JSC News

JÜLICH Forschungszentrum | JÜLICH SUPERCOMPUTING CENTRE

Europe's First Exascale Supercomputer in its Starting Blocks

After the tender for the "Joint Undertaking Pioneer for Innovative and Transformative Exascale Research" (JUPITER) was launched in January 2023, the European High Performance Computing Joint Undertaking (EuroHPC JU) and the award-winning ParTec-Eviden supercomputer consortium signed a contract for the exascale system to be installed at the JSC, a member of the Gauss Centre for Supercomputing (GCS). The system will join the small circle of exascale systems in 2024 and will provide unique computing capabilities for the European HPC and AI community.

JUPITER will implement the dynamic Modular Supercomputing Architecture. The system will consist of a highly scalable booster module, a tightly coupled general-purpose cluster module, and a high-speed storage module. The cluster module will be based on SiPearl's new Rhea processor made in Europe, which is a CPU with exceptionally high memory bandwidth for most complex workloads. The booster module will feature NVIDIA's accelerated computing platform which is designed for next-generation data centre technologies to deliver extreme-scale computing power. The components will be integrated by Eviden into their highly energy-efficient, direct-liquid-cooled BullSequana XH3000 platform, and the modules will be dynamically operated as a unified supercomputer using ParTec's ParaStation Modulo.

The overall project budget for JUPITER is € 500 million, half of which is being provided by the European Union, and the other half equally by the German Federal Ministry of Education and Research (BMBF) and the Ministry of Culture and Science of the state of North Rhine-Westphalia (MKW-NRW).
To ensure that JUPITER's capabilities can be used from day, the "JUPITER Research and Early Access Program" (JUREAP) will open a call for participation soon. More information: jupiter.fz-juelich.de

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JSC @ Supercomputing Conference SC23

The SC23, the leading international exhibition and conference on high-performance computing, networking, storage, and analysis, will take place from 12 to 17 November 2023 in Denver, Colorado, USA. JSC together with its partners from the Modular Supercomputing and Quantum Computing research group of the Goethe-University Frankfurt will present their diverse range of activities at JSC's booth.

As the upcoming European exascale hosting site of the supercomputer JUPITER and operator of the D-Wave Quantum Annealer, this year's highlights at JSC's booth #401 can best be summarized as "Towards Exascale and Quantum Computing – from the very largest to the very smallest".

We are looking forward to giving visitors to our booth the opportunity to live code our D-Wave Advantage™ System JUPSI via JUNIQ (Jülich UNified Infrastructure for Quantum computing). Our partners from the Goethe-University Frankfurt will present research and development in the area of hybrid algorithms for modular supercomputing and quantum computing. JSC will present its achievements and plans in several EU-funded projects. This year's application focus is on artificial intelligence, with news and success stories on JSC's strategy and support in HPC for AI. In addition, in-house HPC tools like LLview, SIONlib, JUBE, and Scalasca will be demonstrated and JSC's support infrastructure will be presented.

A highlight will be the invited talk by our JSC colleague Sandra Diaz, who will present her topic "Boosting Neuroscience Research with High-Performance Computing Infrastructure". JSC employees will organize the full-day tutorial "Efficient Distributed GPU Programming for Exascale", co-organize the tutorial "Hands-On Practical Hybrid Parallel Application Performance Engineering" and the workshop "Third International Symposium on Quantitative Codesign of Supercomputers", and present their work in talks and Birds-of-a-Feather (BoF) sessions. And, of course, JSC colleagues will participate in multiple special

interest group sessions and panel discussions.

Please visit our SC23 webpage for detailed information.

Contact: Jens Henrik Göbbert, Michael Bresser

Sarah Neuwirth Wins the 2023 PRACE Ada Lovelace Award

Dr. Sarah Neuwirth is this year's winner of the PRACE Ada Lovelace Award, which is annually awarded to a female scientist making an outstanding contribution to and impact on HPC in Europe and the world, and who serves as a role model for women at the start of their scientific careers. In her PhD thesis, she demonstrated for the first time that it is possible to disaggregate CPUs and GPUs and to use them in combination, thus enabling modular supercomputing – a cornerstone on the path to exascale supercomputers. She acted as principle investigator and contributed to a number of European and nationally funded research projects, e.g. to the DEEP series and the European Pilot for Exascale (EUPEX). In addition to her technical work, she acted as member of the Equal Opportunities Council at her university, joined round tables discussing the role of women in HPC at supercomputing conferences, and contributed in many other ways to encourage young female talents to start a career in STEM.

At the time PRACE announced the awardee, Dr. Neuwirth was deputy group leader of the Modular Supercomputing and Quantum Computing Group at Goethe University Frankfurt in Germany, and visiting scientist at the JSC. She recently joined Johannes Gutenberg University Mainz as professor and leader of the "High-Performance Computing and its Applications" group.

More information about the award can be found on the PRACE and Goethe University websites.

Contact: Dr. Florian Berberich

LAION Receives Award from by Falling Walls Foundation

JSC would like to congratulate Jenia Jitsev and the dedicated team of LAION e.V., who were awarded "Science Breakthrough of the Year 2023" in the category "Science and Innovation Management" by the Falling Walls Foundation. This award underlines LAION's unique commitment to democratizing AI research, open science, and open source development. Their goal is to create an inclusive AI ecosystem to study foundation models on various scales from which everyone can benefit. Their commitment is demonstrated not only in their active work for the public, but also in their promotion of international research collaborations. JSC's collaboration with Huggingface, the University of Washington, and Stability AI was a cornerstone for this breakthrough. JUWELS Booster and other powerful supercomputers like Summit and Frontier helped position machine learning and AI research as a tool for societal progress. Today, LAION proudly unites a community of over 25,000 enthusiastic machine learning followers which everyone can join on LAION's public Discord server. The Falling Walls Foundation covers the awardee on its website.

Contact: Dr. Jenia Jitsev

The AI Revolution in Weather Forecasting

In September, the JSC, together with ECMWF, the University of Magdeburg, and the University of Bonn organized a workshop on "Large-Scale Machine Learning for the Earth System". The aim was to provide a forum for the breath-taking developments in AI-based weather forecasting and bring the leading groups together with researchers from modelling and operational centres as well as academia. Talks were given by experts from Google Deepmind, Huawei Research, Google Research, UK Met Office, and others. The over 60 participants in Bonn and more than 300 online attendees had lively discussions about the state of the art and future directions. In addition to AI-based ensemble methods and the direct use of observations for model training and inference, seasonal predictions and the role of AI in climate modelling were considered as emerging topics.

More information about the programme can be found on the workshop website.

Contact: Dr. Martin Schultz

AI – From Laptop to Supercomputer

JSC, as member in the Gauss Centre for Supercomputing (GCS), and the NHR Alliance (Verbund Nationales Hochleistungsrechnen) aim to support the use of high-performance computing for AI applications. They therefore jointly developed a webinar series, which was offered for the first time on 19 October 2023, providing an opportunity for the AI community to ask experts from NHR and GCS questions ranging from how to get access to resources to how make the best use of these resources. The participants also learnt about the HPC landscape in Germany as well as the systems and architectures that are available to them. The seminar thus offered a starting point to bootstrap computing time applications. The initiative will continue with weekly webinars, during which participants can ask the experts similar questions, and the community can receive support in getting started with and efficiently using HPC for AI applications.

More information and login details for the weekly "Questions & Answers" sessions: https://www.nhr-verein.de/en/ai-supercomputers

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