

The Swedish EuroCC Hub for High-Performance Computing

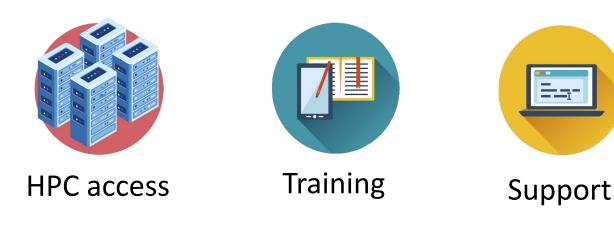
We help you access and use CPUs/GPUs on European Supercomputers for Free

WHO WE ARE

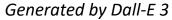




ENCCS empowers Swedish **industry, academia and the public sector** to leverage **HPC, AI, HPDA and QC** efficiently and effectively.











- Meetings on a weekly basis with new potential EuroHPC users
- What is available? Which system is best for me and my group? How do we apply? What are the requirements? How can we get started? Is it really free?
- One-stop shop if ENCCS can't help you, we hopefully know someone who can





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ADAPTING AI-TECHNOLOGY For use in Archives

- Image segmentation models
- Text-recognition

Make scanned images searchable





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BATTERIES FOR Stationary Energy Storage

Optical inspection by using Al-based machine vision

- Speed up model training time
- Larger image datasets

- Beginner/intermediate/advanced level
- HPC, AI, HPDA, Quantum Computing
- Domain specific training
 - CFD
 - Quantum Chemistry
 - Biomolecular Simulations
- Workshops, Hackathons, Bootcamps, Seasonal schools
- Collaborations: Centres of Excellence, HPC centres, NCCs
- Public and open source training material, workshop recordings on YouTube

HPC ACCESS | SUPPORT | TRAINING



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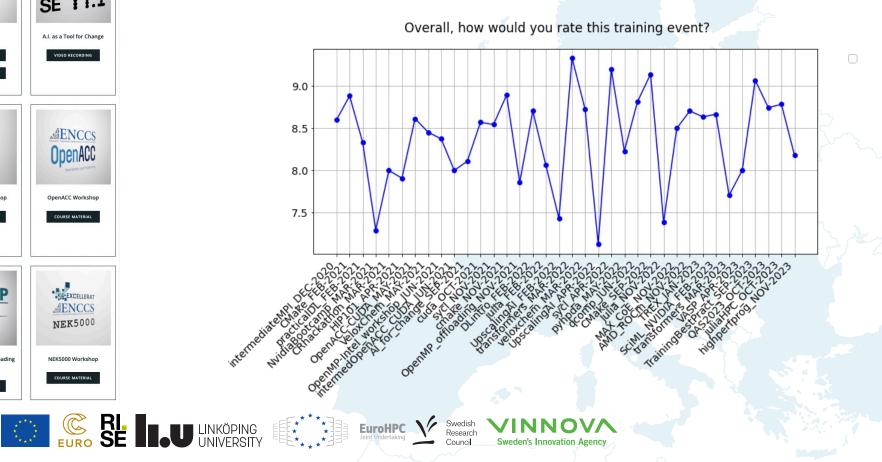
EuroHPC



ENCCS High-performance **ENCCS julia** with Python RE A.I SYCL ENCCS High-performance Julia for High Performance SYCL Workshop A.I. as a Tool for Change Data Analytics with Pytho Scientific Computing COURSE MATERIAL VIDEO RECORDING COURSE MATERIAL OURSE MATERIA VIDEO RECORDING VIDEO RECORDING *AENCCS* RI. ADVANCED: A.I. Workflows OpenACC LEARNING OpenVF0AM8 **AENCCS** Graph Neural Networks and Upscaling A.I. with **OpenFoam Workshop** OpenACC Workshop Transformer Workshop Containers COURSE MATERIAL COURSE MATERIAL COURSE MATERIAL COURSE MATERIAL VIDEO RECORDING EXCELLERAT OpenMP *AENCCS AENCCS* AENCCS MPI ENCCS CUDA NEK5000 Intermediate CUDA termediate MPI Worksh OpenMP for GPU Offload NEK5000 Workshop Workshop Workshop OURSE MATERIAL OURSE MATERIAL COURSE MATERIAL COURSE MATERIAL

HPC ACCESS | SUPPORT | TRAINING

• Over 1500 people trained, ~10% from industry



HPC ACCESS | SUPPORT | TRAINING

GPU programming: why, when and how? Search docs

☆ / GPU Programming: When, Why and How?

C Edit on GitHub

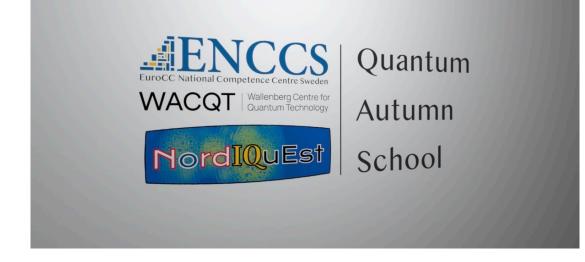
GPU Programming: When, Why and How?

Graphical processing units (GPUs) are the workhorse of many high performance computing (HPC) systems around the world. The number of GPU-enabled supercomputers on the Top500 has been steadily increasing in recent years and this development is expected to continue. In the near future, the majority of HPC computing power available to researchers and engineers is likely to be

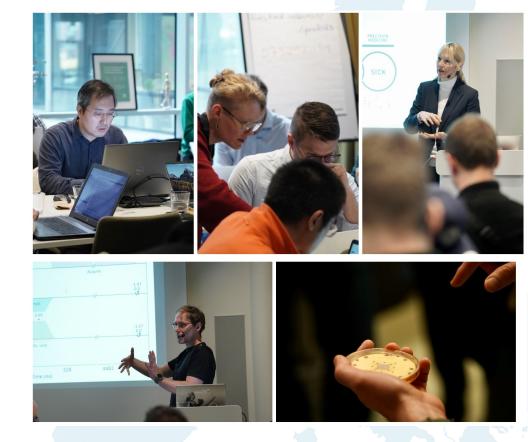
provided by GPUs or other types of accelerators. P crucial to developers of software run on HPC syste

- Collaborative effort with partners from Norway, Denmark, Finland and Lithuania
- Front page on Hacker News
- Best practice guide to be published
- To be developed into MOOC





- Hybrid event with 40 participants inperson and 40 online
- Speakers and instructors from academia and industry

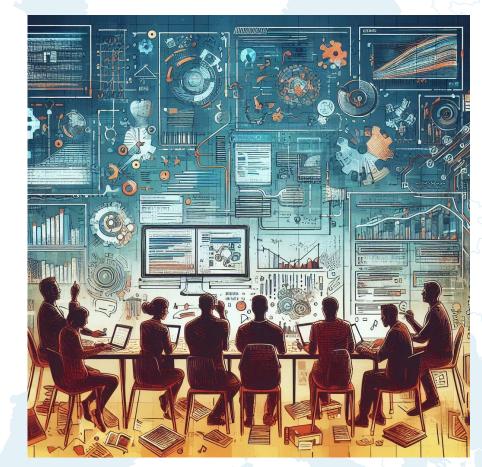






HPC ACCESS | SUPPORT | TRAINING

- In phase 1 we contributed to academic software – GROMACS, VeloxChem, ICON, NEK5000 etc.
- In phase 2 we are transitioning to Proof of Concept projects
 - 3-6 month projects
 - 1-2 ENCCS experts
 - Matching contribution from client
 - Free of charge
 - Technology transfer



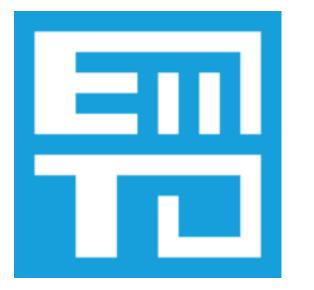
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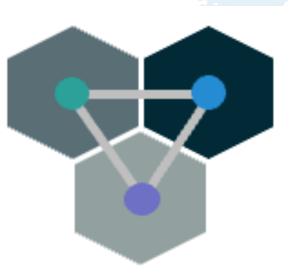






HPC ACCESS | SUPPORT | TRAINING



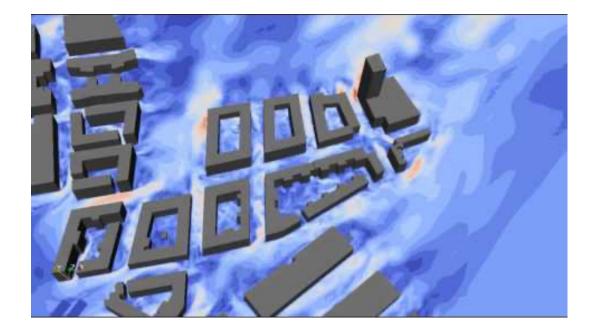


EMTO-CPA is an all-electron density functional theory code based on the Exact Muffin-Tin Orbitals formalism

Colonies is an open-source framework designed to facilitate seamless execution of computational workloads across cloud, edge, devices, or High-Performance Computing (HPC).







SLB-ANALYS ANALYSE AIR Pollution flow USING Meluxina Supercomputer

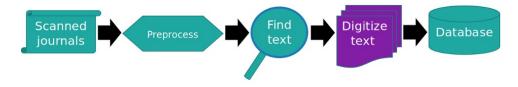
Simulate wind fields for wind comfort simulations and dispersion of air pollutants in complex urban environments

- Simulating larger urban area becomes possible
- Time-to-solution is greatly reduced
- Better results used for air quality assessment





DIGITIZATION OF TABULAR DATA



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- Meteorological agencies possess troves of archival observational data
- SMHI will train machine learning model to read different forms of tabular data
- Result will enable better understanding of climate – especially occurrence of extreme weather events



SUCCESS STORIES



EuroCC National Competence Centre Sweden



THANK YOU!



EURO EURO EUROHPE SE LIGUE Swedish Research Council Sweden's Innovation Agency

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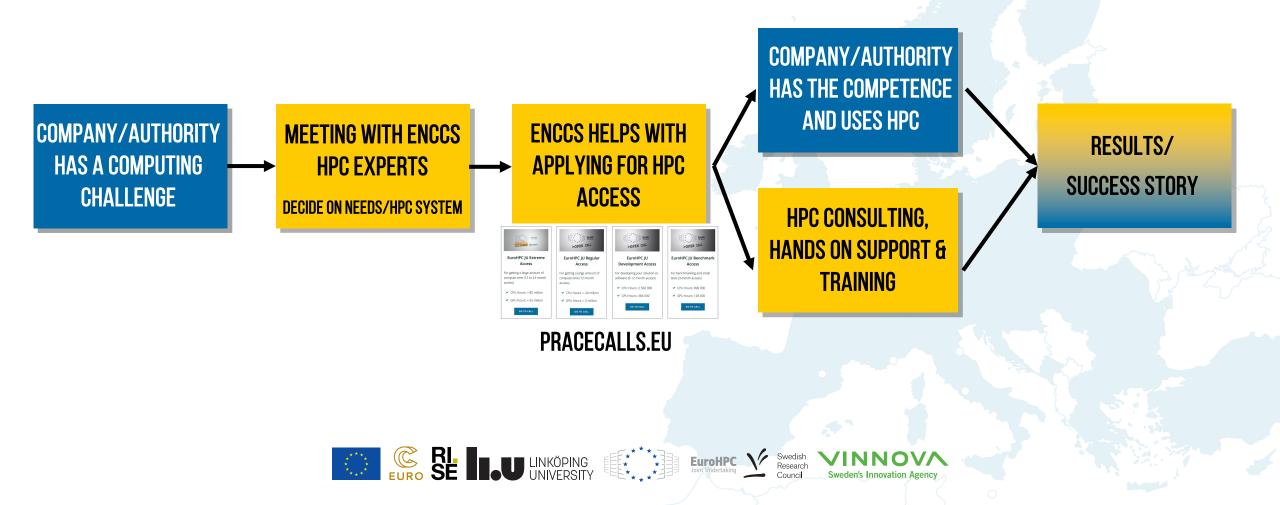
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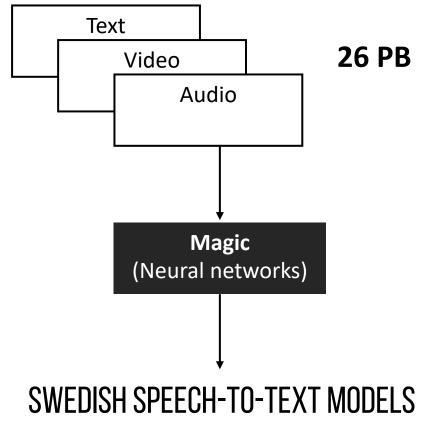
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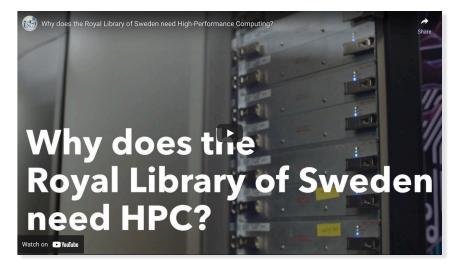




(Based on Google-BERT)



National Library of Sweden





Simulations of the electrochemistry relevant for battery development

Use of classical and reactive molecular dynamics and quantum chemical simulations to devise bottom-up design strategies for improved batteries

Software used:

- LAMMPS (for reactive force field simulations)
- GROMACS
- psi4 (for sapt simulations)
- ADF

northvolt

