

ACMS Applied Math Seminar

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129 Hayes-Healy
3:00 PM**



Baby Steps Towards Living Micromachines

The field of tissue engineering has established to the point where we are now in the position to build living micromachines. Such biomachines can be engineered to function autonomously, can be integrated into humans for regenerative medicine purposes or for body augmentation, or can be used as testing grounds for studying disease pathology and drugs' effectiveness. Two main challenges for achieving such systems are (1) the ability to fabricate arbitrarily complex parts with desired biochemical and mechanical properties while maintaining cell viability and functionality and (2) vascularization, that will allow the components to nourish and communicate with one other. In this talk, I will first give a brief introduction to tissue engineering, and present an overview of some of the biomaterials and fabrication approaches that I have been developing for constructing biomimetic cell-based constructs. Then, I will give specific examples of some of my previous research on engineering cell-based constructs with controlled vascularization, cell-cell communication, cellular orientation and function. Finally, I will conclude with my current research with a focus on electromechanical cell-based biocomputing and on-chip human tissues. Such bio-inspired systems will have impact not only on tissue regeneration applications, but also potentially on emerging fields of research in bioengineering, ranging from bio-robotics to disease modeling.

The Department of Applied and Computational
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