UNIVERSITY OF MARYLAND

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

BRIDGING FLUID DYNAMICS AND MACHINE LEARNING FOR PROPULSION AND ENERGY APPLICATIONS

Wednesday, October 29, 2025 | 11 am

Mechanical Engineering Seminar Room

2164 Glenn L. Martin Hall

Speaker

DR. TAMY GUIMARÃES

Assistant Professor

Department of Mechanical Engineering

The Pennsylvania State University

ABSTRACT

The Guimarães Instrumentation, Measurements, and Aerodynamics Sensing Laboratory (GIMAS Lab) at Penn State advances methods for controlling unsteady aerodynamic and thermal phenomena in propulsion and energy systems. This seminar will explore the current research efforts of Dr. Guimarães' research team, providing insights into their ongoing work. One main area of interest is inlet flow distortion mitigation, where experimental and computational studies investigate how to suppress separation to enhance engine operability. Complementary work applies machine learning to extract predictive features from complex aerodynamic and thermal datasets, supporting more efficient probe calibration strategies. In parallel, studies on passive vortex generators demonstrate their effectiveness in promoting mixing and improving heat transfer in low-speed applications, such as solar air heaters. Collectively, these efforts unify experimental, computational, and data-driven approaches to deliver intelligent flow and thermal management solutions, bridging fundamental fluid mechanics with deployable technologies for propulsion and energy applications.

BIO

Dr. Tamy Guimarães joined the Department of Mechanical Engineering at Penn State as an Assistant Professor in 2021. She received her Ph.D. in Mechanical Engineering from Virginia Tech in 2018, worked in Germany as a postdoctoral researcher (Institute for Fluid Mechanics and Aerodynamics at the Bundeswehr University Munich) and as a Business Development Manager at a start-up. Her research interests are focused on passive and active flow distortion control, and improving experimental techniques and measurements for fluid mechanics and aerodynamics for diverse applications. She is a senior member of AIAA, an affiliate faculty at the Federal University of ABC in Brazil, and a recipient of the Brazilian Scientific Diaspora Award from the Brazilian Embassy in the USA.

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