

## **HSCI RESEARCH SEMINAR SERIES SCHOOL OF HEALTH SCIENCES**

### **“STICKER-LIKE ELECTRONICS (STICKTRONICS) FOR WEARABLE BIOMEDICAL DEVICES”**

**Chi Hwan Lee**

Assistant Professor

Weldon School of Biomedical Engineering (75%)

School of Mechanical Engineering (25%)

Department of Speech, Language, and Hearing Sciences (Courtesy)

Tuesday, September 25, 2018

ME 2061

4:30 p.m.

**Abstract:** Advanced materials engineering and processing technologies provide means to realize a range of mechanically flexible, ultrathin bio-integrated electronics, opening up a new prospect in many biomedical devices and technologies. The mechanical flexible and ultrathin characteristics allow the devices to intimately integrate with biological systems such as biological cells, organs, and skins at their length scale. The embedded semiconducting nanomaterials provide the functionalities that can monitor the clinically useful bio-signals with sufficient spatial and temporal controls. This presentation will introduce two different kinds of novel transfer printing methods by exploiting controlled ‘cracks’ that enable the physical separation of diverse bio-electronics from their original fabrication silicon wafer, thereby can be utilized in many wearable and implantable biomedical applications. Conformal skin-mountable sensors and cell-injectable silicon nano-needles will be discussed to show the representative applications in wearable healthcare monitoring and intracellular drug delivery. Discussions about the results of detailed experimental and theoretical studies will be followed to reveal the essential attributes of the materials, mechanics, fabrication processes, and system configurations.

**Bio:** Dr. Chi Hwan Lee is an Assistant Professor at Purdue University, with joint appointments in the Departments of Biomedical Engineering & Mechanical Engineering. He serves as a Primary Faculty Member in the Center for Implantable Bioelectronics, the Center for Scalable Manufacturing, and the Birck Nanotechnology Center at Purdue University where his main research focus lies on developing wearable biomedical devices. He obtained a Ph.D. degree in Mechanical Engineering from Stanford University in 2013, and received a B.S. degree in Mechanical Engineering from Illinois Institute of Technology in 2007. He is the recipient of Top Innovation Award (2013) from the Technology Connect World National Innovation Summit, Purdue Faculty Award of Research Excellence (2017), Purdue Faculty Summer Grant Award (2017), Hanwha Advanced Materials Non-tenured Faculty Award (2018), and Ralph W. and Grace M. Showalter Research Trust Award (2018).

Host: Dr. Jae-Hong Park

