THE CHINESE UNIVERSITY OF HONG KONG
Department of Information Engineering
Seminar

From multiscale data to digital twin brain

by
Prof. Jianfeng Feng

University of Warwick, UK / Fudan University, China

Date : **28 March 2025 (Friday)**
Time : **3:00pm – 4:00pm**
Venue : **Rm 833, Ho Sin Hang Engineering Building, CUHK**

Abstract

AI and proteomics are recently believed as facing a revolutionary phase and could fundamentally change our understanding of diseases (brain disorders). Using one of the typical mental disorders and AD as examples, we explore the etiology of the disease with genomic, proteomic and other type of omic data and novel AI algorithms. The discoveries subsequently enable us to subtype various diseases and then develop different treatment strategies in TMS and drug therapy. Some further developments aiming to integrate micro-, meso- and macroscopic data results are discussed. Furthermore, equipped with the knowledge we have about the brain, we developed a model of the whole human brain at the neuronal level (digital twin brain, DTB): 86B neurons and 100T synapses(parameters). Examples on applying DTB to medical applications are included. Finally, we developed a mathematical approach termed moment neuronal network to tackle many issues raised in DTB.

Biography

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 Cell, Nature Medicine, Nature Human Behaviour, Nature Aging, Nature Mental Health etc. He led a team to implement for the first time in the world the digital twin brain which has 86B neurons and 100T parameters. He was awarded the 2023 Humboldt Research Award, prestigious Royal Society Wolfson Research Merit Award, and invited to deliver 2019 Paykel Lecture at the Cambridge University.

** ALL ARE WELCOME **

Host: Prof. XING Guoliang (Tel: 3943-8474, Email: guoliang@ie.cuhk.edu.hk)
Enquiries: Information Engineering Dept., CUHK (Tel.: 3943-8385)