



EURO  
Greece

# HPC **Training** Series

## Course 1

**HPC for beginners: basic concepts, MPI and OpenMP**

| PRESENTATION LANGUAGE: GREEK |

**MARCH 29 | 09:45 EET | ONLINE**

Introduction - Ilias Hatzakis



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## Greece's HPC Competence Center

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

### Access to HPC Services

EuroCC@Greece - the HPC-way to Science 2.0 and Industry 4.0!  
Find out how you can **accelerate your research** and **development**.

Join the HPC, Big Data and AI world, **without any cost!**

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



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ACCESS  
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Computer Vision  
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Large Datasets

Life sciences/ Healthcare  
Biotechnologies  
Materials & Batteries  
Engineering & Manufacturing  
Climate change & Metereology  
Cybersecurity  
Robotics



# About EuroCC@Greece



A National Competence Center is the reference and single point of contact and coordination on a national level for HPC. Its missions are to analyse, implement and coordinate all necessary activities and offer services to end users to cover their needs: from access to resources and technological consultancy to the provision of training courses for academia, public administrations and industry.

The aim is to bring together the necessary expertise to set up a cross-European network of NCCs in HPC-related topics with 31 participating members and associated states and to provide a broad service portfolio tailored to the respective national needs of academia, public administrations and industry. Each NCC has a presentation page with their skills and contact information.

EuroCC@Greece is one of the 33 HPC Competence Centres, built in the framework of the European High Performance Computing Joint Undertaking (EuroHPC JU).

**The overall objective of the Greek National Competence Center is to enable the efficient uptake of HPC technologies**

with the 3-fold goal to:

- i) advance competitiveness in research
- ii) improve effectiveness of government services and
- iii) promote innovation in industry.

In order to achieve this goal, the NCC will address the issues of training and skills development, technology transfer, collaboration with Industry, competence mapping and awareness raising, in the fields of High Performance Computing, High Performance Data Analytics, Artificial Intelligence and Big Data.

## **Consortium**

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

- GRNET – National Infrastructures for Research and Technology (**coordinator**),
- National Center for Scientific Research “Demokritos”,
- Foundation for Research and Technology – Hellas (FORTH),
- Institute of Communication and Computer Systems of NTUA
- Aristotle University of Thessaloniki.

The project has received funding from the European High-Performance computing Joint Undertaking (JU) under grant agreement No 951732 and the Greek Secretariat for Research and Technology.



EuroHPC  
Joint Undertaking



# 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)





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

- LUMI in Finland #5
- LEONARDO in Italy #6
- MARENOSTRUM in Spain
- VEGA in Slovenia
- MELUXINA in Luxembourg
- KAROLINA in Czechia
- DEUCALION in Portugal
- 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



# *HPC ecosystem*

- development and uptake of demand-oriented and user-driven innovative and competitive supercomputing system
- widen the use of that supercomputing infrastructure to a large number of public and private users and support
- development of a wide range of applications optimized for these systems;
- development of key HPC skills for European science and industry
- based on a supply chain that will ensure components, technologies and knowledge limiting the risk of disruptions





# The Greek EuroCC Hub for High-Performance Computing



## EuroCC@Greece

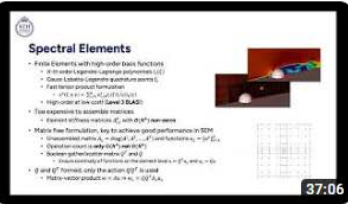
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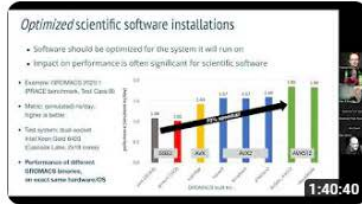
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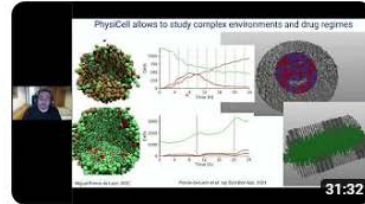
WORKSHOP Code of the Month vol 6 – NEKO

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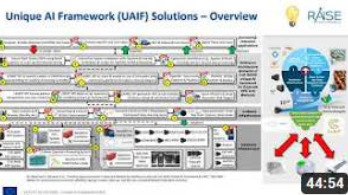
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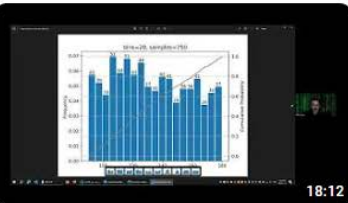
"How to use the PRACE-calls portal - Application to JU supercomputers" Seminar

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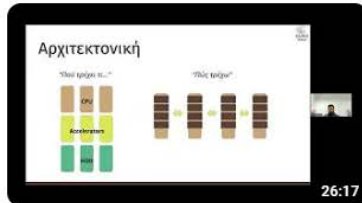


Roundtable discussion "HPC: A growth driver for the healthcare sector"

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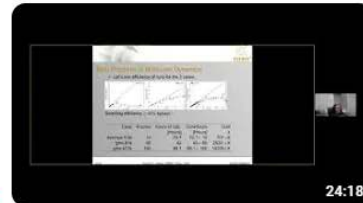
18:12



26:17



21:15



24:18



EuroCC@Greece HPC Newsletter #14

The 14th official EuroCC@Greece HPC Newsletter is out, providing news regarding High Performance Computing (HPC), in Greece and all over Europe! Exciting news! Register for the upcoming Info day on "Access to HPC resources by [...]"



Parallelization with MPI and OpenMP, on April 16-19, 2024

The aim of the workshop "Parallelization with MPI and OpenMP" is to provide attendees with some programming experience: an introduction into the basics of parallel programming. The focus is on the programming models MPI and [...]"



"Access to HPC resources by Greek SMEs" Info day – EuroCC@Greece, on March 13th, 2024

EuroCC@Greece announces the Info day on "Access to HPC resources by Greek SMEs", taking place on March 13th, 2024, at 15:00 – 18:00 EET. Presentation language: Greek. Audience: Suitable for SME professionals interested [...]"



"How to use the PRACE calls portal – Application to JU supercomputers" seminar's recording is now available

The recording of the seminar "How to use the PRACE-calls portal – Application to JU supercomputers" that took place on January 26th, 2024, and was organised by ENCCS (NCC Sweden), is now available to watch [...]"



The recording of the sixth "Code of the month" session on Neko is now available

The recording of the sixth "Code of the month" session on Neko that took place on January 31st, 2024, is now available to watch on EuroCC@Greece's YouTube channel here. Neko is a portable [...]"



Code of the month "GROMACS by BioExcel", on March 13th, 2024

The seventh "Code of the Month" session will be back on March 13th with a presentation of GROMACS by BioExcel. GROMACS is a versatile package for performing classical molecular dynamics simulations, i.e. integrating Newton's [...]"

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# HPC & AI skills development Training series



- HPC for beginners
- Εισαγωγή σε Open MP/ MPI/ CUDA
- Εισαγωγή στην Python για HPC
- Εισαγωγή στην επιστήμη δεδομένων: Structured data, Time series και TEXT
- Γενικές έννοιες παράλληλου προγραμματισμού
- Εισαγωγή σε Linux, Cluster computing και scripting
- Εφαρμογές γραμμικής άλγεβρας
- HPC with C# and Visual Studio
- Machine learning & neural networks
- Εξοικείωση με domain specific αλγόριθμους (GROMACs, OpenFOAM, PYTORCH, TENSORFLOW)
- <https://docs.google.com/forms/d/e/1FAIpQLSdHpJyAbLuWwpelBy812mEirEOGzYnV5JFMnSQkCu4atMnJA/viewform>

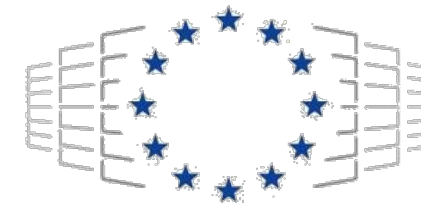
# 1<sup>ο</sup> εκπαιδευτικό σεμινάριο



MARCH 29 | 09:45 EET | ONLINE

- HPC for beginners
- Introduction to OpenMP
- Introduction to MPI

# Thank you!



**EuroHPC**  
Joint Undertaking

This project has received funding from the European High-Performance Computing Joint Undertaking (JU) under grant agreement No 951732. The JU receives support from the European Union's Horizon 2020 research and innovation programme and Germany, Bulgaria, Austria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Greece, Hungary, Ireland, Italy, Lithuania, Latvia, Poland, Portugal, Romania, Slovenia, Spain, Sweden, United Kingdom, France, Netherlands, Belgium, Luxembourg, Slovakia, Norway, Switzerland, Turkey, Republic of North Macedonia, Iceland, Montenegro