



Department of  
Mechanical Engineering  
The University of Hong Kong



## SEMINAR

### **Soft Robots Meet Bioelectronic Interfaces: Deployment of an electrocorticography system assisted with a soft robotic actuator**

**Date:** 4 August, 2023 (Friday)  
**Time:** 4:00 p.m. (Hong Kong Time)  
**Venue:** Online Zoom only

**Speaker:** Dr. Sukho Song  
Group Leader  
Laboratory of Sustainability Robotics  
Empa (Swiss Federal Laboratories for Materials Science and Technology)

#### Join Zoom Meeting

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#### Abstract:

Electrocorticography (ECoG) is a minimally invasive approach frequently used clinically to map epileptogenic regions of the brain and facilitate lesion resection surgery, and increasingly explored in brain-machine interface applications. Current devices display limitations that require trade-offs between cortical surface coverage, spatial electrode resolution, aesthetic, and risk consequences, and often limit the use of the mapping technology to the operating room. In this talk, I report on a scalable technique for the fabrication of large-area soft robotic electrode arrays and their deployment on the cortex through a square centimeter burr hole using a pressure-driven actuation mechanism called eversion. The deployable system consists of up to six pre-folded soft legs and it is placed subdurally on the cortex using an aqueous pressurized solution and secured to the pedestal on the rim of the small craniotomy. Each leg contains soft, microfabricated electrodes and strain sensors for real-time deployment monitoring. In a proof-of-concept acute surgery, a soft robotic electrode array was successfully deployed on the cortex of a minipig to record sensory cortical activity. This soft robotic neurotechnology opens promising avenues for minimally invasive cortical surgery and applications related to neurological disorders such as motor and sensory deficits.

**Biography:**

**Sukho Song is a group leader in the Laboratory of Sustainability Robotics at Empa (Swiss Federal Laboratories for Materials Science and Technology) in Switzerland and a visiting researcher in the Aerial Robotics Laboratory at Imperial College London in the UK. Previously, he was a postdoctoral researcher at the Reconfigurable Robotics Laboratory and the Laboratory for Soft Bioelectronic Interfaces at EPFL. He obtained his Ph.D. in the department of mechanical engineering at Carnegie Mellon University, USA in 2017. During his studies, he was also a research associate in the Physical Intelligence Department at the Max Planck Institute for Intelligent Systems, Germany. He received his undergraduate degree in Aeronautics and Space Engineering and master's degree in Nanomechanics at Tohoku University, Japan in 2005 and 2007, respectively. Dr. Song's research interest is design and manufacturing of multi-scale soft robots that combine microscale features with a larger scale soft robotic architecture for new functionalities. Application areas of interest include, but not limited, soft bioelectronic interfaces for nervous system, electronics-free control of soft robots, bioinspired soft adhesion, and biohybrid robots.**

**ALL INTERESTED ARE WELCOME**

**For further information, please contact Dr. J.T. Kim at 3917 2631.**