

**FRIDAY, JANUARY 27, Room 206 Egan**



### PROGRAM

10:00 a.m. – 10:45 a.m. Lecture.

10:45 a.m. – 11:00 a.m. Q&A and Discussion

Refreshments will be served

### ABSTRACT

To develop advanced bioengineering technologies and regenerative strategies which improve human health, it is essential to delineate the cell microenvironment extensively. Mechanical cues are an integral part of cell microenvironment, which play a vital role in formation, homeostasis and regeneration of tissues and organs. Mechanics of cell microenvironment include the following factors: 1) forces acting on cells, 2) fluid flow induced shear stress on cells, and 3) translation and rolling of cells in fluids. Dr. Gurkan's research involves understanding the interactions of these factors with cells and applying this fundamental knowledge to develop advanced bioengineered technologies with real-world clinical outcome. The technologies and bioengineered systems developed by Dr. Gurkan have significant impact in the following clinically relevant areas: 1) microphysiological systems and functional tissue models for pharmaceutical and cancer research, 2) cell and tissue engineering for advanced regenerative therapies, and 3) cell-based diagnostics and point-of-care (POC) tests for developed world and resource-limited settings, which will be the focus of this seminar.

In this talk, Dr. Gurkan will present his past and ongoing research in the following areas: 1) Engineering a three-dimensional multicellular functional and mechanoresponsive tissue model of bone formation and regeneration for biomedical research, 2) Mechanostimulation in regenerative medicine: improved healing and closure of large open wounds with mechanically active wound patch, 3) Engineering of microphysiological systems and cell microenvironments for pharmaceutical and cancer research using nano- and micro-scale technologies (*i.e.*, photolithography, non-invasive acoustic and magnetic fields, microfluidics, nanotextured surface assembly), and 4) Microfluidics-based technologies with smart interface materials for specific immobilization, identification, quantification and controlled release of cells in microchips for diagnostics and selective cell isolation, with real-world applications in POC tests and stem cell engineering.

### SEMINAR TITLE

## **Mechanics of Cell Microenvironment in Bioengineering and Regenerative Medicine**

### SEMINAR SPEAKER

**Umut Atakan Gurkan, Ph.D.**

Postdoctoral Research Fellow

Harvard Medical School

Center for Biomedical Engineering



Dr. Gurkan received B.S. degrees in Chemical Engineering and in Mechanical Engineering at Middle East Technical University as a Sabanci Scholar; and a Ph.D. degree in Biomedical Engineering at Purdue University. Dr. Gurkan is currently a Postdoctoral Research Fellow in Medicine at Harvard Medical School and at Division of Biomedical Engineering in Brigham & Women's Hospital. Dr. Gurkan's research interests include: 1) cell mechanics, cellular engineering and regenerative medicine, 2) microphysiological systems and functional tissue models, and 3) cell-based diagnostics for point-of-care.