MECHANICAL ENGINEERING GRADUATE STUDENT SEMINAR SERIES

Sunday, Feb. 7th, 2027 at 12:30, D. Dan and Betty Kahn Building, 1

3D-Printed Micropost Arrays with Stiffness Gradients for Studying Durotaxis in Endothelial Cells

Itamar Givon

Adviser: Prof. Leeya Engel

Many cellular processes such as migration, differentiation, and angiogenesis, are influenced by mechanical cues from the cellular environment. One such cue is extracellular matrix (ECM) stiffness. Cells respond to the ECM stiffness gradient by modulating traction forces, and have been observed to travel from softer to stiffer areas in a process termed durotaxis. However, the stiffness range over which endothelial cells exhibit durotaxis, and the sensitivity of this response to stiffness gradients, remain poorly understood.

In this seminar I will present a platform designed to quantitatively study durotaxis in endothelial cells. by creating a substrate with a stiffness gradient while keeping other properties constant, including surface chemistry, porosity, and surface area. The design I will show is a micropost array with varying post heights, fabricated using two-photon lithography. This advanced 3D-printing technology enables precise variation of micropost height at micron-scale resolution, creating structures that would be challenging to produce using conventional microfabrication techniques. This platform enables characterization of durotaxis across stiffness ranges and gradients of our choosing.

Note: the seminar will be given in English

Seminars Coordinator: Prof. Steven Frankel.