

BME SPECIAL SEMINAR

**Monday, January 29, 2024
9:30 – 10:20am, MJIS 2001**

“Respirable Particles in the Lung: From Diseases Caused from Wildland Fire Smoke and E-cigarettes to Effective Treatment Strategies”



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Abstract: The respiratory system is one of the primary portals into the body and is responsible for gas exchange and protection from airborne foreign substances. The extent of deposition, retention, and clearance of inhaled particles is a complex interaction of physical forces, biological mechanisms, and subject's pathophysiology. Aerosol particles that originate from toxic sources (e.g., wildland fires, cigarettes/e-cigarettes, industrial emissions) can cause local and systemic inflammation, which when exposed to chronically, can lead to dysfunction of nearly every system in the body. Alternatively, particles may be designed for therapeutic purposes to treat, for example, asthma or respiratory distress syndrome. This talk will first focus on development of a chronic exposure platform to model occupation exposure in the context of wildland fire fighters. We will discuss how inhaling wildland fire smoke over a long period of time can cause changes in respiratory biomechanics and the biological underpinnings of lung remodeling. Turning our attention to other particles, we will next focus on the biomechanical impact of inhaling e-cig aerosols on the lung. Finally, we will discuss computational modeling of asthmatic and sarcoidosis lungs and importance of sensitivity analysis on predicting therapeutic potential.

Biography: Jessica Oakes is a tenured Associate Professor in the Department of Bioengineering at Northeastern University. Following completion of her PhD in 2013 (UC San Diego), she continued research in aerosol medicine as a postdoc fellow at INRIA Paris, France and at UC Berkeley, supported by a Whitaker Fellowship, a UC Presidential Postdoc Fellowship, and an American Lung Association Fellowship. Now, her research group focuses on combining experimental and numerical techniques to predict, quantify, and optimize aerosol dosimetry, and the corresponding structure/function response, in the lung. Dr. Oakes's is the recipient of the Outstanding New Environmental Scientist award from NIH/NIEHS. Her research has also generously supported by the FEMA/DHS Assistance to Firefighters grant program, NIH NHLBI, and the Bill & Melinda Gates Foundation. In June 2023, Jessica received with the YC Fung Early Career Medal from the American Association of Mechanical Engineers.

~ BME Host: Craig Goergen ~