

DEPARTMENT OF MECHANICAL & AEROSPACE ENGINEERING

WILLIAM MAXWELL REED SEMINAR SERIES

“Experimental and Numerical Analysis of Impacts, Mass Transfer, and Deposition in Dispersed Phase Systems”

Austin J. Andrews
University of Minnesota Twin Cities
Department of Mechanical Engineering

Abstract:

Multiphase flows, encompassing fluid systems with two or more distinct phases transported jointly, present challenges in engineering analysis and design. This seminar talk delves into experimental and numerical techniques employed to characterize dispersed phase systems, particularly focusing on dilute secondary phases that significantly influence system behavior. First, I will discuss particle-laden high-speed flows and experimental techniques to characterize particle-induced surface damage and erosion that is relevant to high-speed aerospace vehicles. Second, I will discuss numerical solutions to the Navier-Stokes Nernst-Planck-Poisson (NS-NPP) equations to describe dissolved-ion transport in liquids near sensing membranes and determining the effects of fluid flow on ion transport and sensor performance. Third, I will present a unique approach for analyzing particulate removal and mass transfer rates in electrostatic air cleaners using computed particle trajectories. These three topics highlight several outstanding issues present in dispersed phase systems and that a combination of experimentation, simulation, and theory is needed to better understand, control, and design such systems.

Speaker Bio:



Austin Andrews is a graduate research assistant working with Professor Chris Hogan at the University of Minnesota. He received his BS in Mechanical Engineering at the University of Minnesota in 2019. His research interests are in high-speed particle flows and fundamental and applied aerosol transport processes in electrohydrodynamic systems. He has over 6 years of experience working in aerosol research groups with a wide range of expertise, including agricultural spray drift, aerosol deposition, high-speed particle impactions, medical and biological aerosols, fibrous air filtration, indoor air quality control and aerosol measurement techniques.

Date: Friday, February 9, 2024
Place: Whitehall Classroom Building 110

Time: 3:00 PM EST
Contact: Dr. Jonathan Wenk

Attendance open to all interested persons