MEDICAL SIMULATORS FOR CLINICAL SKILLS TRAINING: OPPORTUNITIES AND CHALLENGES

presented by

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Abstract:
There has been an intense interest in medical simulators in the past decade for several reasons: the increase in minimally invasive surgical techniques, novel surgical and medical devices that require skilled or even remote operation, and advances in computing and sensor technologies. Coupled with the interest in medical simulators is the mounting evidence that these “artificial” environments are effective in rehearsing and improving crucial clinical skills that are required for patient care. In my talk, I will provide some historical context for the burgeoning research in medical simulation. Further, examples of documented efficacy of popular simulators like the Fundamentals of Laparoscopic Surgery (FLS) trainer will be discussed. Finally, and perhaps most importantly, I will provide my perspective on key research questions that, in my opinion, require the attention of the current generation of scientists. These insights are based on my work in developing simulators for haptic skills training in laparoscopic surgery, suturing skills assessment and a simulator for training cannulation skills of dialysis nurses and technicians. Among the research questions discussed will be: (1) the need for extracting meaningful metrics from the vast array of sensor data available in modern simulators, (2) methods to address and measure simulator fidelity as a function of clinical task rendered and (3), integration of multiple sensor streams (from multiple sensory modalities) with virtual environments for training clinical skills.

Bio:
Dr. Ravikiran “Joseph” Singapogu is Assistant Research Professor in the Department of Bioengineering at Clemson University and also affiliated with the cross-disciplinary, Institute for Biological Interfaces in Engineering (IBIOE) at Clemson University. He is an Embedded Scholar in the Department of Surgery at the Greenville Health System. Dr. Singapogu graduated with an PhD in 2012, with a doctoral dissertation that focused on the design and testing of a novel haptic device for rendering force (haptic) feedback useful for surgical skills training. Upon graduation, Dr. Singapogu participated In the National Science Foundation’s Innovation Corps (I-Corps) program, exploring the possibility of commercializing the haptic surgical simulation he previously developed. Their team won People's Choice award for best presentation among 27 countrywide teams at a competition in Atlanta. In his role as an Embedded Scholar in a clinical environment, Dr. Singapogu has gained an appreciation for the use and tremendous potential of the role of simulation technology for clinical skills training. His latest funded project is a K01 from the National Institutes of Health to develop a simulator for hemodialysis cannulation.

Friday, October 28, 2016 @ 2:30 pm        McAdams Hall, Room 119

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