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Friday, February 22, 2019  
3:00 PM, 132 Gilman Hall

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***"Towards Understanding and Modeling Disperse  
Multiphase Flows in Engineering-Relevant Regimes"***

Presented by Prof. Jesse Capecelatro  
University of Michigan

The past three decades have seen significant progress in the numerical simulation of disperse multiphase flows. However, the majority of these efforts have focused on dilute suspensions of particles under low-speed and isothermal conditions. This presentation will focus on recent progress towards understanding and predicting particle-laden flows in more extreme environments. The talk will begin with a focus on collisional fluid-particle flows in chemically reacting systems. Results from high-resolution numerical simulations will be presented to show how multiphase interactions at the particle scale augment and restrict large-scale flow processes. I will then show how the underlying numerical framework can be extended to account for higher-speed flows in the presence of shocks. Particular attention is made on the role wakes past individual particles (termed pseudo-turbulence) have on the local sound speed. The talk will conclude with recent simulations demonstrating how particle-turbulence interactions affect the sound field near high-speed shear flows.