Department of Psychology
The University of Hong Kong
香港大學心理學系

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Departmental Seminar

Towards a (New Kind) Foundation Model of Intelligence

Prof. Xiao-Jing Wang
Distinguished Global Professor of Neural Science and Mathematics
Center for Neural Science
New York University

4:30p.m. – 5:30p.m.
Room 1103-1104, 11/F
The Jockey Club Tower
Centennial Campus
The University of Hong Kong

Abstract

Here I will eschew the conventional format of a research talk. Instead, to stimulate brainstorming, I'll ask questions and identify challenges in our efforts to develop a new kind of foundation model for intelligence, namely connectome-based large-scale brain circuit modeling instead of large language models (LLMs). First, I will highlight the prefrontal cortex (PFC) as a quintessential example of "cognitive-type" neural systems in contrast to sensory or motor systems. Second, I will discuss training recurrent neural networks (RNNs) for PFC-dependent cognitive processes such as multitasking and learning-to-learn. Third, I will summarize a parallel line of research on the development of connectome-based multiregional modeling of the neocortex. Finally, I will propose an integration of these two approaches (connectome-based modeling and training RNNs). A focus on complex sequences would allow us to probe the mechanisms and computational algorithms of abstraction, syntax, compositionality, recursiveness, etc underlying thinking and mental programming. This will be done in close collaboration with experimentalists. Among impactful deliverables will be a connectome-based foundation model of the primate brain capable of many tasks underlying fluid intelligence, which represents a central goal of NeuroAI.

About the Speaker

Xiao-Jing Wang is Distinguished Global Professor of Neural Science at New York University, with a PhD in Theoretical Physics. Previously he was Professor at Yale University School of Medicine. Using theory and computational modeling, Dr. Wang's research focuses on neural circuit mechanisms of cognitive functions such as decision-making, with a special interest in the prefrontal cortex which plays a central role in intelligence and executive control of behavior. He is one of the founders of the nascent field of Computational Psychiatry. More recently, his group developed connectome-based modeling of large-scale brain circuits to investigate whole-brain dynamics and distributed cognition. His research bridges neuroscience, artificial intelligence and psychiatry. Dr. Wang is a recipient of Alfred P. Sloan Research Fellowship, Guggenheim Fellowship, Swartz Prize for Theoretical and Computational Neuroscience, Goldman-Rakic Prize for Outstanding Achievement in Cognitive Neuroscience, and he was elected to the Royal Academy of Belgium. Dr. Wang's H-index is 108, the total number of citations=51,757 as of today. He was recognized as Highly Cited Researcher by Clarivate Analytics, Web of Science Group in 2021 and 2024. He is the author of "Theoretical Neuroscience: Understanding Cognition" published by CRC/Taylor & Francis (2025), 561 pages. Currently he is a visiting professor at Stanford University.

Zoom Meeting (For participants who couldn't attend the Seminar in person)

https://hku.zoom.us/j/95140839431?pwd=hW0QoALgfVbaSUW1fOdHyCSQjnaJeZ.1
Meeting ID: 951 4083 9431 | Password: 030705

~ All are Welcome ~

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