“ENGINEERING CELLULAR MICROENVIRONMENTS”

Tissue Engineering holds great promise to generate functional, living tissues for use as *in vivo* tissue replacements as well as *in vitro* tissue models. It is the interplay of the chosen cell population with physical environment and soluble factors that leads to the production of the desired tissue. Our laboratory is interested in biomaterial platforms for both bone and heart valve tissues that direct cell function through physical properties such as macro and micro-structure, stiffness, and surface chemistry. To address this task, we work to develop new polymeric materials and processing techniques for new types of biomaterial platforms. We also examine cell/material interactions to gain better insight into the interactions that lead to the desired cellular function. Through this work we hope to be able to engineer synthetic environments that precisely control tissue formation.

In this talk, I describe our work examining cells of the aortic heart valve in many varied physical environments and how our results have led to a novel method for induction of aortic heart valve calcification *in vitro*. I will also present a new polymer system that was recently developed in our lab along with novel processing techniques for bone tissue engineering.