Seminar Talk

Makarand Deo, Ph.D.
Assistant Professor
Department of Engineering
Norfolk State University

Tuesday, October 18, 2016
3:00 p.m. KH 224

Title: Cardiac Engineering: Predictive Modeling and Innovative Sensing Devices

Abstract:
Heart disease is the leading cause of death and the number one health issue in the U.S. with an estimated 80 million Americans currently having one or more types of heart disease. The exact mechanisms of several types of heart's electrical disorders, called arrhythmias, are poorly understood, mainly due to inherent limitations of clinical and experimental methods in teasing out various contributing factors in these complex diseases. However, numerical modeling has the potential to provide vital insights into the underlying mechanisms of arrhythmias. This talk provides an overview of mathematical modeling of heart's electrical activity and how it can be used to study various heart disorders. Electrophysiologically and anatomically detailed computer models of heart were developed at various levels of integration, namely, single-cell, 2-dimensional tissue and 3-dimensional heart geometry. These predictive models can also be used as an assistive tool in clinical diagnosis of arrhythmias and designing patient-specific drug therapy. Recent advances in sensing systems and biological data acquisition devices for collecting the electrophysiological data from microscopic heart cells and methods of incorporating the data into predictive computer models will also be presented.

Bio:
Dr. Makarand Deo earned his PhD in Electrical Engineering from University of Calgary, Canada in 2009. His undergraduate and graduate degrees are from University of Pune, and Indian Institute of Technology (IIT) Bombay, India, respectively. After PhD, Dr. Deo joined the reputed Center for Arrhythmia Research at the University of Michigan, Ann Arbor, for his postdoctoral training followed by a research faculty position at the University of Toledo, OH. He is currently an Assistant Professor in the Department of Engineering at Norfolk State University.

Dr. Makarand Deo's research interests are in multiscale computational modeling of complex biomedical systems such as the cardiovascular system, and novel micro-sensing devices for biological applications. He has received several research-related awards including the American Heart Association's Scientist Development Grant and National Science Foundation's EAGER grant. Dr. Deo has a strong publication record in high-impact engineering as well as medical journals.