications

https://eurohpc-ju.europa.eu/access-our-supercomputers/access-policy-and-faq_en

Open Calls for Proposals



Cut-off ends in

3 hours

EuroHPC Benchmark Access Call

● Open

The EuroHPC Benchmark call is designed for code scalability test...



Cut-off ends in

6 days

EuroHPC Extreme Scale Access C...

● Open

The Extreme Scale Access mode is designed to serve research...



Cut-off ends in

7 days

EuroHPC AI and Data-Intensive A...

● Open

The EuroHPC JU AI and Data-Intensive Applications Access cal...



<https://access.eurohpc-ju.europa.eu/>

Frequently Asked Questions (FAQ)

https://eurohpc-ju.europa.eu/access-our-supercomputers/access-policy-and-faq_en

- **How can I gain access to computation time on EuroHPC machines?**
 - You will need to **apply** to one of the open **access calls** that **EuroHPC** provides. The list of available calls can be found here.
- **Which organisations are eligible for access to EuroHPC machines?**
 - Any European organisation is eligible for access to perform Open Science research (the **results** of the work are made available for **open access**). This includes **public and private** academic and research institutions, public sector organisations, industrial enterprises and SMEs
- **What is the cost?**
 - Currently access is **free of charge**.
- **What are the participation conditions?**
 - Participation conditions depend on the specific access call that a research group has applied. In general users of EuroHPC systems commit to: **acknowledge** the use of the **resources** in their related publications, contribute to **dissemination** events, produce and submit a **report** after completion of a resource allocation. More information on participation conditions can be found in the call's Documents section.



EURO Greece

HPC Training Series

Course 1

HPC for beginners: basic concepts, MPI and OpenMP

| PRESENTATION LANGUAGE: GREEK |

MARCH 29 | 09:45 EET | ONLINE



EURO Greece

HPC Training Series

Course 2

Introduction to accelerators: GPUs / CUDA

| PRESENTATION LANGUAGE: GREEK |

APRIL 19, 2024 | 10:00 EET | ONLINE



EURO Greece it.auth

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



NTUA EURO Greece

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



EURO Greece

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



NTUA gnet EURO Greece DCoMEX

Workshop

Data-driven Applications for Exascale Supercomputers

SEPTEMBER 2-3, 2024 | 09:00 - 17:00 EET | ATHENS, GREECE

Our Training Events

<https://eurocc-greece.gr/events-2/>

HPC Training Series - Course 6 “Gradient-based and gradient-free optimization, with applications to CFD and beyond”

Dr Nikos Bakas

<https://eurocc-greece.gr/newsletter/>

<https://www.linkedin.com/company/eurocc-greece>

<https://www.youtube.com/@euroccgreece9501>

https://twitter.com/EuroCC_Greece



EuroHPC
Joint Undertaking

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