UNIVERSITY OF TORONTO | Department of Cell & Systems Biology

Postdoctoral Position

Application of Advanced Microscopy for whole-brain neural recording

Lin Lab of Systems Neuroscience, University of Toronto, Toronto, Canada

In the last two decades, neural recording tools have transformed from monitoring a few neurons to large-scale neuronal populations, while the pursued questions have extended from sensorimotor representation to more complex functions. Simultaneously, computational approaches have evolved from a representation framework to a dynamic perspective to construct brain state transitions, while perturbation methods, such as optogenetics, have been improving sensitivity and precision to address causality.

Adopting these advances, Lin Lab features whole-brain neural recordings of behaving animals and quantitative and optogenetic tools to understand the neural mechanisms underlying cognition and behaviors. The central question of Lin Lab is – how does the brain produce adaptive, flexible behavior?

We take a multi-disciplinary and holistic (systems) approach to answer this question. We combine whole-brain neural imaging and computational tools on behaving animal models in virtual realities to study the neural mechanisms underlying cognition and behaviors at the systems level. To access the whole brain with single-cell resolution at a high speed, we work with the zebrafish model and state-of-art optical neurotechnology. Our approach is to develop data-driven computational models (such as machine learning & dynamical systems) that can explain and predict behaviors from neural activity.

Position

1. Maintain and operate the Thorlabs Multiphoton Mesoscope (the first one in Canada)
2. Assist neuroscientists in the lab to build devices of zebrafish behavioral paradigms
3. Develop cost-effective microscopes for large-scale neural recordings in zebrafish

Qualifications

1. Highly motivated and goal-driven, with an interest in neuroscience
2. Ph.D. in physics, optics, or electrical engineering; hands-on experience with optics
3. Programming skills in MATLAB or Python with hardware
4. Experience with nonlinear dynamics, machine learning, and complex systems is a plus

How to Apply

Potential candidates should contact Qian Lin neuroqian.lin@utoronto.ca with these application materials: a cover letter about research interest and plans; a CV; contact information for two reference letters. For more information: https://lin.csb.utoronto.ca/

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