IWR
Interdisciplinary Center
for Scientific Computing

UNIVERSITÄT
HEIDELBERG
ZUKUNFT
SEIT 1386

IWR COLLOQUIUM WINTER SEMESTER 2023/24

Prof. Andrea Beck
Institute of Aerodynamics and Gas Dynamics,
University of Stuttgart

Computational Fluid Dynamics Frameworks for the next Decade

In this talk, I will venture a glimpse into the future of cutting-edge numerical methods and software for computational fluid dynamics (CFD) for many aerospace applications. While established, off-the-shelf commercial solutions for a broad range of applications exist, the current push towards fundamental changes in the fields of energy generation and transport necessitates computational tools that can keep pace and facilitate discovery through computation.

This talk will give an overview of the ingredients of modern simulation software for CFD, in particular for multi-scale, multi-physics and multi-fidelity problems. Among these are high-order discretization schemes that can adapt locally in space and time to the underlying resolution requirements and thus combine accuracy and robustness. While the potential of leveraging data-driven approaches has become apparent, I advocate for a shift from a purely data-driven to a data-informed approach, which combines both machine learning models (ML) and classical solution schemes consistently. Last but not least, modern discretization methods and ML/CFD hybrid schemes must produce efficient and reliable results. For this, GPU-parallelization and an incorporation of the FAIR principles into the simulation stack must be part of the next generation CFD solvers.

Also streamed via Zoom

January 24, 2024 • 16:15

Mathematikon • Conference Room / 5th Floor
Im Neuenheimer Feld 205 • 69120 Heidelberg
www.iwr.uni-heidelberg.de/events/iwr-colloquium