

九州大学  
先導物質化学研究所講演会  
科研費基盤S 19H05627

# Mind the gap: challenges when interfacing biology with electronics

令和5年 12月12日 (火) 10:30-12:00  
伊都地区先導物質化学研究所  
1Fセミナー室 (ハイブリッド)

参加URL

<https://us04web.zoom.us/j/74453001886?pwd=kLoRX4KIOu9zzFpbFJ71Pro1iW5YeM.1>

ミーティング ID: 744 5300 1886

パスコード: 9HVuDE

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## Abstract:

Neural electrodes are the primary functional elements of neuroelectronic devices designed to record and electrically stimulate. Our main research topics are the design and characterization of neuron-interface interactions, and the development of flexible neural interfaces for in vivo and in vitro applications.

Microelectrode arrays (MEAs) are typically used to interface neurons with electronic devices. However, there is an urgent need for improvements in the strength of signal detection, precision of neural modulation and biocompatibility. On the one side we are developing nanomaterial-based MEAs with advantageous physical and chemical properties that also lead to improved cell-electrode coupling. In particular, we have designed a combination of vertical nanostraws with nanocavities, resulting in stable, non-invasive and long-term recording with sub-threshold resolution. On the other side we are using surface plasmon resonance microscope (SPR) to investigate the interface between electrode and neurons in real time (in the imaging mode) and measure the distance between the cell membrane and the gold surface (in the scanning mode). Both these measurements work in situ and without chemical labeling.

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