

ME 250 SEMINAR

Droplet physics in modeling transmission of COVID-19 like pandemics

Respiratory droplets play a critical role in transmitting many viruses, including SARS-Cov2, responsible for the current COVID-19 pandemic. Hence, it is essential to understand and analyze the mechanisms of evaporation, precipitation, and transport of these droplets ejected from our oral or nasal cavities during respiratory events such as sneezing, coughing, talking, or breathing. In this talk, we will present a model that accounts for droplet dynamics and connects it to a pandemic model to assess the growth in the infected population. To evaluate the respiratory droplets' lifetime, we have used classical theories on evaporation and precipitation, which were experimentally validated. The interactions between the respiratory droplet-cloud ejected from an infected individual and the healthy individuals were modeled using molecular collision theory. The results will demonstrate that, in certain climate conditions, the droplets can survive and travel much longer than 6 feet. We will also discuss the relative probabilistic contributions from two different transmission modes, droplets vs. aerosols. We will conclude the presentation with a note on the importance of masks in restricting the transmission of respiratory droplets and show how improperly designed masks can have severely opposite effects.

THURSDAY, JANUARY 28, 2021 | ZOOM | 11:00 AM - 11:50 AM



Abhishek Saha is an Assistant Professor in the Department of Mechanical and Aerospace Engineering at the University of California San Diego. His research encompasses areas of combustion and droplets concerning power generation, propulsion, manufacturing, and bio-transport. Before joining UCSD, Abhishek was a research staff at Princeton University. He received his B.S. from Jadavpur University and his Ph.D. from the University of Central Florida, both in Mechanical Engineering.

Abhishek Saha
UC San Diego