

# 化学部門特別講演会

演題：**High throughput nanopore chip and its applications in nanopore sequencing and DNA lesion sensing**

講師：**Shuo Huang 教授**

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日時：2018年8月2日(木)16:30~18:00

場所：北海道大学 理学部 7号館 7-310 室



講演内容：

Protein nanopores such as  $\alpha$ -haemolysin and *Mycobacterium smegmatis* porin A (MspA) can potentially be used to sequence long strands of DNA quickly and at low cost. To provide high-speed sequencing, large arrays of nanopores are required that allow the nanopores to be individually addressed, but current nanopore sequencing methods rely on ionic current measurements and such methods are likely to prove difficult to scale up. Here we show that, by optically encoding the ionic flux through protein nanopores, the discrimination of nucleic acid sequences and the detection of sequence specific nucleic acid binding events can be parallelized. We make optical recordings at a density of  $\sim 10^4$  nanopores per  $\text{mm}^2$  in a single droplet interface bilayer. Nanopore blockades can discriminate between DNAs with sub-pico ampère equivalent resolution, and specific miRNA sequences can be identified by differences in unzipping kinetics. By creating an array of 2,500 bilayers with a micropatterned hydrogel chip, we are also able to load different samples into specific bilayers suitable for high-throughput nanopore recording. The high throughput optical nanopore chip may thus benefit our recent work in DNA lesion detection and nanopore sequencing.

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