

North Dakota Water Resources Research Institute (NDWRRI) Seminar Series

“Intersecting Supercomputing, Computational Fluid Dynamics, and Artificial Intelligence”

Presenter: Dr. Andrew Kirby, University of Wyoming

Date: Monday, September 28

Time: 3:30–4:30 PM (CDT)

Zoom link: <https://ndsu.zoom.us/j/98591740209>



Abstract

High-performance computing is fundamentally transforming scientific discovery, and the University of Wyoming is actively accelerating this shift through robust infrastructure like the AI4WY GPU supercomputing cluster. Leveraging these advanced computational capabilities is essential for pushing the boundaries of computational fluid dynamics (CFD) in highly complex, real-world engineering environments. Specifically, extreme-scale CFD simulations are essential for driving modern innovations in aerospace hypersonics and wind turbine aerodynamics, both of which demand heavily optimized, parallelized solver architectures. To meet these intense computational demands, researchers are increasingly integrating Large Language Models (LLMs) into the software development lifecycle to accelerate the creation, debugging, and performance tuning of GPU-enabled scientific codes. Beyond pure code generation, the rapid adoption of these capabilities requires a thoughtful philosophical examination of how AI tools should be responsibly utilized within academic institutions. This presentation will explore the vital intersection of next-generation HPC resources and AI-assisted programming, outlining practical strategies for embracing LLMs in computational science research and computing education while maintaining strict scientific rigor.

Speaker biography

Andrew Kirby is an Assistant Professor at the University of Wyoming, jointly with the School of Computing and the Department of Mathematics & Statistics. His research is oriented around developing highly scalable computational methods for aerospace and energy applications. He holds a BS in Mathematics from the University of Wisconsin-Madison, an MS in Applied Mathematics from Columbia University, and a Ph.D. in Mechanical Engineering from the University of Wyoming. His research in Computational Fluid Dynamics has propelled his career in High-Performance Computing and GPU-accelerated computation and enabled extensive collaborations across NASA and the Department of Defense. He is the Principal Investigator of the University of Wyoming's NSF Track II Major Research Infrastructure (MRI) grant, which funded UW's recently inaugurated GPU cluster, Gannett Peak.

