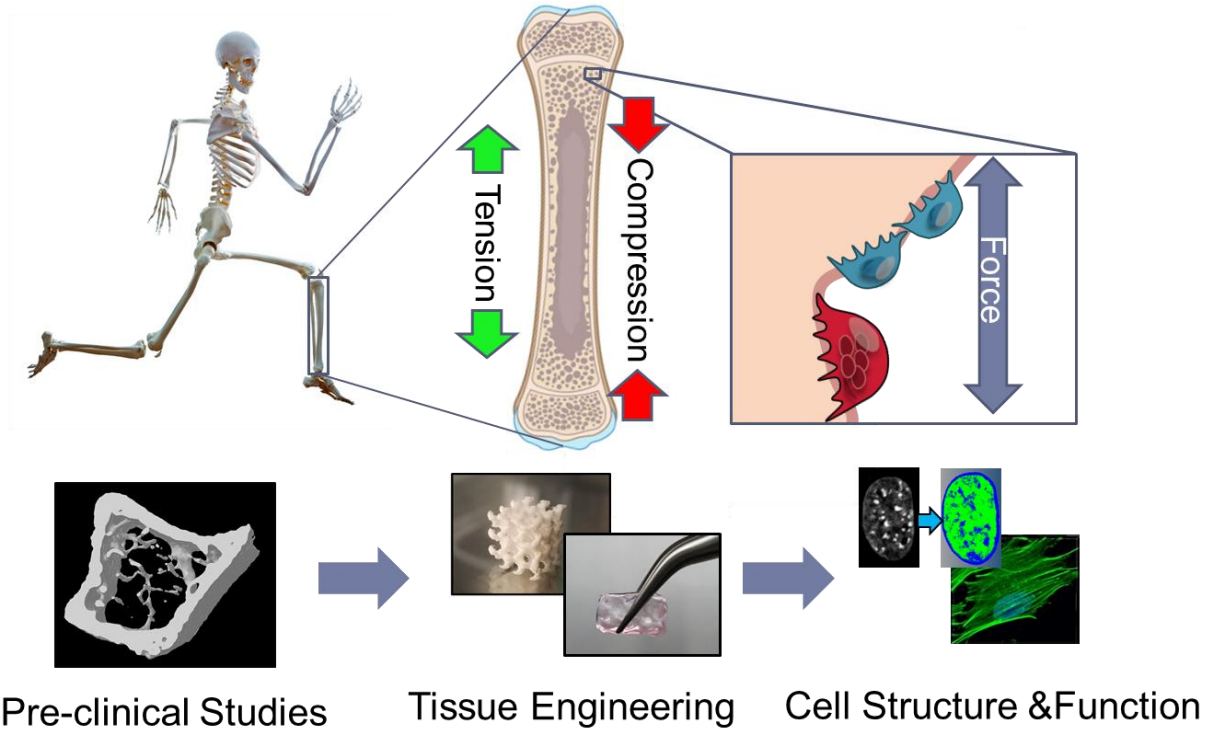
Mechanobiology of Stem Cells in Bone



Sensation of the mechanical qualities of the environment is critical in directing cellular function and, in the case of stem cells, regulating lineage selection. This seminar will focus on the identification of mechanical factors regulating mesenchymal stem cells in the bone marrow that provide regenerative capacity by replacing and reinforcing the skeleton at load bearing sites. The ability of mesenchymal stem cells to respond to mechanical cues generated during functional loading is critical for this capacity. I will discuss my laboratory's findings that how mechanical coupling of nucleus with the cytoskeleton contributes to mesenchymal stem cell mechanosensitivity and fate selection. During the talk I will further highlight major research themes we are pursuing towards understanding cellular and tissue level mechanical adaptations, as well as strategies for treatment and rehabilitation of musculoskeletal impairments at the cellular level.

Dr. Gunes Uzer is an Associate Professor in the Department of Mechanical and Biomedical Engineering at Boise State University. He joined to the department in August 2016. Dr. Uzer is the director of the Mechanical Adaptations Laboratory leading a multidisciplinary research program.

Studies in Mechanical Adaptations Laboratory are directed towards understanding how changes in tissue mechanical environment in relation to exercise, injury, aging and disuse regulate structural adaptations in cells to control signaling and eventually fate decisions in stem cells.