



JOHNS HOPKINS
Center for Environmental
& Applied Fluid Mechanics

SPRING 2022 CEAFM VIRTUAL SEMINAR

“A Renaissance of Aerodynamics - Revise & Surpass Classical Theory with Modern Computational Methods”

Presented by Prof. Sven Schmitz

Pennsylvania State University

College of Engineering

Hosted by Prof. Charles Meneveau (MechE)

Abstract: Aerodynamics is a pillar of every Aerospace Engineering curriculum. Both the beauty and benefits of classical concepts and methods are oftentimes forgotten though when high-fidelity Navier-Stokes solutions and advanced optimization and search algorithms are becoming increasingly available to the practicing engineer and scientist. The presenter is a passionate researcher and teacher of aerodynamics and will illustrate how classical aerodynamics concepts remain relevant and provide physical insight into current aerodynamics questions in the areas of renewable energy and future sustainable aviation. This is achieved by bridging the traditions of ‘mathematical physics’ and ‘technical mechanics’ that have been rival theories in aerodynamics since the early days of the discipline. Some examples include a viscous correction to the classical Kutta-Joukowski theorem, rotational augmentation and stalled flow on a wind turbine blade, a novel approach of extracting wave drag from a transonic Navier-Stokes solution, and aircraft drag decomposition using partial pressure fields (PPFs) that split the static pressure in a viscous flow solution into Euler and dissipative contributors.

Bio: Dr. Sven Schmitz joined the faculty of Aerospace Engineering at Penn State University in 2010. He received a diploma degree in Aerospace Engineering from RWTH Aachen (Germany) in 2002 and a Ph.D. in Mechanical and Aeronautical Engineering from the University of California Davis in 2006. Dr. Schmitz spent four years as a post-doctoral researcher and project scientist at Davis before coming to Penn State. He is an Associate Editor of the Journal of the American Helicopter Society, an AIAA Associate Fellow, and a recent recipient of the Penn State George. W. Atherton Award for Excellence in Teaching.



Friday, April 1, 2022 at 3:00 PM

Zoom Meeting

<https://wse.zoom.us/j/93762992307>