

Nicholas Malaya

Session 2

Title: Beware the Jabberwock: Open Software for a Heterogeneous HPC Future

Abstract: High performance computing is entering an era where architectural diversity is no longer the exception but the rule. Heterogeneous accelerators, AI techniques, and increasingly complex system and memory hierarchies have created a landscape that can feel as bewildering as Lewis Carroll's Wonderland. For scientific software teams tasked with delivering reliable mission capability, the challenge is not simply adapting to one new architecture, but navigating an ever shifting ecosystem of heterogeneous systems and software.

This talk will discuss how open ecosystems enable portable performance and long-term sustainability for mission software. In a computing landscape that grows, in Carroll's words, "curiouser and curiouser," as the community explores heterogeneous technology vendors and federated learning across datacenters.

We will also discuss the growing importance of confidential computing technologies, including Secure Encrypted Virtualization (SEV), which enable secure multitenant datacenters for sensitive data and models. Finally, we will examine how the future of scientific computing will increasingly blend traditional FP64 simulations with lower-precision AI-driven workflows, creating hybrid systems that accelerate insight across disciplines. Together, these technologies point toward a new class of datacenters purpose-built for both simulation and learning, enabling the AI-HPC systems of tomorrow. Ultimately, open software may be the vernal sword that allows the community to face the Jabberwock of architectural and system complexity.

Bio: Nicholas Malaya is an AMD Fellow in High Performance Computing and is AMD's technical lead for exascale application performance. His role is to ensure that workloads run efficiently on the world's largest supercomputers for HPC and Sovereign AI from Day-0 of machine deployment.

Nick's research interests include HPC, computational fluid dynamics, Bayesian inference, and AI. He received his PhD from the University of Texas. Before that, he double majored in Physics and Mathematics at Georgetown University, where he received the Treado medal. In his copious spare time, he enjoys long distance running, wine, and spending time with his wife and children.