



**MATERIALS SCIENCE  
& ENGINEERING**  
UNIVERSITY OF MICHIGAN

## Materials Science & Engineering presents



### Chi Hwan Lee

Assistant Professor

Weldon School of Biomedical Engineering

School of Mechanical Engineering

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

Purdue University

**Friday, April 12**

**10:30 a.m. • 1670 Beyster**

### Sticker-like Electronics (Sticktronics) for Wearable Biomedical Devices

Advanced materials engineering and processing technologies provide means to realize a range of ultrathin, flexible and stretchable bio-integrated electronics, opening up a new prospect in many biomedical devices and technologies. The mechanical flexibility and stretchability 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- or tissue-injectable silicon nano-needles will be discussed to show the representative applications in wearable healthcare monitoring and intracellular/intratissue 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 flexible and stretchable materials for wearable biomedical devices. He obtained a Ph.D. & M.S. degrees 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, Graduate Silver Award from Materials Research Society (2013), 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).