



## **Department of Materials Science and Engineering Seminar Series 2023**

### **Self-powered and Sustainable Flexible Sensors for Healthcare and Robotics**

**Jingyi Yang**

**Date and time: 22 Dec. 2023 (Friday), 3.30 pm**

**Venue: EA-06-04**

### **Abstract**

Flexible sensors have attracted significant attention recently, due to their potential applications in healthcare monitoring, human-machine interaction, and other areas. Flexible sensors with sensitive environmental detection abilities, also provide substantial advantages by allowing customization with diverse properties tailored to specific applications. With the rapid development of flexible sensors, there is a growing intention towards sustainability to reduce electronic waste and minimize energy requirements. In this thesis, four different flexible sensors with excellent self-power abilities and sustainable properties were designed. First, a fully recyclable and transparent flexible sensor with simultaneous thermal and tactile sensations for robotic skins, was assembled by ionic thermoelectric hydrogel and triboelectric encapsulation. Second, a recyclable and stretchable triboelectric patch was designed to differentiate textiles, assisted by machine learning. Third, a reusable and self-powered 3D pressure sensor cube based on an electromagnetic mechanism was developed for underwater sensing. Last, a degradable and battery-free 2D magnetic patch was explored for health monitoring. These diverse designs show the potential of flexible sensors for a more convenient and sustainable future.

### **Biography**

Yang Jingyi received her B. Sc degree from Southern University of Science and Technology in 2019. She is currently a Ph.D. candidate under the supervision of Assoc. Prof. Benjamin Tee. Her research focuses

on developing sustainable flexible devices with multiple sensing abilities for health monitoring and artificial robotics.

**Please join us!**

HOST: Dr Colin Woods