UNIVERSITY OF MARYLAND

THE BURGERS PROGRAM FOR FLUID DYNAMICS
THE FLUID DYNAMICS REVIEWS SEMINAR SERIES

UNRAVELING FLUID-THERMAL-STRUCTURAL INTERACTIONS

Thursday, October 30, 2025 | 3 pm

Mechanical Engineering Seminar Room
2164 Glenn L. Martin Hall

Speaker

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ABSTRACT

Fluid-Thermal-Structural Interactions (aka FTSI) are a key pacing issue for the advancement of high-speed flight vehicles. A broad network of coupling mechanisms of varying importance paired with multi-scale physics obfuscates the attainment of the deep fundamental understanding needed to meet desired performance requirements. In this seminar the different aspects and challenges are discussed, along with different strategies for making progress. A deeper focus is also included on the nuanced and poorly understood role of fine-scale turbulence in FTSI. The seminar will conclude with future directions and outlook on the problem.

BIO

Jack J. McNamara is a professor in the Department of Mechanical & Aerospace Engineering at The Ohio State University, and director of the Multi-Physics Interactions Research Group (MIRG\ murj\). His research interests are broadly in the areas of fluid-structural interactions and model reduction of high-dimensional dynamical systems, with an interconnected goal of improving basic understanding and computational methods. A core application target is air vehicle operation in high-speed (supersonic/hypersonic) flow regimes, where there is a potential for complex interactions at both the component (fluid-thermal-structural-material) and vehicle (aero-servo-thermo-elastic-propulsive) levels. Other application areas include fluid-structural centric problems associated with ship airwakes, wind turbines, flapping wing air vehicles, automobiles, and turbomachinery.

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