

BME Spring 2024 Seminar Series

Toeing the line: understanding the benefits and risks of mechanical loading during physical activity

Mariana Kersh, Ph.D.

Associate Professor

Department of Mechanical Science and Engineering
Health Innovation Professor of the Carle Illinois College of Medicine
University of Illinois at Urbana-Champaign



Thursday April 11, 2024 11am–12pm in PWEB 150

WebEx: [Click here](#)



Abstract: For most individuals, the musculoskeletal system sustains thousands of mechanical loading cycles every day with remarkable resilience. Yet, increased loading cycles is a known risk factor for tissue dysfunction. This talk will explore the benefits and risks of mechanical loading for two tissues: bone and tendon. First, we will assess the potential for a moderate exercise intervention to induce bone adaptation using a juvenile equine model and the role of muscle-bone cross talk. Next, we review the mechanical effects of basketball maneuvers in college athletes in the context of bone stress injuries. Finally, the shoulder biomechanics during exercises for wheelchair users will be discussed to assess the risk of rotator cuff tendon overloading as well as the potential for non-invasive imaging methods (diffusion tensor MRI) to detect the effects of fatigue.

Biography: Mariana Kersh is an Associate Professor in the Department of Mechanical Science and Engineering and Health Innovation Professor of the Carle Illinois College of Medicine at The University of Illinois at Urbana-Champaign. She also serves as the Integrative Imaging Theme Co-Chair at the Beckman Institute for Advanced Science and Technology. She directs the Tissue Biomechanics Laboratory - an interdisciplinary lab that aims to understand the structure-function relationships in bone, ligament, and tendon with the end goal of improving options for diagnosis and treatment of musculoskeletal disorders.

Dr. Kersh first received a Bachelor of Arts in English at The University of Texas-Austin, then went on to receive a Bachelors and Masters in Mechanical Engineering, and PhD in the Materials Science Program at The University of Wisconsin – Madison. She was a McKenzie Post-doctoral Fellow at the University of Melbourne. She has received awards from both the US and Australian Orthopedic Research Societies and her work has been funded by government agencies, foundations, and industry partners.