



American Institute of
Aeronautics and Astronautics
Dayton-Cincinnati Section

Lunch 'n' Learn Turbulent Combustion Modeling for High-Speed Propulsion

Guest Speaker:
Dr. David Peterson

Friday 26 April 2019; 11:45 AM



Abstract: Turbulent combustion is a difficult problem to model in any flow regime. Much of our knowledge of turbulent combustion comes from studying low-speed laboratory-scale flames. Modeling turbulent combustion in high-speed air-breathing propulsion applications brings additional challenges to the problem, including extreme velocities, a large range of flow and chemistry time scales, shock interactions and other compressibility effects. In this talk we will discuss the reasons numerical simulations play an important role in understanding high-speed turbulent combustion, as well as the unique physical phenomena that make this combustion regime challenging. Topics will include introductions to modeling combustion chemistry; turbulence modeling, ranging from Direct Numerical Simulation, Large-Eddy Simulation and steady-state Reynolds-Averaged Navier-Stokes simulations; as well as common modeling approaches for modeling the interactions between turbulence and chemistry. This overview will highlight the current state-of-the-art as well as discuss the challenges that motivate the latest fundamental research in the field.

Biography: Dr. Peterson is an Aerospace Engineer in the High-Speed System Division of the Air Force Research Laboratory, Aerospace Systems Directorate. His work focuses on modeling of turbulence, mixing and combustion using approaches from Reynolds-Averaged Navier-Stokes to Direct Numerical Simulation for high-speed air-breathing propulsion. He earned his PhD in Aerospace Engineering and Mechanics from the University of Minnesota in 2011. He has been a postdoc at the Center for Hypersonics at the University of Queensland in Australia, as well as a postdoc in the National Research Council Research Associates program at the Air Force Research Laboratory.

Location

China Garden Buffett
Airway Center
112 Woodman Drive
Dayton OH 45432

Lunch

Buffett style, all-you-can-eat Asian cuisine.
Available for purchase.

