

Center for Environmental & Applied Fluid Mechanics

SPECIAL CEA FM SEMINAR

Prof. Jeffrey Bons
The Ohio State University
Aerospace Engineering

**“Airborne Particle
Deposition in Jet Engine
Hot Sections” or “Should I
Board a Flight during a
Sandstorm”**

Abstract: The subject of deposition in gas turbine hot sections has seen an explosion of interest in the last thirty years. Growth markets for commercial aviation (Asia, Africa, and the Middle East) are known to be regions with elevated micron-sized particulate, both naturally occurring and man-made. This increased traffic in regions of heightened airborne particulate levels has resulted in loss of engine performance, increased maintenance intervals, and accelerated deterioration of engine components. At the same time, two key technological advances have combined to render modern gas turbines more susceptible to this increased particulate load. First, the pursuit of higher performance and efficiency has led to hot gas temperatures in modern engines that exceed



melting temperatures of nearly all ingested particulate. Second, higher fidelity computational tools have significantly shortened the design cycle of modern engines while at the same time allowing for more complex designs that are operating closer to their peak efficiency. In some cases, this has resulted in products that have a reduced ability to compensate for erosion, deposition, and wear. Meanwhile, researchers have struggled to understand and model the complex physics of deposition at relevant engine operating conditions (high pressure and

temperature). Full engine tests are prohibitively expensive and provide limited detailed data for CFD modeling and validation. To close this gap, Dr. Bons' lab has spent over two decades researching gas turbine deposition and providing key data, insights, and models to the engine community. In this presentation, he will share some of these insights as a pattern for tackling other multi-disciplinary challenges as tomorrow's engineers.

Spring 2025 CEA FM Seminar Series

April 4, 2025 ✦ 3:00 PM ✦ Gilman Hall 50