****

**CECS Seminar Series**

*Presents*

**Inertial and Bio-potential-based Wearable Computers:**

**Algorithms and Applications**

**Professor Roozbeh Jafari**

Associate professor at University of Texas, Dallas

**Abstract:** Wearable computers bring to fruition many new opportunities to continuously monitor human body with sensors placed on body; whether they are intended to detect an early onset of a disease, assess human performance or determine the effectiveness of a treatment. In the past few years, the community has observed a large number of applications leveraging wearable computers. There are, however, a number of fundamental challenges that need to be addressed before realizing the true ubiquitous use of the wearable computing systems.

In the first half of the talk, we highlight several inertial-based wearable applications including systems capable of monitoring activities of daily living (ADLs) and home exercises for senior citizen. We focus on a class of signal processing algorithms that provide extreme robustness leveraging accelerometers and gyroscopes. We present our results on ADLs and highlight our efforts in line with data dissemination for the scientific community. In the second half of the presentation, we focus on dry-contact electroencephalography (EEG). We present our brain-computer interface (BCI) system developed for intensive care units leveraging dry-contact EEG. We outline several components of EEG systems and focus on skin-electrode contact noise.

We provide techniques for noise reduction including contact reconfiguration along with experimental verifications. We provide concluding remarks on the trends of wearable computing technology development and future directions.

**Biography­­:** Roozbeh Jafari (http://www.essp.utdallas.edu) is an associate professor at UT-Dallas. He received his PhD in Computer Science (UCLA) and completed a postdoctoral fellowship at UC-Berkeley. His research interest lies in the area of wearable computer design and signal processing. His research has been funded by the NSF, NIH, DoD (TATRC), AFRL, AFOSR, DARPA, SRC and industry (Texas Instruments, Tektronix, Samsung & Telecom Italia). He has published over 100 papers in refereed journals and conferences. He has served as the general chair and technical program committee chair for several flagship conferences in the area of Wearable Computers including the ACM Wireless Health 2012 and 2013, International Conference on Body Sensor Networks 2011 and International Conference on Body Area Networks 2011. He is an associate editor for the IEEE Sensors Journal, IEEE Journal of Biomedical and Health Informatics and IEEE Internet of Things Journal. He is the recipient of the NSF CAREER award (2012) and the RTAS best paper award (2011) and the IEEE SMCS best transactions paper award (2014).

**Tuesday, February 12, 2015 - 11:00am to 12:00pm**

Donald Bren Hall 4011