Dr. Stephan Anderson, Boston University Medical Center

Applying Micro- and Nanofabrication Strategies to Biomedical Imaging and Sensing

Abstract: Leveraging the unique strengths of micro- and nanofabrication technologies holds potential for a variety of biomedical imaging and sensing applications. In this talk, the use of these fabrication strategies will be discussed for three distinct applications. First, in the case of Magnetic Resonance Imaging (MRI) contrast agents, the use of top-down approaches to fabricate precisely engineered micro- and nanoscale magnetic structures yields the potential for developing a novel class of contrast agents. Enabling a precisely defined distortion of the local magnetic field, these engineered structures yield the potential of multiplexed imaging using MRI. Second, in the application to cell force analyses, microfabrication strategies may be employed to address certain limitations of conventional approaches. Specifically, through the combination of microfabricated polymeric pillar arrays and a unique, moiré-based readout, incredibly sensitive and efficient cell force sensing is realized. Finally, the use of biologically-templated micro- and nanofabrication approaches may enable unique biosensing platforms. Through the use of diatoms, which are incredibly diverse, unicellular microalgae representing biologically evolved micro- and nanostructured materials, novel fabrication strategies may be realized and applied to photonic biosensing. In these three distinct applications of micro- and nanofabrication technologies, fundamental concepts and motivations, key results, and potential avenues of future inquiry will be discussed.

Bio: Dr. Anderson, an Associate Professor in the Department of Radiology at Boston University Medical Center and Affiliated Associate Professor of Mechanical Engineering, is the Director of Computed Tomography and the Section Chief of Abdominal Imaging. Dr. Anderson's clinical interests lie in the imaging of diffuse liver disease as well as hepatocellular carcinoma and his research is focused on the development of micro- and nanofabrication strategies for biomedical imaging and sensing applications. Dr. Anderson graduated from the University of Maryland with an MD, completed a Diagnostic Radiology residency at Boston University Medical Center, and an Abdominal Imaging fellowship at the Beth Israel Deaconess Medical Center.