

PRESS RELEASE

Fraunhofer ITWM at Supercomputing 2024

Pioneering technologies for High Performance Computing and Artificial Intelligence

The Fraunhofer Institute for Industrial Mathematics ITWM will be presenting innovative solutions for parallel programming and Artificial Intelligence at Supercomputing 2024 in Atlanta, USA, from November 18 to 22. Two Fraunhofer spin-offs will participate at the joint booth 3115 in Hall B: ThinkparQ will present its roadmap for the parallel file system BeeGFS. The spin-off UNEEC Systems will be demonstrating the STX processor and its system approach to energy efficient and cost effective compute infrastructure. The STX processor accelerates HPC simulations while keeping programming simple.

Researchers from the division »High Performance Computing« will share new developments in parallel programming and other AI solutions for high performance computing.

NASE – Neural Architecture Search Engine

NASE is a powerful AI tool that optimizes neural network models with respect to the underlying hardware, e.g. AI accelerators, such as ASICs and FPGAs. The tool automates the search for efficient AI models that meet specific performance requirements such as speed, latency and power consumption. By considering unique hardware characteristics in the model design, NASE ensures customized neural architectures. Advanced algorithms and extensive computing resources enable the provision of ready-to-use, efficient neural networks for real-world applications.

Carme – Open Source Software Stack for AI Infrastructure Management

The open source software stack CARME bundles Fraunhofer ITWM's expertise in Artificial Intelligence and High Performance Computing and can be seamlessly integrated into existing HPC systems. Users can focus on their AI development goals without the need for experience or knowledge of workload management tools or hardware. CARME features web-based access, two-factor authentication (2FA) and

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integrated container technology, making it a user-friendly and robust tool for managing interactive and batch AI workloads on HPC systems.

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GaspiLS – Scalable Iterative Linear Solver for Cfd and Fem Simulations

The GaspiLS scalable iterative solver library has demonstrated exceptional scalability in codes from independent software vendors and industry. With the widespread use of workstations with over one hundred cores and small HPC installations with thousands of cores, the strong scalability of this solver library is essential for engineering solutions.

GaspiLS utilizes highly scalable Algebraic Multigrid (AMG) and hybrid Incomplete-LU preconditioners to design the optimal solver for each code. In addition, GaspiLS is open source, which encourages a collaborative approach to improving its capabilities. GaspiLS can be seamlessly integrated into any code that uses Message Passing Interface (MPI) or Global Address Space Programming Interface (GPI).

MCSS – The Next Revolution in Data Storage

For the first time, researchers from Fraunhofer ITWM will present their novel Memory Centric Storage System. The aim of the new I/O system is to eliminate the separation of memory and the various storage devices and bring them together in a distributed I/O system under a standardized interface. This makes it possible to work with bytes and files across all devices in a flexible and highly optimized way, facilitating workflows and supporting campaign storage.

The Fraunhofer ITWM HPC team is looking forward to your visit and intensive discussions.

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FRAUNHOFER INSTITUTE FOR INDUSTRIAL MATHEMATICS ITWM**About the Fraunhofer Institute for Industrial Mathematics ITWM**

The Fraunhofer Institute for Industrial Mathematics ITWM in Kaiserslautern is one of the largest research institutes for applied mathematics in the world. We see it as our task to further develop mathematics as a key technology and to provide innovative impulses. Our focus is on the implementation of mathematical methods and technology in application projects and their further development in research projects. The close cooperation with partners from industry guarantees the high practical relevance of our work.

Their integral building blocks are consulting, implementation and support in the application of high performance computing technology and the provision of customized software solutions. Our various areas of expertise address a wide range of customers: the automotive industry, mechanical engineering, the textile industry, energy and the financial sector. This also benefits from our excellent networking, for example in the Simulation and Software-based Innovation Center.

About the Fraunhofer-Gesellschaft

The Fraunhofer-Gesellschaft, based in Germany, is the world's leading organization for application-oriented research. With its focus on future-oriented key technologies and the utilization of results in business and industry, it plays a central role in the innovation process. As a guide and driving force for innovative developments and scientific excellence, it helps to shape our society and our future. Founded in 1949, the organization currently operates 76 institutes and research facilities in Germany. More than 30,000 employees, most of whom are trained in the natural sciences or engineering, work on the annual research volume of 2.9 billion euros. Contract research accounts for 2.5 billion euros of this total.

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