



Time: 10:00am, 14 Oct (Fri) Venue: ERB1122 and on Zoom

Seminar Link:

<https://cuhk.zoom.us/j/95763168103?pwd=Mys2ZWhtZE51SjRiRkNFdzJUU1VIUT09>

Toward a complete map of the whole brain with serial electron and light imaging techniques



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Abstract

Electron microscopy (EM) is a powerful tool to resolve ultrastructure in biological specimens. However, it had been limited to small regions of interest and lacked the capability of in-depth 3D imaging. In recent years, the technique called serial sectioning scanning electron microscopy (ssSEM), assisted with the automated tape-collecting ultramicrotome (ATUM) and large-scale image segmentation based on deep learning algorithms, was developed to produce real 3D images of large volumes. EM-compatible optical imaging method, i.e. the optical multilayer interference tomography (OMLIT) was further developed to generate fused brain maps with serial EM approaches. Here we will introduce the related techniques and demonstrate how it empowers the reconstruction of big and complicated brain networks, eventually the whole brain of mouse, at ultrahigh resolution.

Biography

Dr. Ruobing Zhang is currently a full professor of Biomedical Engineering at the Suzhou Institute of Biomedical Engineering and Technology (SIBET), Chinese Academy of Sciences. He is also appointed as an adjunct professor and group leader of the Institute of Artificial Intelligence, Hefei Comprehensive National Science Center, China. Dr. Zhang has been working as faculty in developing and applying imaging technologies to brain studies. His research interest revolves around the question of how mammalian brain circuits are wired and physically altered by experience or by diseases. This work involves the development of novel techniques such as serial sectioning scanning electron microscopy (ssSEM), optical multilayer interference tomography (OMLIT), and deep learning-based algorithms to automatically segment and reconstruct massive image data. Dr. Zhang got his B.S. from Peking University at 2004 and his Ph.D. in Biophysics from the University of Illinois at Urbana-Champaign at 2010. He then worked as a postdoctoral fellow in Jeff Lichtman lab at Harvard University until he joined the SIBET in 2017. He has authored many scientific research papers, and served as reviewers for leading academic journals. He has also been selected to the Hundred Talents Program and the Young Scientist Team in Fundamental Research of Chinese Academy of Sciences, as well as the Award of Innovation and Entrepreneurship of Jiangsu Province.

***** ALL ARE WELCOME *****

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