

EURO
Greece

HPC **Training** Series

Course 2

Introduction to accelerators: GPUs / CUDA

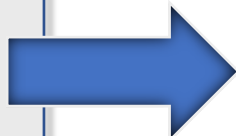
| PRESENTATION LANGUAGE: GREEK |

APRIL 19, 2024 | 10:00 EET | ONLINE

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

SUPPORT
ACCESS
TRAINING
CONSULTING
ASSESSMENT



RESEARCH & ACADEMY
SMEs & INDUSTRY
PUBLIC ADMINISTRATION

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

Simulations
Digital Twins
Large Datasets
AI
Machine Learning
LLMs

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



Leading the Way in European Supercomputing

EuroHPC JU is a joint initiative between the EU, European countries and private partners to develop a World Class Supercomputing Ecosystem in Europe.

- 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;
- based on a supply chain that will ensure components, technologies and knowledge limiting the risk of disruptions
- development of key HPC skills for European science and industry



Discover EuroHPC JU



Our supercomputers



Access to Our Supercomputers



Research & Innovation

The Greek EuroCC Hub for High-Performance Computing



EuroCC@Greece

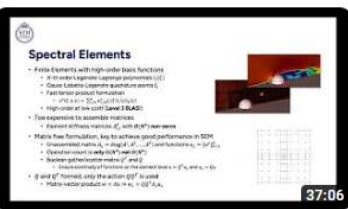
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EuroCC@Greece is one of the 33 HPC Competence Centres, built in the framework of the E...

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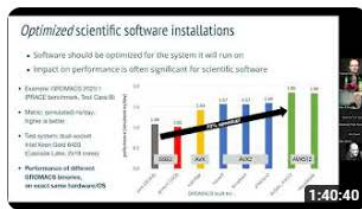
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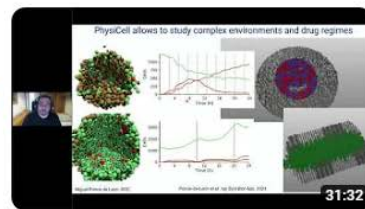
WORKSHOP Code of the Month vol 6 – NEKO

4 views · 2 weeks ago



WORKSHOP Code of the Month vol 5 – EESSI

7 views · 2 weeks ago



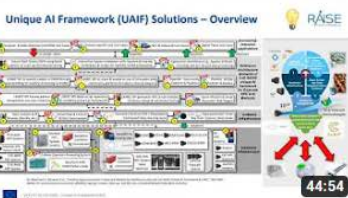
WORKSHOP Code of the Month vol 4 – PhysiCellX

No views · 2 weeks ago



WORKSHOP Code of the Month vol 3 – nekRS

3 views · 2 weeks ago



WORKSHOP Code of the Month vol 2 – UAIF Unique AI Framework

1 views · 2 weeks ago



WORKSHOP Code of the Month vol 1 – AVBP

13 views · 2 weeks ago



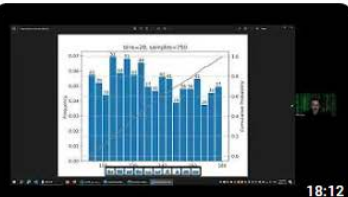
"How to use the PRACE-calls portal - Application to JU supercomputers" Seminar

6 views · 2 weeks ago

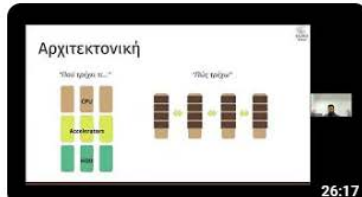


Roundtable discussion "HPC: A growth driver for the healthcare sector"

24 views · 3 weeks ago



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 [...]

ENCCS
PRACE National Competence Centre Sweden

"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 [...]

CODE OF THE MONTH

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 [...]

bioexcel

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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Be part of our mailing list and frequently receive e-mails with training events and latest news.

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Access to Resources

Get free access to HPC systems, resources, consulting and training.

APPLY

Visit our Youtube channel

WATCH

HPC & AI skills development Training series



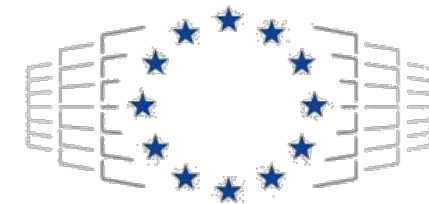
- HPC for beginners
- Εισαγωγή σε Open MP/ MPI
- Εισαγωγή σε GPUs/ CUDA
- Large Language Models on HPC resources
- Εισαγωγή στην Python για HPC
- Εισαγωγή στην επιστήμη δεδομένων: Structured data, Time series και TEXT
- Γενικές έννοιες παράλληλου προγραμματισμού
- Εισαγωγή σε Linux, Cluster computing 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/1FAIpQLSdHpJyAbIuWwpelBy812mEirEOGzYnV5JFMnSQkCu4altMnJA/viewform>

2^ο ΕΚΠΑΙΔΕΥΤΙΚΟ ΣΕΜΙΝΑΡΙΟ



10:00	→ 10:15	Introduction: EuroCC & the training events Speaker: Mr Ilias Hatzakis (GRNET)	🕒 15m
10:15	→ 10:45	HPC for beginners General concepts of HPC, OpenMP, MPI, CUDA, GPUs, available resources, a bit of history. Speaker: Dr Nikos Bakas (GRNET)	🕒 30m
10:45	→ 11:15	Unlocking the Power of GPUs: A Comprehensive Guide Fundamental differences between GPUs and CPUs, major GPU software suites available, such as CUDA, what are GPUs good for, GPU programming concepts. Speaker: Dr Manos Pavlidakis	🕒 30m
11:15	→ 13:30	Introduction in programming GPUs using CUDA Using CUDA API, CUDA Kernels, allocate memory and transfer data, porting the code, asynchronous execution. Speaker: Dr Xenophon Trompoukis	🕒 2h 15m
13:30	→ 14:00	Q&A	🕒 30m

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