



Department of
Mechanical Engineering
The University of Hong Kong



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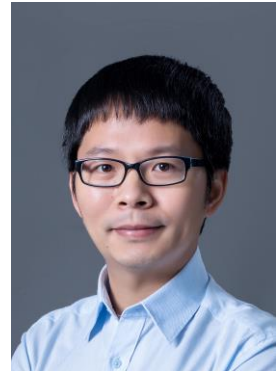
Adaptive neural interface materials and devices

Date: 15 August, 2024 (Thursday)

Time: 11:30 a.m. – 12:30 p.m.

Venue: Room 7-34 & 7-35
Haking Wong Building
HKU

Speaker: Professor Xuemin Du
Institute of Biomedical and Health Engineering
Shenzhen Institute of Advanced Technology
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Abstract:

Neural interface technologies have gained significant attention for their ability to address neurological conditions such as blindness, depression, and Parkinson's disease. Despite extensive progress, they still face challenges in establishing seamless integration between the implanted devices and living tissues. These devices often have two-dimensional flat structures that fail to match the three-dimensional morphology of tissues, leading to ineffective information interaction. Moreover, the surfaces of these devices always lack cell affinity, thereby causing inflammation responses and the final loss of information transmission function. To overcome these challenges, we propose a new strategy that integrates intelligent polymers with implanted neural electrodes to achieve unique bio-adaptivity. By adjusting the macro-geometry of the intelligent polymer-based electrodes, we can ensure a macro-morphological match with tissues. By rationally modulating the micro-geometry of the intelligent polymer-based electrode surfaces, we can enhance the biocompatibility with tissues. Furthermore, we explore the potential applications of these bio-adaptive devices in the treatment of neurological diseases.

Biography:

Xuemin Du is a full professor at Shenzhen Institute of Advanced Technology (SIAT), Chinese Academy of Sciences (CAS), where he is also the Director of Center for Intelligent Biomedical Materials and Devices (IBMD). His research interests cover mainly intelligent polymers, bio-adaptive interfaces, and smart wearable and implantable devices (*e.g.*, soft sensors & actuators, tissue engineering scaffolds, bioelectronics). He has published high impact articles in *Science Advances*, *Matter*, *Advanced Materials*, *Device*, *ACS Nano*, *Advanced Functional Materials*, *The Innovation*, *National Science Review*, etc. He was awarded the National Science Foundation of China's Excellent Young Scientists in 2020, the RSC *Nanoscale* Emerging Investigator in 2021, Nano Research Young Innovators (NR45) in 2023, and Outstanding Member of Youth Innovation Promotion Association of CAS in 2024, etc. Currently, he is the deputy Editor of *Research and Advanced Bionics*, and also serves on the editorial boards of numerous esteemed international journals, including *The Innovation*, *National Science Open*, and *BMEMat*.

ALL INTERESTED ARE WELCOME

For further information, please contact Prof. M. Wang at 3917 7903.