

Aerospace and Mechanical Engineering Seminar

Dr. Christopher R. Schrock

Senior Research Aerospace Engineer Air Force Research Laboratory Christopher.schrock@us.af.mil

AFRL's Multi-Fidelity Analysis for Design Team

Abstract: The design and analysis of revolutionary aerospace vehicle concepts under development by the US Air Force requires the integration of multi-physics analysis capabilities with reasonable computational cost to impact design-driving requirements and reduce uncertainty early in the vehicle design process. The mantra of the Multi-Fidelity Analysis for Design Team is "Bringing Physics to Flight". The team is part of the Multidisciplinary Science and Technology Center (MSTC) within AFRL's Aerospace Systems Directorate (RQ). In realizing its mission, the Team develops computational methodologies for multiphysics, leveraging the concept of "right-fidelity" modeling and analysis to be impactful in early weapon system development where computational cost is of key importance, but also where the need to identify cross discipline couplings and system limitations have the greatest payoff. Late discovery of such phenomena can lead to cost and schedule overruns and decreased vehicle performance. During this talk, Dr. Schrock will give an overview of the Team, its major technology thrusts, and current fundamental & applied research efforts in multidisciplinary analysis methods for cost-effective aerospace system design.

Bio: Dr. Christopher Schrock is a Senior Research Engineer at the Air Force Research Laboratory, Acting Team Lead for the Analysis Methods for Design Team in the Air Force Research Laboratory's Multidisciplinary Science and Technology Center (MSTC), and Acting Technical Advisor for the Design and Analysis Branch of the Aerospace Systems Directorate. Dr. Schrock's 19 year career with the Air Force began in the Aerospace Systems Center (ASC) where he spent 9 years working in Aircraft Conceptual Design in the Capability Planning Directorate. There he held the role of Lead Aerodynamicist before transitioning to AFRL. Over the past 10 years in AFRL, Dr. Schrock's research efforts have been focused on high-order finite element methods for computational fluid dynamics (CFD), multi-fidelity methods for fluid structure interaction (FSI), and machine learning approaches to improve turbulence modeling. Dr. Schrock holds a Ph.D. in Applied Mathematics from the Air Force Institute of Technology (AFIT), as well as, an M.S. and B.S.E in Aerospace Engineering from AFIT and the University of Michigan, respectively.

Thursday, April 22nd at 4:00 P.M. Zoom Link: <u>https://arizona.zoom.us/j/84564071827</u> Passcode: 17502021