

## **Notice and Invitation**

Oral Defense of Master's Thesis

The Volgenau School of Engineering, George Mason University

**Venkata Naga Sai Chaitanya Neelamraju**

Bachelor of Technology, Jawaharlal Nehru Technological University

### **Design of Wearable Knee Angle Sensor**

Friday, August 3, 2018, 10:30am

Engineering Building, Room 4501

All are invited to attend.

### **Committee**

Dr. Lance Sherry, Thesis Director

Dr. Kris Gaj

Dr. Jens-Peter Kaps

### **Abstract**

This thesis describes the design, construction, and testing of a Wearable Knee Angle Sensor (WKAS) device that measures knee flexion angle designed for operation in various competitive sports. The goal is to design a rugged wearable (i.e., low weight, low profile) sensor that can be worn in game situations in contact sports. The sensor can be used for performance assessment (e.g., leg motion while sprinting) and for injury prevention (e.g., leg motion leading to specific injuries). An analysis of alternate sensor options was conducted leading to selection of a Flex-Sensor. The WKAS was configured with a Flex Sensor mounted in a sensor-sleeve behind the knee that is attached to a knee sleeve. An Arduino was used to collect and process the data and store it on an SD card. The data from the SD card can then be downloaded and analyzed in visualization software developed in MATLAB. The accuracy of the sensor was assessed, and future improvements are proposed.