LiMe
医生物学研究所
Institute for Life and Medical Sciences
Kyoto University

7th nanobiofluids seminar

2024 November 12th, 10:30-12:00

Conference room (Room 134), Bldng No.1 **https://www.infront.kyoto-u.ac.jp/en/access/**

Zoom registration

Molecular imaging using optics-free spatial DNA networks

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Abstract: Spatial-omics methods seek to resolve the spatial locations of biomolecules like mRNA or proteins without optics, using instead spatial information encoded in DNA sequences. Current methods relying on printed array-based spatial omics methods depend on acquiring a spatial reference map prior to biomolecule capture and sequencing, involving either top-down assignment of spatial positions via array-printing or in situ sequencing on random arrays. Sequencing-based microscopy is an emerging alternative to which seeks to embed recoverable spatial information in the topology of DNA barcode networks, formed through self assembly in the sample or space of interest in 2D or 3D. Networks able to communicate spatial information exhibit spatial coherence, or a correlation between topological and Euclidean distances. Sequencing-based microscopy methods offer a novel route toward image formation, potentially circumventing limitations such as the requirement of planarity in classical optics or array based spatial omics.

Biography: Ian Hoffecker is originally from the US and studied chemical engineering at the University of Colorado Boulder and Carnegie Mellon University. Dr. Hoffecker is of partial Japanese descent, and from 2011-2014, he moved to Japan and conducted his doctoral studies developing cell-interfacial control technologies at Kyoto University, Department of Polymer Chemistry, at the Institute for Frontier Medical Sciences under the supervision of Prof. Hiroo Iwata. Dr. Hoffecker did his postdoctoral work in DNA origami nanotechnology at Karolinska Institutet, Stockholm, Sweden. And in 2021, he started an independent group at KTH Royal Institute of Technology, Stockholm, Sweden as leader of the Molecular Programming Group, focused on applying concepts from classical computation to develop new technologies in molecular contexts with life sciences applications.

Host: Hirofumi Shintaku, shintaku@infront.kyoto-u.ac.jp