Curriculum Vitae

Name
Bi-Chang Chen

Current Position
Research Fellow

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Education & Professional Experiences

Department of Chemistry and Biochemistry, The University of Texas at Austin, Austin, TX, USA

Research Interests

Developing lightsheet imaging technique at high spatiotemporal resolution via single molecule localization and expansion microscopy.

Selected Publications

Tian, X.; Lin, T.-Y., L; Lin, P.-T., Tsai; M.-J., Chen, H.; Chen, W.-J.; Lee, C.-M.; Tu, C.-H.; Hsu, J.-C.; Hsieh, T.-H.; Tung, Y.-C.; Wang, C.-K.; Lin, S.; Chu, L.-A.; Tseng, F.-G.; Hsueh, Y.-P., Lee, C.-H.; Chen, P.; **Chen, B.-C.*** "Rapid lightsheet fluorescence imaging of whole Drosophila brains at nanoscale resolution by potassium acrylate-based expansion microscopy", ***Nature Communications,*** 15, 10911 DOI:10.1038/s41467-024-55305-8 (2024)

Lee, C.-M., Tian, X., Tsao, C., Chen, P. Huang T.-N., Hsueh,Y.-P., **Chen, B.-C.***, "Macro Photography with Lightsheet Illumination Enables Whole Expanded Brain Imaging with Single-cell Resolution", ***Discoveries Journals*** , Jul-Sep, 9(3):e133 DOI:10.15190/d.2021.12 (2021)

Chu, L.-A., Lu, C.-H., Yang, S.-M., Liu, Y-T, Feng, K.-L., Tsai, Y.-C., Chang, W.-K., Wang, W.-C., Chang, S.-W., Chen, P.; Lee, T.-K., Hwu, Y.-K., Chiang, A.-S. *; and **Chen, B.-C.***, "Rapid single-wavelength lightsheet localization microscopy for clarified tissue" ***Nature Communications***, 10, 4762, DOI: 10.1038/s41467-019-12715-3 (2019)

Lecture Title
Beyond the diffraction limit by LightSheet Microscopy

Abstract (500 words maximum)

By combining the intrinsic optical sectioning with wide-field detection, lightsheet microscopy allows fast imaging speeds to record multi-megapixel imaging of the selected plane in a single exposure. In order to break diffraction limit, coupled with structural illumination, we are now able to achieve final lateral and axial resolutions of 130 nm and 200 nm, respectively. On the other hand, one could combine the advantage of localization microscopy and lightsheet microscopy to have super-resolved cellular or deep-tissue imaging in 3D across large field of view. With densely labeled spontaneous blinking fluorophore, these allow us to construct 3D super-resolution multi-cellular imaging at high speed (~minutes) by lightsheet localization microscopy. Moreover, expansion microscopy (ExM) was invented to detour the optical diffraction limit by physically expanding the samples to ~80x larger than original with swellable polymer and lightsheet microscopy enables imaging such large specimens rapidly at high spatial and temporal resolution.