

Friday, May 19th, 2023, 12 PM – 1 PM
Klug Seminar Room, Boelter Hall Penthouse



The Cell Nucleus as a Mechanosensor of Amplified Strain

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ABSTRACT: Knowledge of the mechanics of cells and tissues in their native physiologic environment is critical to understand the conditions that must be replicated when engineering replacement biomaterials. An understanding of the micromechanical environment of healthy tissue will improve the ability to quantify cellular responses to physical stimuli, track the progression of tissue damage or degeneration, and fabricate and evaluate biomimetic biomaterials. My lab is dedicated to the study of multiscale biomechanics, mechanobiology, and regeneration of soft biological tissues, with an emphasis placed on the design of tools to assess diseases of the musculoskeletal and cardiovascular systems. Here, we will present our efforts to implement novel imaging techniques, involving MRI and optical microscopy, to noninvasively describe internal patterns of strain and material properties throughout the volume of tissues and single cells. We will highlight recent achievements, including hybrid methods to characterize deformation in tissues, in addition to challenges for single cell measures in vivo. Preliminary biomechanical data in musculoskeletal and cardiac tissues and single cells, with direct implications for mechanobiology and regeneration, will be presented.

BIO: Dr. Corey Neu received his Sc.B. in mechanical engineering and Sc.M. in biomedical engineering from Brown University in Providence, Rhode Island. He completed his Ph.D. in biomedical engineering at the University of California at Davis. He was a postdoctoral scientist with A. Hari Reddi in the Center for Regeneration and Repair at UC Davis Medical Center, and was co-advised by Kyriakos Komvopoulos in mechanical engineering at the University of California at Berkeley. He was assistant and associate professor in the Weldon School of Biomedical Engineering at Purdue University in West Lafayette, Indiana. He is now the Donnelly Family Endowed Professor of Mechanical Engineering at the University of Colorado Boulder. He will serve as Director of the Program in Biomedical Engineering beginning in summer 2023, and is a Member of the Bio Frontiers Institute.