**COLLOQUIUM**

Department of Computer Science and Engineering

University of South Carolina

**Motion Tracking Problems in IoT: Sports, Drones and Wireless Networks**

**Mahanth Gowda**

Date: **February 28, 2017**

Time: **3-4:15pm**

Place: **Swearingen 2A21**

# Abstract

Motion tracking is a broad and classical problem that dates back many decades. While significant advances have come from the areas of robotics, control systems, and signal processing, the emergence of mobile and IoT devices is ushering a new age of embedded, human-centric applications. Fitbit is a simple example that has rapidly mobilized proactive healthcare; medical rehabilitation centers are utilizing wearable devices towards injury diagnosis and prediction. In this talk, I will discuss a variety of (new and old) IoT applications that present unique challenges at the intersection of mobility, multi-modal sensing, and indirect inference. For instance, I will discuss how inertial sensors embedded in balls, racquets, and shoes can be harnessed to deliver real-time sports analytics on your phone. In a separate application, I will show how GPS signals can be utilized to track the 3D orientation of an aggressively flying drone, ultimately delivering the much needed reliability against crashes. I will also show how injecting controlled mobility into conventional wireless infrastructure can open new opportunities in indoor WiFi and outdoor cellular networks. I will end with how arm motions of an individual can be inferred from smartwatch sensors alone, even when her arm and body are moving simultaneously (e.g., dancing). In general, I hope to show that information fusion across wireless signals, sensors, and physical models can together deliver motion-related insights, useful to a range of applications in IoT, healthcare, and cyber physical systems.

**Mahanth Gowda** is a PhD candidate in the Computer Science department at the University of Illinois, Urbana Champaign (UIUC). His research interests include wireless networking, mobile sensing, and wearable computing, with applications to IoT, cyber physical systems, and human gesture recognition. He has published across diverse research forums, including NSDI, Mobicom, WWW, Infocom, Hotnets, ASPLOS, etc. Prior to joining UIUC, Mahanth obtained his M.S. from Duke University, and a B.Tech from Indian Institute of Technology, Varanasi. He has interned at Microsoft Research, IBM Labs, and recently at the wearable computing group at Intel.