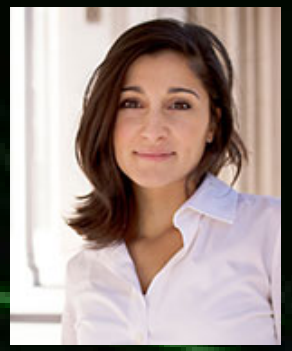
Unsteady fluid fragmentation

Friday, April 12th

12:30 PM 222Bowen Hall



Lydia Bourouiba
Massachusetts Institute of Technology

Understanding secondary droplet formation from fluid fragmentation is critical for industrial, environmental, and health processes including for predicting and controlling the transport of pathogen-bearing droplets created from contaminated fluids or surfaces. Despite the complexity and diversity of modes of unsteady fluid fragmentation into secondary droplets, universality across geometry and fluid systems emerges. We discuss results from our joint experimental and theoretical investigations elucidating the role of unsteadiness in shaping a ubiquitous, yet neglected class of fluid fragmentation problems. In particular, we revisit fundamental assumptions of hydrodynamic instability and reveal how unsteadiness and multi-scale dynamics couple to select the sizes and speeds of secondary droplets generated. Implications for human health and food safety are discussed.

Prof. Lydia Bourouiba is an Associate Professor at the Massachusetts Institute of Technology, where she directs the Fluid Dynamics of Disease Transmission Laboratory. Her research specializes in joining advanced mechanical, physical, and biological experiments and applied mathematics to elucidate the fundamental fluid dynamics and biophysics governing the multiscale dynamics of pathogen transmission in human, animal, and plant populations where drops, multiphase, and complex flows are at the core. More on her recent work can be found at lbourouiba.mit.edu

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lbourouiba.mit.edu