

# EuroCC2

# AI for Science Bootcamp

Welcome

---

Claudia Blaas-Schenner

VSC Research Center, TU Wien and EuroCC Austria

# AI for Science Bootcamp

27 May

- 09:00–09:20 Welcome to the EuroCC 2 Bootcamp (Moderator)
- 09:20–10:20 Introduction to NVIDIA PhysicsNeMo and Physics-Informed Approach... (Lecture)
- 10:20–10:30 *Break*
- 10:30–12:15 Physics-Informed Approach to an AI for Scientific Application (Lecture and Lab)
  - Lab 1: Simulating Projectile Motion
  - Lab 2: Steady State Diffusion in a Composite Bar using PINNs
- 12:15–12:30 *Wrap Up and Q&A*

Group Photo

28 May

- 09:00–10:30 Physics-Informed Approach to an AI for Scientific Application (Lab cont.)
  - Lab 3: Forecasting Weather using Navier-Stokes PDE:
  - Lab 4: Spring Mass Problem – Transient and Inverse Problems – Optional
- 10:30–12:15 Data-Driven Approach to an AI for Scientific Application (Lecture and Lab)
  - Lab 1: Solving the Darcy-Flow Problem using FNO
  - Lab 2: Solving the Darcy-Flow Problem using AFNO
  - Lab 3: Forecasting Weather using FourCastNet
- 12:15–12:30 *Wrap Up and Q&A*

Project Discussion

# Zoom

NO Zoom chat → Slack

## Housekeeping

- All **hands-on exercises** will be done in groups, according to **assigned login cluster**:

→ Please rename yourself in Zoom, so we can assign you to the right room:

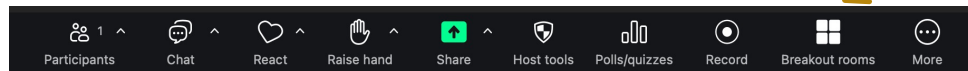
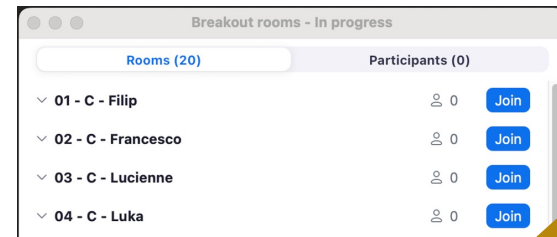
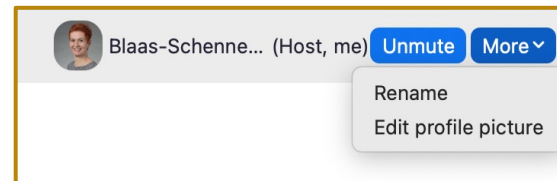
First name   Last name

- **Teaching Assistants** please rename yourself:

First name   Last name(TA)

- You can also **self-select a room**:


→ click on the “**Breakout rooms**” button at the bottom of the Zoom window, then select your preferred room.





# Slack


Channels → Manage → Browse channels


Our main communication channel 

**#announcements** - Keep an eye on this channel for all important information, messages, and links 

**#cluster-support-XXX** - Use this channel to ask any questions you have on the cluster/issues you encounter 

**#general** - Use this channel to ask any general questions you may have 

**#lab-questions** - Ask any questions you have on the labs in this channel 

**#lecture-questions** - Ask any questions you have on the lectures in this channel 

**#presentations** - Find all slides, supporting materials, and links to the recordings in this channel 

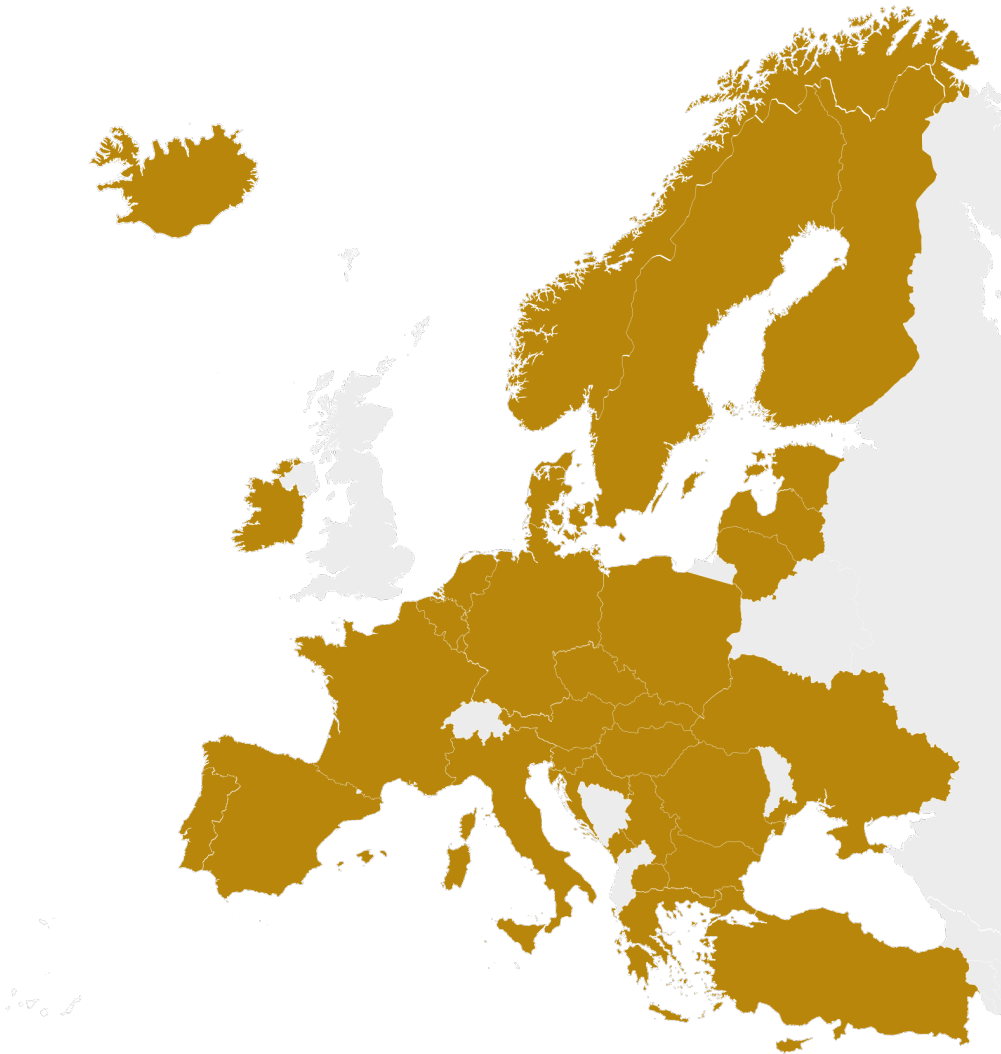
**#introduce-yourself** - Don't forget to tell us a bit about yourself and introduce yourself to the other participants! 

Please add after your **name (akronym of your institution, country)** - you'll see it will get crowded here 

# Welcome

## EuroCC & EuroCC 2

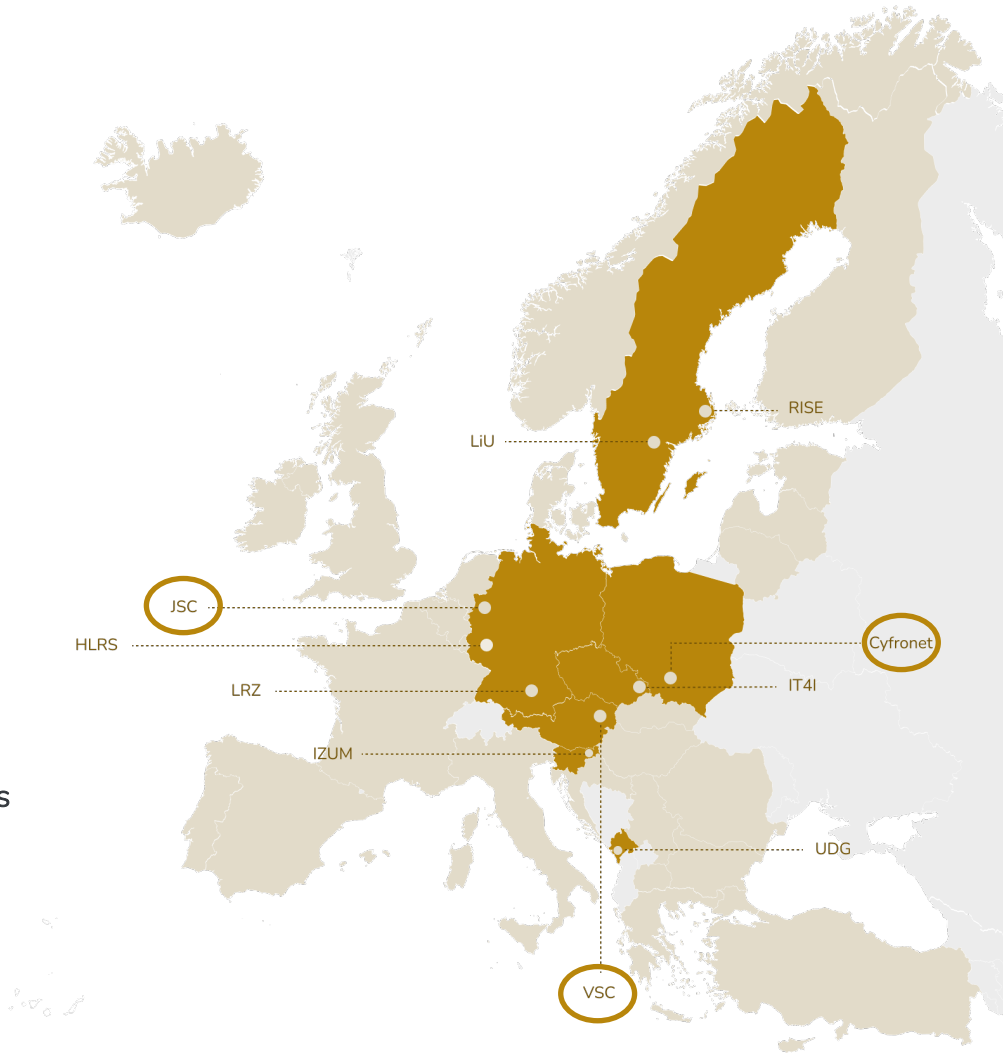
- National Competence Centres (NCCs) for HPC/HPDA/AI



# Welcome

## EuroCC & EuroCC 2

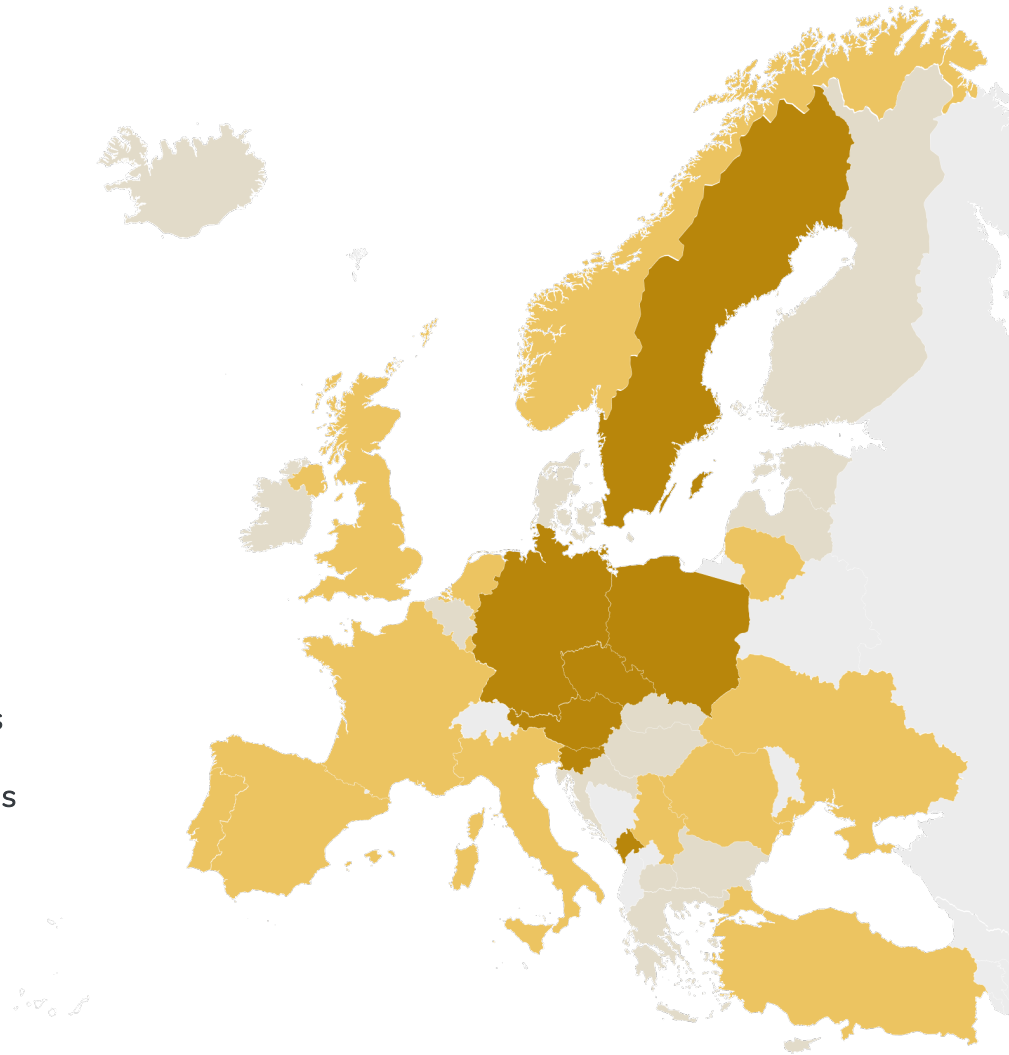
- National Competence Centres (NCCs) for HPC/HPDA/AI
  - AI for Science Bootcamp
    - EuroCC Austria
    - EuroCC Czechia
    - EuroCC@GCS (Germany)
    - EuroCC Montenegro
    - EuroCC Poland
    - EuroCC Slovenia
    - ENCCS (Sweden)
- 7 NCCs
- 10 HPC centres
- 3 HPC systems
- + NVIDIA & OpenHackathons



# Welcome

## EuroCC & EuroCC 2

- National Competence Centres (NCCs) for HPC/HPDA/AI
  - N-Ways to GPU Programming
    - EuroCC Austria
    - EuroCC Czechia
    - EuroCC@GCS (Germany)
    - EuroCC Montenegro
    - EuroCC Poland
    - EuroCC Slovenia
    - ENCCS (Sweden)
- 7 NCCs
- 10 HPC centres
- 3 HPC systems
- + NVIDIA & OpenHackathons
- 250+ participants from 25 countries



# AI for Science Bootcamp

Helping you to use AI for Science

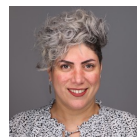
Niki Loppi (NVIDIA; instructor)

Mozhgan Kabiri Chimeh (NVIDIA; instructor)

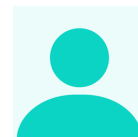
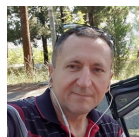
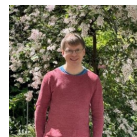
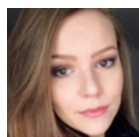
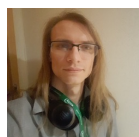
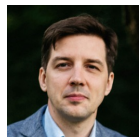
Martin Pfister (VSC & EuroCC Austria; floating TA)

Claudia Blaas-Schenner (VSC; moderator day 1)

Kathrin Bild (LRZ & EuroCC@GCS ; moderator day 2)



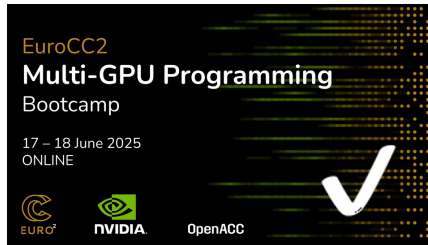
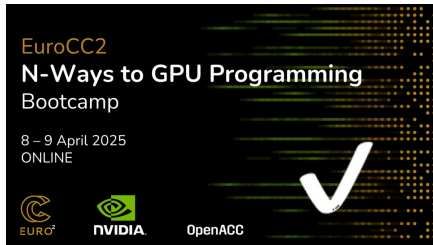
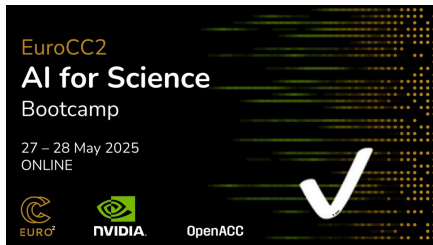
20 Teaching Assistants + 10 Cluster Support + 3 Clusters (ATHENA (Cyfronet), JURECA-DC (JSC), VSC-5 (VSC))





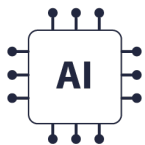
# Bootcamps & Hackathons

<https://www.openhackathons.org/s/upcoming-events>



<https://vsc.ac.at/training>

# EuroHPC Key Facts & Figures



13

AI Factories



12

Supercomputers



10

Quantum Computers



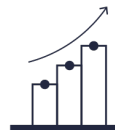
55

R & I Projects



35

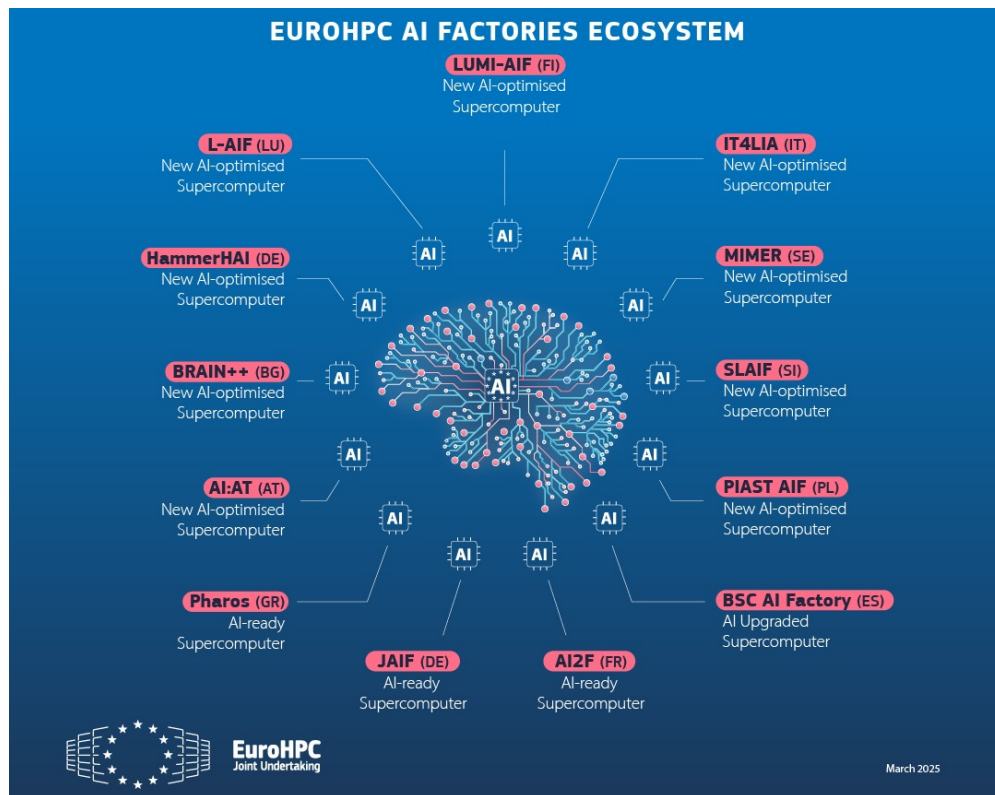
Participating States



7

Billion EUR Total Budget

# EuroHPC AI Factories



# EuroHPC Supercomputers

Get access to CPUs and GPUs



**1(+1) exascale systems**

JUPITER, (ALICE RECOQUE)



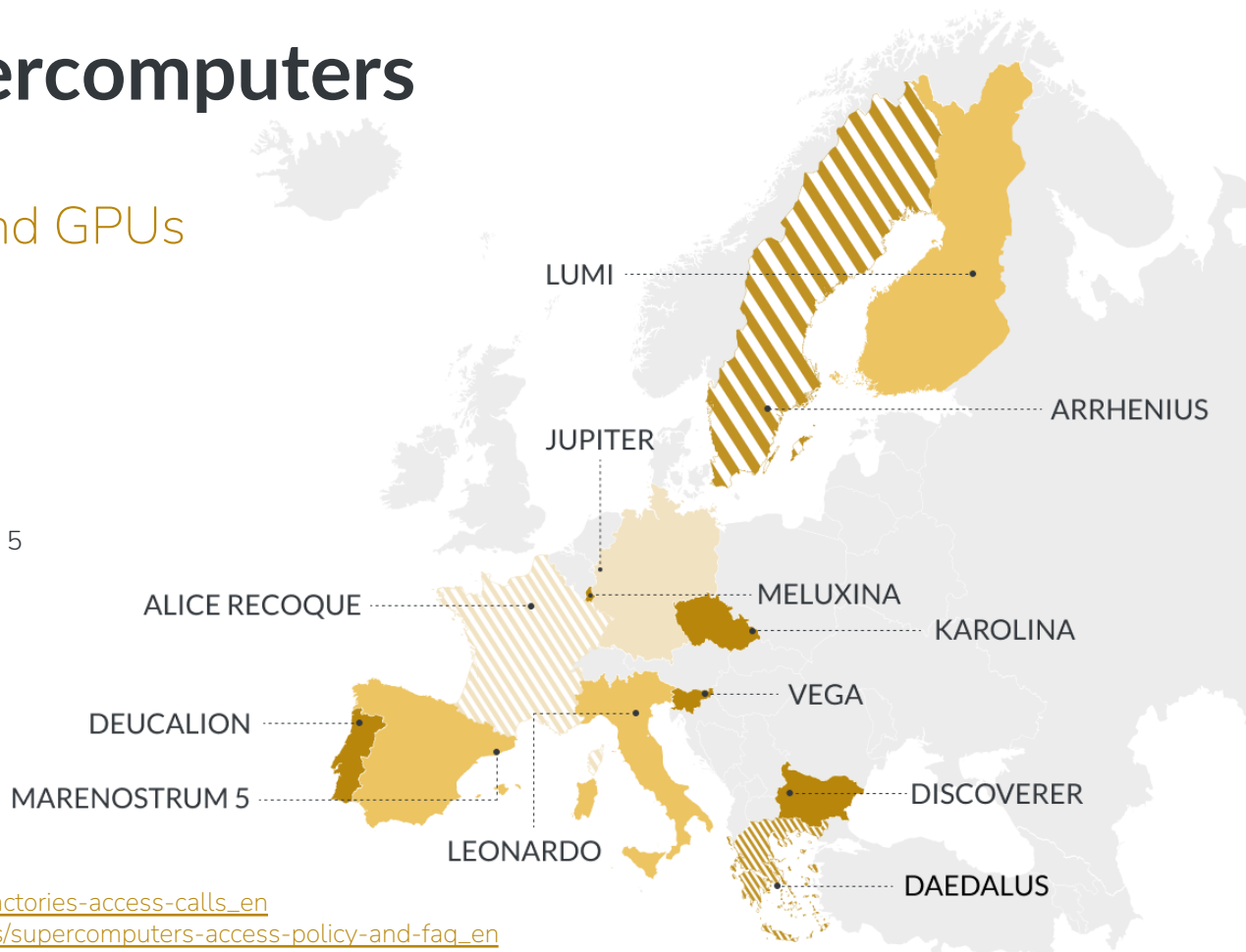
**3 pre-exascale systems**

LUMI, LEONARDO, MARENOSTRUM 5



**5(+2) petascale systems**

DEUCALION, DISCOVERER,  
MELUXINA, KAROLINA,  
VEGA, (DAEDALUS),  
(ARRHENIUS)



[https://eurohpc-ju.europa.eu/ai-factories/ai-factories-access-calls\\_en](https://eurohpc-ju.europa.eu/ai-factories/ai-factories-access-calls_en)

[https://eurohpc-ju.europa.eu/supercomputers/supercomputers-access-policy-and-faq\\_en](https://eurohpc-ju.europa.eu/supercomputers/supercomputers-access-policy-and-faq_en)

# EuroCC Austria

National Competence Centre for Supercomputing, Big Data and AI



## Consulting & project support

- ❑ Consulting & support
- ❑ Free Proof of Concept (PoC)
- ❑ Securing state funding
- ❑ Help with finding project partners & experts
- ❑ Business plan development



## Training with VSC

- ❑ Parallel programming
- ❑ GPU programming
- ❑ AI / Machine learning
- ❑ Data analytics
- ❑ Python, C++, MPI, OpenMP
- ❑ Best practices for better code performance



## HPC infrastructure

Access to supercomputers, including help with the application process and programming support:

- ❑ Vienna Scientific Cluster
- ❑ MUSICA, Leonardo
- ❑ Other EuroHPC Systems

# STAY IN TOUCH

---



eurocc-austria.at



vsc.ac.at



# THANK YOU

---



This project has received funding from the European High-Performance Computing Joint Undertaking (JU) under grant agreement No 101101903. The JU receives support from the Digital Europe Programme and Germany, Bulgaria, Austria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Greece, Hungary, Ireland, Italy, Lithuania, Latvia, Poland, Portugal, Romania, Slovenia, Spain, Sweden, France, Netherlands, Belgium, Luxembourg, Slovakia, Norway, Türkiye, Republic of North Macedonia, Iceland, Montenegro, Serbia