


High-Performance Computing Benefits for Artificial Intelligence Applications in the Energy Sector

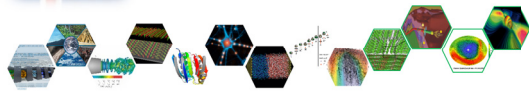
PROF. DR. – ING. MORRIS RIEDEL, SCHOOL OF ENGINEERING & NATURAL SCIENCES (SENS), UNIVERSITY OF ICELAND

MINISTRY APPOINTED EUROHPC JOINT UNDERTAKING GOVERNING BOARD MEMBER OF ICELAND

12TH OCTOBER 2025, IGEC 2025 CONFERENCE, HARPA CONFERENCE CENTER, REYKJAVÍK, ICELAND

IGEC 25
Energy & AI

 IHPC National Competence Center for HPC & AI in Iceland

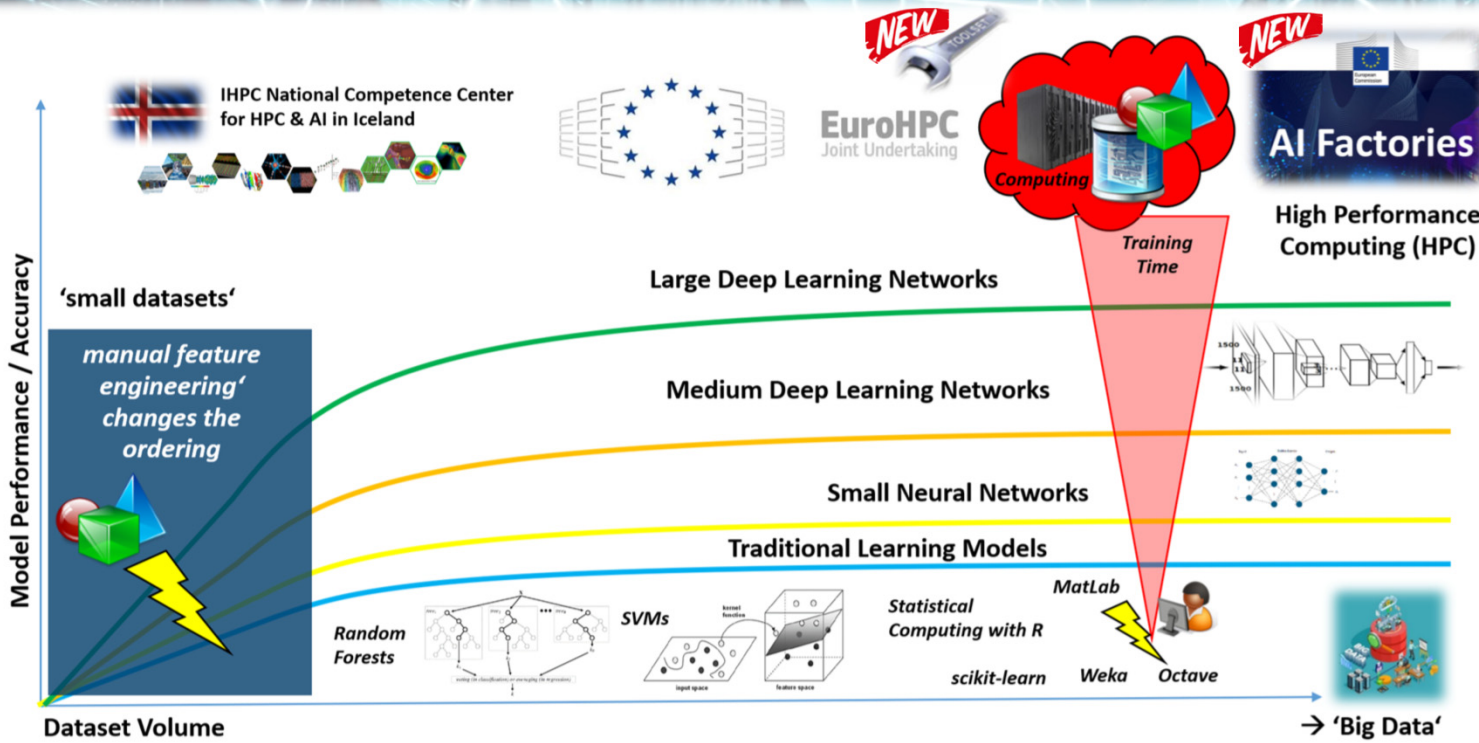


EuroHPC
Joint Undertaking



JÜLICH
SUPERCOMPUTING
CENTRE

Intertwined: Innovative AI (generative AI, large language models, etc.)... ...needs High-Performance Computing & Big Data



Examples in Healthcare & Remote Sensing

Large scale performance analysis of distributed deep learning frameworks for convolutional neural networks

Toward the Production of Spatiotemporally Consistent Annual Land Cover Maps Using Sentinel-2 Time Series


Developing an Artificial Intelligence-Based Representation of a Virtual Patient Model for Real-Time Diagnosis of Acute Respiratory Distress Syndrome

Attitudes and perceptions of artificial intelligence in healthcare: A cross-sectional survey among patients

Examples of AI in Healthcare and Remote Sensing: Includes logos for Sage Journals and Springer.

IHPC National Competence Center (NCC) Iceland for HPC & AI


HI Science/Engineering Skillsets bring Innovation in Public Sector & SMEs

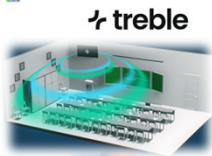


IHPC National Competence Center for HPC & AI in Iceland

Simulation & Data Labs


HPC/AI Application Domain-specific Competencies in Science & Engineering





Industry Collaboration Example

With NCCs help we have been able to run our wave based acoustic simulations on GPU based HPC systems allowing us to run larger simulations than ever before, and making it possible for Treble to verify the accuracy of our technology. We are grateful to have received HPC access through the NCC Iceland, including user support on technical environments, scalability, and configuration of the HPC systems. We are happy therefore to have contributed to one success story of the collaboration from Treble with NCC Iceland




Industry Collaboration Example

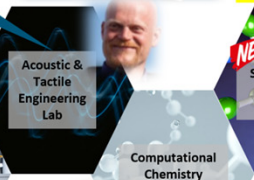
We have received great support from Forschungszentrum Jülich and University of Iceland regarding access to GPU clusters for training and fine-tuning of large language models

We are looking to contribute to European projects to support smaller languages in NLP and AI


Many thanks to Prof. Dr. -Ing. Morris Riedel & his NCC team!




Algorithmic Mathematics Lab




Acoustic & Tactile Engineering Lab




Supramolecular & Inorganic Chemistry Lab




Health & Medicine Lab




Neuroscience Lab




Software Engineering Lab



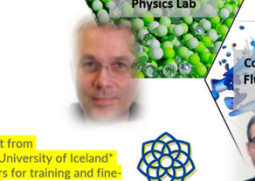
Remote Sensing Lab




Statistical Weather Lab




Computational Chemistry Lab




Computational Physics Lab





Computational Fluid Dynamics Lab



Natural Language Processing Lab



Quantum Lab

<https://www.ihpc.is>

SELECTED TESTIMONIALS

SME GET RÁÐGÁF
"With EDH-IS and NCCs help we have been able to develop our data functions as part of integration to analyze multi-ERP architecture and data cycle. This support is making it possible for Get Ráðgáfi to be an E2B customer related processes as well as others. We are grateful to have received HPC access through the NCC Iceland, including user support on technical environments, data scalability, and configuration of AI models and verifying our datasets. We are happy therefore to have contributed to one success story of the collaboration from Get Ráðgáfi with NCC Iceland for AI and HPC."

SME GREENFISH
"With EDH-IS and NCCs help we have been able to run our fishing localization simulations on GPU based Greenfish to verify the accuracy of our technology. We are grateful to have received HPC access through the NCC Iceland, including user support on technical environments, data scalability, and configuration of AI models and verifying our datasets. We are happy therefore to have contributed to one success story of the collaboration from Greenfish with NCC Iceland for AI and HPC."

SME ECOSPHY
"Ecosphy has benefited from collaboration with EDH-IS and NCC Iceland for AI and HPC, who have developed our spatiotemporal data analysis system. Further, EDH-IS and NCC Iceland AI and HPC network, which is invaluable to early stage startups."

SME LAGAVITIS DMF
"With the help of EDH-IS and NCC Iceland, we have been able to kickstart the development of our product has made it possible for Lagaviti to advance in developing our newest product to empower user systems in Iceland, including system platform research and preparation for product development. We're proud to be a part of the success story of the collaboration from Lagaviti with EDH-IS and NCC Iceland for AI and HPC."

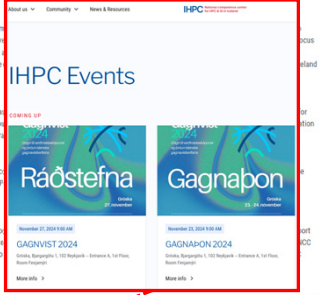
SME ORB DMF
"With EDH-IS and NCCs help we have been able to develop our next generation of our next product allowing us to analyze the carbon reserves of forests, wood quality and the quantity of wood products expected in the future customer platform technology. We are grateful to have received data analyze and AI support through the NCC Iceland, including user support on technical environments, data scalability, and configuration of AI models and verifying our datasets. We are happy therefore to have contributed to one success story of the collaboration from Orb DMF with EDH-IS and NCC Iceland for AI and HPC."

THE NATIONAL STATISTICS OFFICE (HAGSTOFU ÍSLANDS)
"With EDH-IS and NCCs help we have been able to analyze our data management systems allowing us to structure our APIs for High Value Datasets, making it possible for Statistic Iceland (Hagstofan) to verify the accuracy of our AI self-service customer platform technology. We are grateful to have received data- and AI consultant support through the NCC Iceland, including user educational support on technical environments. We are happy therefore to have contributed to one success story of the collaboration from Hagstofan with EDH-IS and NCC Iceland for AI and HPC."

ORIKIDA
"We are grateful to have been able to validate the research and development for our stakeholders' products, with the help of EDH-IS and NCC Iceland. This has helped to analyze the digital security architecture of our stakeholders within eco-industrial parks providing us with valuable lessons going forward. Oríkida was part of a consortium of ten partners led by NCC for AI/HPC and Cybersecurity that submitted a Horizon CL3-2024-CS-01-01 proposal promoting innovation within eco-industrial parks. The proposal suggests approaches and tools for security in software and hardware development and Adaptive Socio-Technical Assessment for Resilient Smart Manufacturing for large supply chains. Oríkida facilitated the participation of one of our stakeholders as a use case and full partner in the proposal. In addition, emphasis was placed on the potential for scalable solutions across countries and the need for interdisciplinary collaboration to effectively address complex challenges. We are proud to contribute to a success story that showcases the collaboration between Oríkida, EDH-IS and NCC Iceland in AI and HPC."

SME TREBLE
"Treble Technologies leverages high-performance computing (HPC) to run multiple wave-based acoustic simulations simultaneously, enabling large-scale synthetic data generation. This process allows for the rapid creation of diverse, highly realistic audio datasets, essential for training advanced machine learning models. By simulating various acoustic environments in parallel, Treble accelerated the development of AI-driven applications such as speech recognition, noise suppression, and adaptive audio technologies. The scalability and efficiency of this approach empower industries to optimize their products with unparalleled precision and speed. With the support of EDH-IS and NCC Iceland for AI/HPC, we have been able to run our simulations on GPU-based HPC clusters. This has allowed us to perform large-scale simulations, validating our system model and technology for our latest product. We are grateful for the HPC access provided by NCC Iceland for AI/HPC, which has been instrumental in advancing our work. We are proud to have collaborated with EDH-IS and NCC Iceland for AI/HPC, contributing to a shared success story in high-performance computing and acoustic simulation."

SME UNIK.ME
"Unik.me has benefited from EDH-IS and NCC Iceland for AI/HPC support, we have been able to work on our next generation product that allows us to analyze the cycle of image data, which allows Unik.me to assist nutrition in food, in our customers' technology. We are grateful to have received data analysis and AI support through NCC Iceland for AI and HPC, including advisory regarding user support for technical environments, data scalability and distribution of AI models and datasets at a larger scale. Unik.me has benefited from the collaboration with NCC Iceland for AI and HPC, who through their network, which is invaluable for early product development, have connected us with experts and facilitated access to technical resources and researchers, which has assisted us in the analysis of our nutrition and food and image analysis system."



IHPC Events

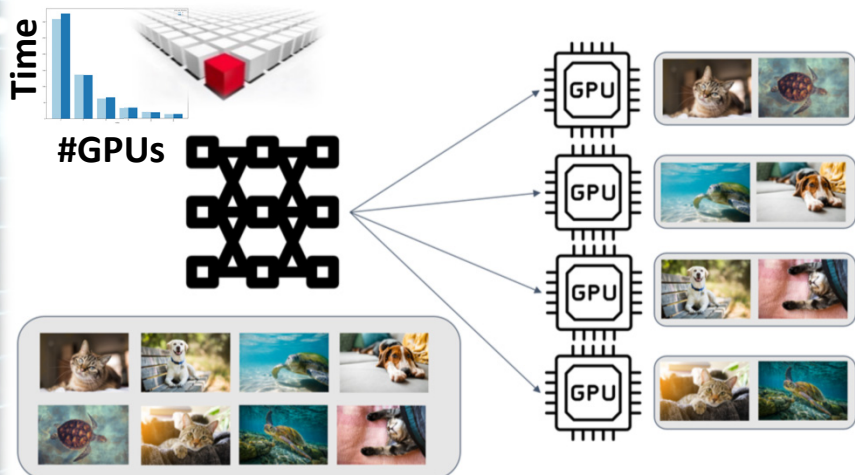
Upcoming events: Ráðstefna, Gagnafest 2024

HPC benefits:

(1) Train AI models faster

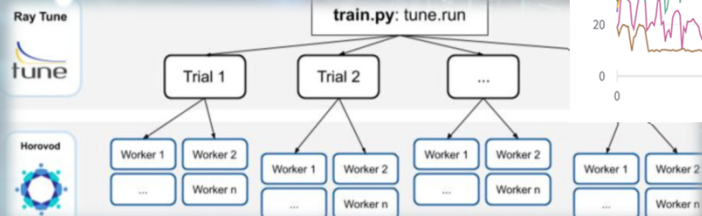
(2) Train better AI models

Distributed Deep Learning – Train AI Models faster with HPC



Systematic Hyperparameter Optimization...
... Train better AI models with HPC

✓ Lower error rates
✓ Higher accuracy



Selected AI/HPC Applications...

... in the Green Energy Sector

SME Snerpa Power – Activities



Relevant Markets

Predict energy consumption in the next hour* to understand the energy situation for companies requiring/providing energy

Sustainable Modeling

AutoGluon tools generates with weather information much better models (50% gain) at a much quicker time per customer through automation

Tools for AI Modeling

Hyperparameter Optimization of AI prediction models, Automated AI tools like AutoGluon Tools, deep learning models



Relevant Datasets

Data of Icelandic Data Centers & Aluminium Smelters; more customer datasets expected



Data Understanding

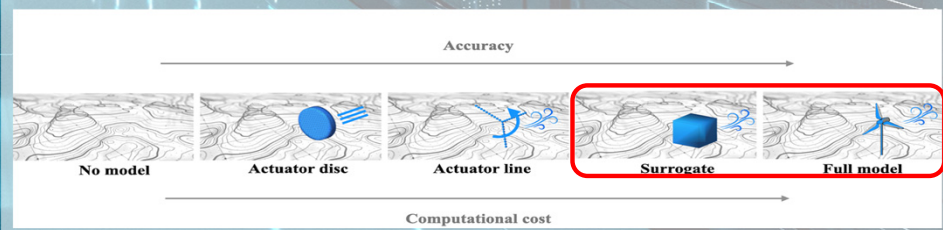
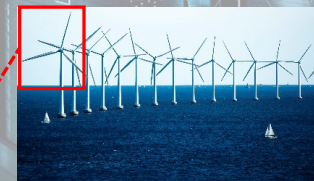
E.g., spikes in the data; Aluminium smelters going off completely or data centers maintenance

Data Fusion

Adding publicly available weather information to the original datasets



AI for wind farm layout optimization



LUMI AI

AI Factories



EuroHPC
Joint Undertaking

Up to
1.6 B€

EU strategy on AI Factories

- (Networked) AI Ecosystems
- AI supercomputers (new)
- Upgrades of (AI-) supercomputers
- Dedicated HPC/AI services
- Application support
- Access policy to supercomputers
- Access to common EU data spaces
- Support to AI EDIC (ALT-EDIC)
- Human talent and skills

National strategy on AI Factories

- Invest in an AI ecosystem
- AI-supercomputer
- Data centre(s)
- Access to data + open gov. data
- Dedicated services
- Human talent and skills, incl. investing in housing facilities
- Cooperation with Universities
- Local GPU clusters
- Digital Innovation Hubs
- AI start-up policy (access to capital, tax incentives, etc.)



NEW Draft Proposal

Call: EuroHPC AI Factory Antennas
HORIZON-EUROHPC-JU-2024-AIF-4-01

Overview of this call

Proposals are invited against the following Destinations and topics:

Topics	Type of Action	Budgets (EUR million) 2025	Expected EU contribution per project (EUR million)	Indicative number of projects expected to be funded
Deadline (indicative): 09 April 2025				
HORIZON-EUROHPC-JU-2024-AIF-4-01: EUROHPC AI FACTORY ANTENNAS	HORIZON-AIF-4-01	70	5	
Overall indicative budget				

General conditions relating to this call

The aim of AI Factories is to provide European citizens, as well as the industrial and the scientific community with enhanced access to AI optimized computing capabilities and underpinning services for the training and development of general-purpose, large-scale AI models, and for the development, testing and validation of emerging AI applications.

Call EUROHPC-2024-CEI-AI-01 and Call EUROHPC-2024-CEI-AI-02 were launched on 14 September 2024. The present Call for proposals aims to select 'AI Factory Antennas' that will be linked with an established AI factory and its AI optimized supercomputer. This call is launched in accordance with the EuroHPC Regulation, taking into account the EU Financial Regulation and where relevant on the basis of Financial Rules of the EuroHPC JU.

Work in Progress



NEW

Press Release on Call Outcome on Monday – Contact us if you are interested!
Engage with the Icelandic HPC Community in pan-European AI Factories