PHYSICAL MATHEMATICS SEMINAR

Modeling inertial-capillary transport from bouncing drops to bursting bubbles

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ABSTRACT:

Interfacial fluid mechanics, such as the dynamics of drops and bubbles, are important to problems in a variety of fields. For example, superhydrophobic surfaces can repel droplets; whereas the aerosols formed from bursting bubbles over the ocean can transport pathogens and cloud-condensation nuclei into the atmosphere. In both of these cases the rapid dynamics depend on a balance of capillary (surface-tension) and inertial forces. This talk explores two types of transport in this inertial-capillary regime: the amount of heat transferred when a drop bounces off of a superhydrophobic surface and whether jet drops transfer into the atmosphere when a bubble ruptures at an air-liquid interface. I will show thermal and high-speed movies to highlight the phenomena, and I will discuss how experiments and mathematical modeling have given us insight into the underlying physics.

BIO:
James Bird is an Assistant Professor in the Department of Mechanical Engineering at Boston University. He received his B.S. from Brown University and his Ph.D. from Harvard University, after which he completed an NSF Mathematical Science Postdoctoral Fellowship at MIT. His research focuses on interfacial fluid dynamics with an emphasis on the dynamics of drops and bubbles. He is the recipient of a Fulbright Fellowship (2004), an NSF CAREER award (2014), and an ONR YIP award (2016).

TUESDAY, APRIL 3, 2018
2:30 PM
Building 2, Room 136

Reception following in Building 2, Room 290
(Math Dept. Common Room)

http://math.mit.edu/seminars/pms/

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