



EURO

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“High Performance Computing (HPC) technologies” seminar
Aristotle University of Thessaloniki - April 5, 2023

EuroCC@Greece - at a glance



- **EuroCC**
 - European project to establish **National Competence Centres (NCCs)** ...
 - ... on **High Performance Computing (HPC)** ...
 - ... in **33 European countries**
 - Started in **2020**
 - Funded by EuroHPC JU & GSRI



EuroHPC
Joint Undertaking

- **EuroCC@Greece is the NCC for HPC in Greece**

EuroCC@Greece - at a glance



• Members

- 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



ΑΡΙΣΤΟΤΕΛΕΙΟ
ΠΑΝΕΠΙΣΤΗΜΙΟ
ΘΕΣΣΑΛΟΝΙΚΗΣ

The role of EuroCC@Greece



- Mission & Role of the National Competence Centre (NCC)
 - **Point of contact** and coordination on a national level for HPC
 - **Cover needs of HPC users**
 - access to resources, technological consultancy, training courses, networking, etc.
 - Set up a cross-European network of NCCs
- Users
 - **Research & academic institutions**
 - e.g., to advance competitiveness
 - **Public administration**
 - e.g., to improve effectiveness
 - **Industry**
 - e.g., to promote innovation

“Services” of EuroCC@Greece




- Learn about HPC
- Access to training resources (courses, videos, tools, code, etc.)
- Access to infrastructure
- Industrial innovation (tech transfer, funding opportunities, internships)
- Mapping of competences
- HPC “marketplace”
- Information (news, newsletter, etc.)
- Event organization


- Introduction to HPC


Understanding HPC

In this section you may find useful videos (created by EuroCC) that will help you familiarize yourself with High Performance Computing and EuroCC project:



Watch on  YouTube



Watch on  YouTube

WHAT IS A SUPERCOMPUTER?

"Supercomputers" are computer systems used in scientific applications that require the execution of several millions of mathematical calculations. Due to limited resources (eg cache, storage space) they could not be performed at all. Supercomputers overcome these limitations by using thousands of computers (commonly referred to as "nodes") that communicate with each other using a very fast network and which have been used for the origin of the universe, the discovery of new drugs, research on climate change and much more.

A supercomputer is a powerful research tool. Today, supercomputers are used to solve some of the most important problems of modern science.

IS THERE A NATIONAL HPC INFRASTRUCTURE IN GREECE?

In 2013, the ARIS HPC system, the Greek supercomputer, was deployed and operated by GRNET S.A.. ARIS consists of 532 computing nodes. GRNET additionally offers application support and training services. Computational resources are available in order to allow full and equal access to the ARIS national high performance computing system, GRNET launches calls, addressed to scientists and researchers.

DOES AN SME HAVE ACCESS TO THE NATIONAL HPC INFRASTRUCTURE IN GREECE??

The ARIS supercomputer system is available at this point only to the public academic sector. If you are a Greek SME there are several ways to benefit from our technology transfer service portfolio.

IS THERE ANY HPC-RELATED TRAINING IN GREECE?

Greece is strongly involved in pan-European High-Performance Computing (HPC). GRNET is a core member of the PRACE project bearing PRACE operational services, as well as to the prototyping of new services. Regular training courses take place in the fields of efficient HPC applications. For more information, visit [/en/category/training-events-en/](#)

Apart from the strictly HPC related training by the GRNET PRACE training center, there is a large spectrum of AI, HPC, HPDA, BD related training programs, depending on your level of readiness. Currently 421 relevant training programs have been identified, mainly bachelor degree or masters' degree programs.

IS THERE A GUIDE HELPING SMEs TO GET STARTED WITH HPC?

There is a large number of all kinds of HPC related training all over Europe. Most of them, especially in the current pandemic era, are online. The best place to discover all upcoming training events in Europe is the [PRACE training portal](#).

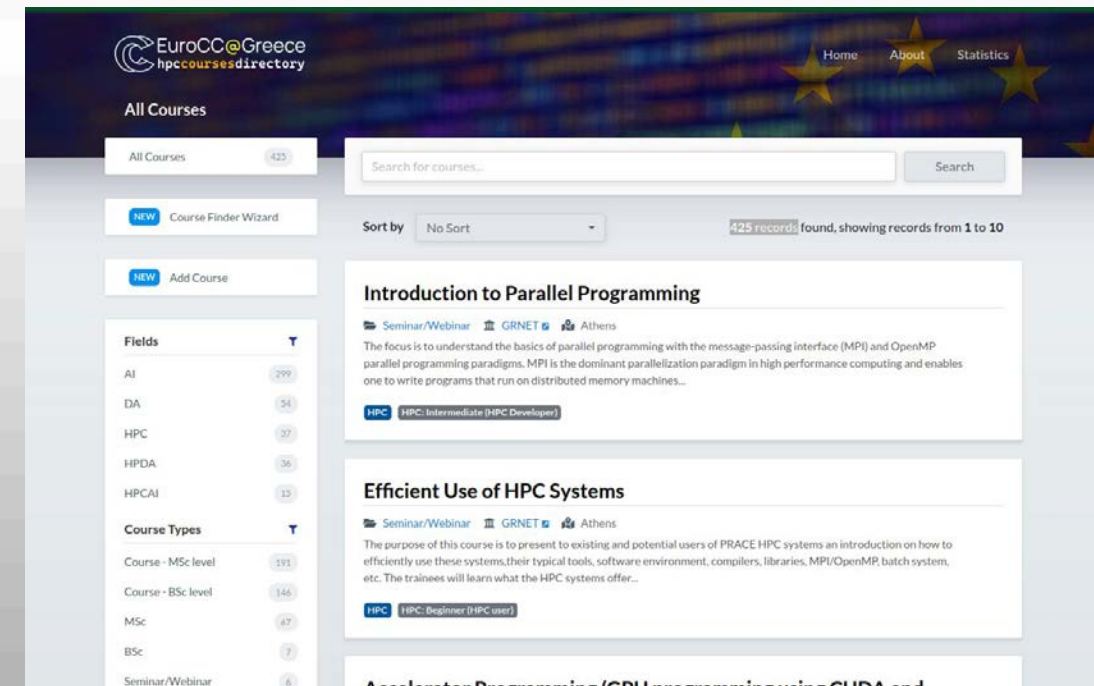
HOW CAN I HAVE ACCESS TO EUROPEAN-WIDE HPC-RELATED TRAINING COURSES?

There is a large number of all kinds of HPC related training all over Europe. Most of them, especially in the current pandemic era, are online. The best place to discover all upcoming training events in Europe is the [PRACE training portal](#). We also strongly recommend that you [follow our social media accounts](#) found at the bottom of all pages, as we publish all interesting news.

WHICH ARE THE SCIENTIFIC DOMAINS THAT USE HPC IN GREECE?

Today, the usage of the ARIS supercomputer, by field of science and by institution, is as follows:

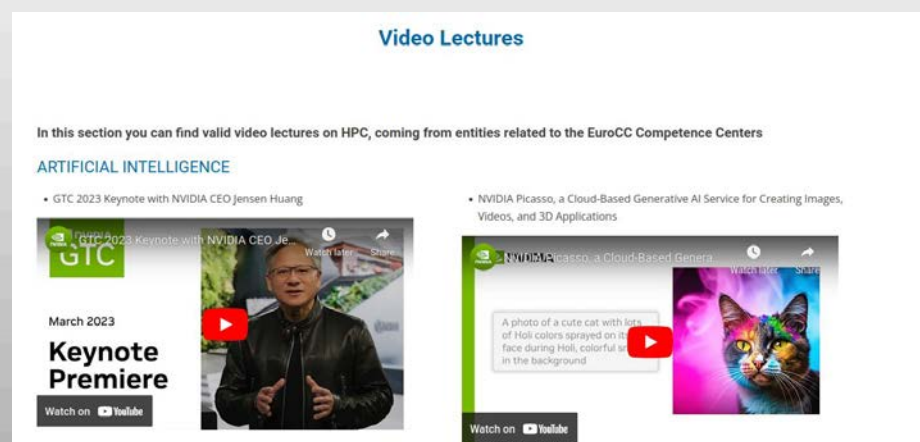
- HPC PRACE training center
 - seminars: Parallel Programming, GPU programming, CUDA, biomolecular modeling in HPC, ML/AI in HPC, Meteorological and climate modeling, etc.
- Repository of HPC training courses
 - <http://hpc-courses.chemeng.ntua.gr/>
 - 425 courses (BSc, MSc, seminars, summer schools, etc.)



The screenshot shows the EuroCC@Greece hpcoursesdirectory website. The header includes the logo and navigation links for Home, About, and Statistics. The main content area displays 'All Courses' with a search bar and a 'Search' button. Below the search bar, there are filters for 'All Courses' (425), 'NEW Course Finder Wizard', and 'NEW Add Course'. A sidebar on the left lists 'Fields' (AI: 499, DA: 54, HPC: 37, HPDA: 36, HPCAI: 13) and 'Course Types' (Course - MSc level: 191, Course - BSc level: 146, MSc: 67, BSc: 7, Seminar/Webinar: 6). The main content area shows search results for 'Introduction to Parallel Programming' and 'Efficient Use of HPC Systems', both categorized as 'HPC: Intermediate (HPC Developer)' and 'HPC: Beginner (HPC user)' respectively.

- Repository of video lectures (YouTube)
 - Topics: HPC, AI, Biomolecular, CFD, Computational chemistry, Energy, Material sciences, Seismology

- Links to external repositories of training resources



Training



- Several training events every year



EUMaster4HPC



- Applications are open!!! next deadline 14 April

The poster is divided into two main sections. The left section has a white background with a teal header containing the EUMaster4HPC logo and text. Below this, it says 'CALL FOR APPLICATIONS' and 'EUMaster4HPC' in large, bold letters. Underneath, it reads 'Apply to the first pan-European Master for High-Performance Computing'. The right section has a teal background and contains a bulleted list of benefits. At the bottom right of this section is a QR code with the text 'Apply here' next to it.

EUMaster4HPC

CALL FOR APPLICATIONS

EUMaster4HPC

Apply to the first pan-European Master for High-Performance Computing

- 2 European degrees
- 8 Awarding universities
- Scholarship
- Access to the most powerful supercomputers in Europe
- Internship in industry and supercomputing centers

Apply here

Access to HPC resources



- HPC infrastructures in Greece
 - GRNET - “ARIS”
 - AUTH - “Aristotelis”
 - ICS-FORTH
 - Demokritos

- External infrastructure
 - MELUXINA
 - Leonardo

contact us!!

HPC marketplace



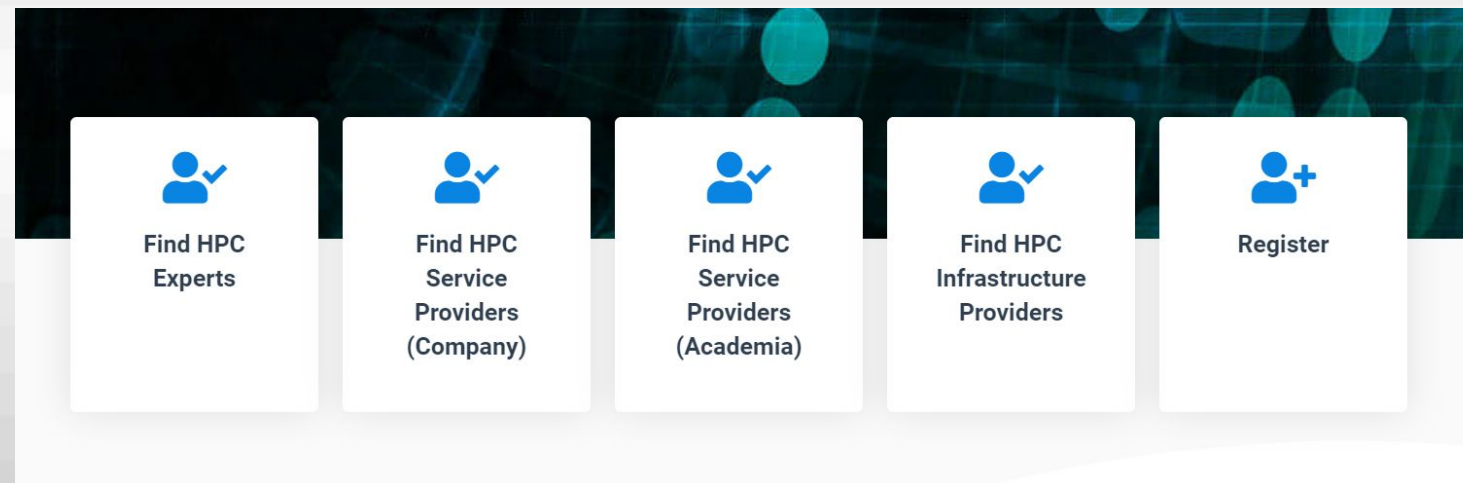
- **HPC marketplace:** database (or “yellow pages”) of HPC providers in Greece
- **“HPC providers”**
 - HPC service providers (industry & academia)
 - HPC infrastructure providers
 - HPC experts (independent professionals)
 - ... that provide any type of HPC and/or Big Data and/or AI services

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

HPC marketplace



- Can be seen as a marketplace...
 - **Providers** of HPC services ... that **register** their organizations & services
 - **Users** of HPC services ... that **search** for a provider to cover their needs



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

HPC marketplace



- Simple registration process

Registration form fields:

- Username *
- First Name
- Last Name
- E-mail Address
- Password *
- Confirm Password *

Register

Profile page for Data & Web Science Lab (DataLab), Aristotle University of Thessaloniki

Organization name: Data & Web Science Lab (DataLab), Aristotle University of Thessaloniki

Describe briefly your organization and the type of services you provide: DataLab is a research lab providing data analytics, big data and ML/AI services

Website URL: <https://datalab.csd.auth.gr/>

Actions: Edit Profile, My Account, Logout, Cancel

Category of services *

HPC Big Data Other

AI

Big Data (High Performance Data Analytics, HPDA)

Data warehousing Big Data Storage and Management

Big Data Analytics Big Graph Data Analytics

Big Data Streaming / Real-time Big Data processing Big Data Optimization

Big Data Visualization

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

HPC marketplace



- Filtered search

The screenshot displays the HPC marketplace interface. On the left, two organization profiles are visible:

- IT Center of Aristotle University of Thessaloniki**
The IT Center of Aristotle University of Thessaloniki is responsible for the operation of the "Aristotelis" cluster and supports the academic community to utilize HPC services and applications.
Organization name: IT Center of Aristotle University of Thessaloniki
Organization type: Academic sector (University, Research institution)
Country: Greece
HPC (hardware): Compute Processing (CPU architectures), Compute Co-Processors (GPUs, FPGAs, others), Storage
Phone Number: 2310 999000
- Data & Web Science Lab (DataLab), Aristotle University of Thessaloniki**
DataLab is a research lab providing data analytics, big data and ML/AI services.
Organization name: Data & Web Science Lab (DataLab), Aristotle University of Thessaloniki
Organization type: Academic sector (University, Research institution)
Country: Greece
AI (Applications): Decision optimization, Expert systems (reasoning, not ML), Predictive analytics, Recommendation systems
Phone Number: 2310123456

On the right, a search and filter interface is shown:

- A search bar with a "Search" button.
- A "Sort by: Organization Name" dropdown menu.
- A "More filters" link.
- A grid of filter dropdowns:
 - Organization name
 - Organization type
 - Country
 - Location (city)
 - Domain
 - AI (Applications)
 - Technologies (AI)
 - AI (Technical skills)
 - HPC (hardware)
 - HPC (software)
 - HPC (support and services)
 - Technologies (HPC)

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

Tech transfer & Industry hub

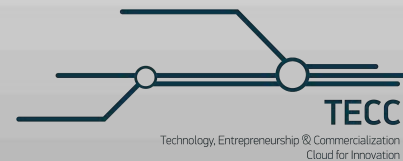
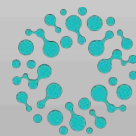


- **Services to industry**
 - Access to HPC infrastructure
 - Access to funding
 - Tech transfer services
 - Consultation in HPC, AI and HPDA technologies
 - Mentoring on business aspects
 - Networking
 - Facilitation of industrial internships

Tech transfer & Industry hub



- Support of the submission of 10 proposals (15 SMEs) in ff4eurohpc
- Support the implementation of 4 projects (5 SMEs)
- Contacts of various types with 27 SMEs
- Handbook for HPC adoption by SMEs
- Industrial Internship Program
- Support of 100+ academic projects on the National HPC infrastructure



Where you can find us



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

Twitter: @EuroCC_Greece (https://twitter.com/EuroCC_Greece)

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

YouTube: @euroccgreece9501 (<https://www.youtube.com/@euroccgreece9501>)

Email: contact@eurocc-greece.gr

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

Thanks!

Don't forget to...

@all: visit the [website](#)

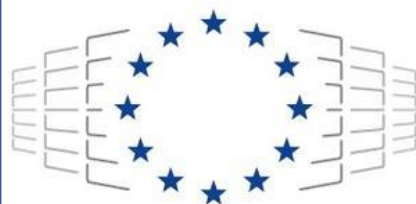
& register to the [newsletter](#)

@students: check the [training material](#)

& [EUMaster4HPC](#)

@industry: register at the [marketplace](#)

& [contact us](#) for access to resources



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