THE UNIVERSITY OF HONG KONG

DEPARTMENT OF MECHANICAL ENGINEERING

SEMINAR

Online

Title: Flexible Multichannel Neural Probe Developed by Electropolymerization for Localized Stimulation and Sensing

Speaker: Mr. Chik Kwok Ki (MPhil candidate)
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Date: 26 April, 2022 (Tuesday)

Time: 2:30 p.m. (Hong Kong Time)

Zoom meeting:

1) Link to join the meeting:

https://hku.zoom.us/j/99806065543?pwd=VWVoWmhsYitqTmRYVGFadENTS0xDdz09

2) Meeting ID: 998 0606 5543

3) Password: 963284

Abstract:
Miniaturization and minimization of mechanical mismatch in neural probes have been two well-proven directions in suppressing immune response and improving spatial resolution for neuronal stimulations and recordings. While the high impedance brought by the miniaturization of electrodes has been addressed by using conductive polymers coatings in multiple reports, the stiffness of such coatings remains orders of magnitude higher than that of the brain tissue. Here, a flat neural probe based on a highly flexible microelectrode array with electrodeposited hydrogel coatings poly(2-hydroxyethyl methacrylate) (pHEMA) and conductive polymer poly(3,4-ethylenedioxythiophene) polystyrene sulfonate (PEDOT/PSS), with a cross-section area at only 300 μm × 2.5 μm is presented. The PEDOT/PSS coating provides a low interfacial impedance, and the pHEMA deposition bridges the mechanical mismatch between the probe and the brain tissues. The two layers of polymers modification enhance the signal-to-noise ratio and allow the microelectrodes array to be engineered for both recording and stimulation purposes. Besides, in vivo testing of microelectrode arrays implanted in rat hippocampus confirms a high senstivity in neural signal recording and excellent charge injection capacity which can induce long-term potentiation in neural activities in the hippocampus. The probes provide a robust and low-cost solution to the brain interfaces problem.

ALL INTERESTED ARE WELCOME
For further information, please contact Dr. P.K.L. Chan at 3917 2634.

Research area: Advanced Materials