

**DEPARTMENT OF MECHANICAL ENGINEERING****SEMINAR****Online**

Title: Emerging Designs for Polymer-Based Optoelectronics and Wearables

Speaker: Dr. Tse Nga Tina Ng
Department of Electrical and Computer Engineering
University of California San Diego
USA

Date: 24 February, 2021 (Wednesday)

Time: 11:00 a.m. (Hong Kong Time)

Zoom meeting: 1) Link to join the meeting:

<https://hku.zoom.us/j/92616236190?pwd=MnJRMEJBVE9rTS85a3JPcTYwd0pvUT09>

2) Meeting ID: 926 1623 6190

3) Password: 025392

Abstract:

Rapid, on-site assessment is highly desirable in the fields of both medical treatment and novel robotics. To achieve this goal, our research aims to develop low-cost, flexible, large-area sensor devices for different health applications. In this presentation, we discuss case studies for two different point-of-use applications:

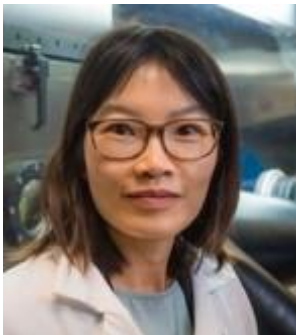
- 1) **Physiological measurement.** Cardiovascular monitors are being developed using organic photosensors responsive to the short wavelength infrared (SWIR) spectra. Currently conventional SWIR sensors are limited by complex die transfer and bonding processing. Here we are advancing SWIR photodiodes by using a new generation of semiconducting polymers that are processed by solution processing techniques and allow simple direct deposition. The bulk heterojunction photodiodes show photo-response

spanning from the visible to 1.7 micron. We develop a physical model to pinpoint the origins of efficiency losses by decoupling the exciton dissociation efficiency and charge collection efficiency, and identify avenues that will improve sensor detectivity. Several demonstrations will show the various potential applications of organic SWIR photodiodes including blood pulse measurements, spectroscopic identification, and image reconstruction.

- 2) **Motor skills characterization.** There is no objective metric for evaluating motor skill training progress, and current assessments rely on qualitative surveys. We have fabricated an instrumented glove with touch sensors on textile for motor characterization. This glove could find future use for characterizing motor skills of people suffering from autism, Parkinson's disease, and other neurological motor disorders.

Biography:

Dr. Tse Nga Tina Ng is an Associate Professor in the Department of Electrical and Computer Engineering at University of California San Diego (UCSD), USA. Her research focuses on devices and fabrication methods for flexible printed electronics: <http://flexible-electronics.ucsd.edu/> She received her PhD in Physical Chemistry under the supervision of Professor John Marohn at Cornell University. Subsequently she worked at Palo Alto Research Center before joining UCSD in 2015. Her work on printed systems has received the 2012 Innovation Award from Flextech Alliance, named Runner-up for the Wall Street Journal Technology Innovation Award, and received second place in the 2017 Bell Lab Prize and is named a Hartwell Investigator in 2017. She is on the Editorial Board of the journal Flexible Printed Electronics and ACS Applied Electronic Materials.



ALL INTERESTED ARE WELCOME

For further information, please contact Dr. P.K.L. Chan at 3917 2634.

Research area: Energy