THE HONG KONG POLYTECHNIC UNIVERSITY
香港理工大學

UBSN
University Research Facility in Behavioral and Systems Neuroscience
神經科學中心實驗室

UBSN Capacity Building Scheme: Inbound Scheme

UBSN Research Seminar

Imaging Infant Brain Development: Multimodal Data Collection, Analysis, and Modeling

Reschedule of the seminar

Date: **26th September, 2025 (Friday)**
Time: **10:00 am -12:00 noon**
Venue: **Room Z206, PolyU**

- ***All are welcome***
- ***Register through the QR code***

(Limited seats available on a first-come first-served basis.)

Speaker

Dr. Han ZHANG

Associate Professor
School of Biomedical Engineering
ShanghaiTech University

Abstract:

As a key component of the nation-level “China Brain Initiative” Projects, the Chinese Baby Connectome Project (CBCP) aims to establish a large-scale (n>1000), longitudinal cohort dedicated to investigating healthy brain development in Chinese infants. Currently, the project is collecting unprecedented, comprehensive datasets from infants aged 0 to 6 years, encompassing: multimodal and quantitative infant brain magnetic resonance imaging (MRI), electroencephalography/event-related potentials (EEG/ERP), behavioral assessments, environmental exposures, and genetic information. The novel protocols, techniques, and tools developed through CBCP will significantly advance research into early-life language acquisition, cognitive development, and social-emotional maturation.

This talk will share insights from the CBCP, focusing on infant brain imaging practices, multimodal image analysis workflows, and preliminary brain developmental atlases/curves constructed with novel artificial intelligence (AI) techniques. Specifically, the presentation will first introduce the core design of the CBCP protocol, followed by a detailed overview of the project’s dedicated analysis pipelines for structural, functional, and diffusion MRI data. Subsequently, several generative AI models developed for infant MRI denoising, super-resolution, and 4D data imputation will be discussed, along with an individualized brain development prediction model built on graph learning algorithms. The talk will conclude with preliminary findings comparing fine-grained brain development patterns between Chinese infants and Western populations.

Biography:

Dr. Han Zhang earned his Bachelor of Science (BS) in Electronic Engineering from Zhejiang University and his Doctor of Philosophy (PhD) in Cognitive Neuroscience from Beijing Normal University. He completed postdoctoral training and later served as an Assistant Professor at the University of North Carolina at Chapel Hill before joining the School of Biomedical Engineering at ShanghaiTech University. Dr. Zhang’s research group specializes in infant multimodal neuroimaging, data analysis, modeling, and individualized developmental assessment using deep learning and other advanced AI technologies. He currently serves as the Principal Investigator (PI) leading the Chinese Baby Connectome Project (CBCP), the largest cohort study focused on infant brain imaging in China. The overarching goal of CBCP is to unravel the neural mechanisms underlying early brain development, with the long-term aim of enabling early diagnosis of developmental disorders such as Autism Spectrum Disorder (ASD).

For enquiry, please contact Dr. Patrick Yeung (Tel: 2766 7773; Email: patrick-kk.yeung@polyu.edu.hk)