Keynote speech (II)

Visualizing Memory: The Next Generation Connectomics

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Location:
Time: Sept. 13 16:15-17:15

Abstract

Understanding dynamic change in information flows in the brain requires a map of neural structures at all levels, similar to those of Google Earth for continents, countries, cities, and streets. Using methodology for nano-to-microscale imaging, I propose a practical approach for mapping neural structures, ranging from single molecules to the whole brain in *Drosophila*. I will discuss how the multiscale connectome leads us to define cell type, predict information flow, manipulate target neuron and visualize memory protein. By cracking the physical engram of a small *Drosophila* brain, we aim to learn how the brain changes decision making based on past experience. I will also discuss our strategy of using multiscale imaging for mapping human connectome.

Selected recent publications:

Chu LA#, Lu CH#, Yang SM, Liu YT, Feng KL, Tsai YCh, Chang WK, Wang WC, Chang SW, Chen P, Lee TK, Hwu YK, Chiang AS*, Chen BC* (2019) Rapid single-wavelength lightsheet localization microscopy for clarified tissue. **Nature Communications** 10: 4762.

Shih HW, Wu CL*, Chang SW, Liu TH, Sih-Yu Lai J, Fu TF, Fu CC, Chiang AS* (2015) Parallel circuits control temperature preference in *Drosophila* during ageing. **Nature Communications** 6: 7775.

Shih CT*, Sporns O, Yuan SL, Su TS, Lin YJ, Chuang CC, Wang TY, Lo CC, Greenspan RJ, Chiang AS* (2015) Connectomics-based analysis of information flow in the *Drosophila* brain. **Current Biology** 25: 1249-1258.

Lin HH, Chu LA, Fu TF, Dickson BJ, Chiang AS* (2013) Parallel neural pathways mediate CO_2 avoidance responses in *Drosophila*. **Science** 340: 1338–1341.

Chen CC, Wu JK, Lin HW, Pai TP, Fu TF, Wu CL, Tully T, Chiang AS* (2012) Visualizing long-term memory formation in two neurons of the *Drosophila* brain. **Science** 335: 678–685.