

From Data to Modelling: Exploration At the Whole Brain Scale with Possible Clinical Applications



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Date: May 30, 2023 (Tuesday)

Time: 4:00 – 5:30pm

Venue: OEE1017, HSH Campus



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ABSTRACT

We will first present some of our recent results on tackling brain disorders with the aim to establish nonlinear association, prediction, subtype, and spatio-temporal pattern analyzing for data ranging from genetic, MRI imaging and phenotypes. With the aid of AI algorithms (usually developed by ourselves), the analyzing above is usually carried out at the whole brain scale (data-driven approach) to avoid possible bias. Possible clinical applications are mentioned. A digital twin brain (DTB) platform including the whole brain for human (86 B neurons), monkey and zebrafish (100,000 neurons) is established to simulate the activity both in the resting-state and in action. The activity of the DTB at voxel level shows a correlation coefficient of 0.9 with its biological counterpart in the resting state. We also test the DTB in actions including visual and auditory tasks. Finally, we are working on developing the DTB platform for brain-machine interfaces (DBS for example) and applications in other brain disorders.

BIOGRAPHY

Professor Jianfeng Feng is the chair professor of Shanghai National Centre for Mathematic Sciences, the Dean of Brain-inspired AI Institute in Fudan University, and the dean of the School of Data Science. He has made considerable contributions on developing brain-inspired AI algorithms and applying them to tackle challenges raised in neuroscience and mental health with many publications in Nature Medicine, Nature Human Behaviour, Nature Aging, Nature Mental Health etc. He led the development of the world first human Digital Twin Brain. He was awarded the prestigious Royal Society Wolfson Research Merit Award, and invited to deliver 2019 Paykel Lecture at the Cambridge University.