

Panel

Title: Revolutionizing Parallel & Distributed Computing: The Quantum, LLM Systems, and AI-Driven Future of HPC

Abstract: As the boundaries of traditional high-performance computing (HPC) are pushed by the increasing demand for efficiency, scalability, and problem-specific optimization, emerging architectures—such as quantum computing, LLM systems, and machine learning-accelerated hardware—are reshaping the HPC landscape. This panel brings together experts from academia, industry, and research institutions to discuss how these novel architectures are redefining performance metrics, energy efficiency, and the very nature of computational workflows. Key discussion points will include the practical integration of quantum and LLM systems into existing HPC ecosystems, the role of ML in optimizing workloads and accelerating simulations, and the challenges of programming models, hardware co-design, and software portability. The panel will also explore the implications for scientific discovery, industry applications, and the future of supercomputing. Attendees will gain insights into emerging trends, current limitations, and potential breakthroughs that could transform how we approach large-scale computation in the coming decade.

Panel Moderator: Cynthia Ann Phillips, Sandia National Laboratories **Speakers:**

Anastasiia Butko, Lawrence Berkeley National Laboratory, USA Paolo Cremonesi, Politecnico di Milano, Italy Jeffrey Vetter, Oak Ridge National Laboratory, USA Kentaro Sano, RIKEN, Japan







