Department of Engineering
Seminar Program
Wednesday, Mar 1, 2017
Shanahan Teaching and Learning Center
Lecture Hall 1430, 4:15pm

"Airway Mechanics in Chronic Lung Disease"

Mona Eskandari

Summary:
Lung disease is the third leading cause of death in the United States and has an even higher fatality rate in countries with excessive pollution. Strikingly, pulmonary mechanics and airway obstruction remain drastically understudied. The airway is a living system, and its disease-driven adaption induces remodeling of its geometry and material properties, resulting in airway occlusion. Utilizing computational simulations and experimental characterization of airway mechanical properties, I confront clinically relevant questions pertaining to airway collapse in diseases such as asthma and bronchitis. My computational results—based on the theory of finite growth, solid mechanics, and nonlinear finite element analysis—rationalize my medical collaborators' observations and elucidate the complex phenomenon of airway obstruction. My complementary porcine tissue experiments address the pressing need for airway-specific material characterization to inform the biophysical response of the small bronchi, the predominant site of obstruction. This talk will focus on highlighting the tightly connected, iterative computational-experimental nature of my research to enable translational discoveries in the clinic through predictive modeling, advanced medical diagnostics, and optimized interventions in pulmonary healthcare.

Bio:
Mona Eskandari is a Ph.D. Candidate in Mechanical Engineering at Stanford University, with a Ph.D. minor in education. She obtained her master's degree from Stanford University, and her bachelor's degree from the University of Arizona, where she was also a Nugent medalist. She is a Stanford Graduate Science and Engineering Fellow, a National Science Foundation Graduate Research Fellow, and a Diversifying Academia Recruiting Excellence (DARE) Doctoral Fellow. Her area of expertise is computational modeling and experimental characterization of biological systems, with an emphasis on the pulmonary system. In partnership with medical specialists, the multifaceted methodology of her computational and experimental research ultimately aims to revolutionize pulmonary healthcare. Eskandari received the Early Engineering Educator Award from the American Society for Engineering Education for innovative teaching. Most recently, she received the prestigious K. Patricia Cross Future Leaders of Higher Education Award from the Association of American Colleges and Universities.

After the seminar there will be an informal dinner and conversation with the speaker in the Rose Hills PDR at Hoch-Shanahan Dining Hall. If you are not on the meal plan, we will have a signup sheet. If you are interested in attending, please RSVP with Sydney Torrey at storrey@hmc.edu.