



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

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Departmental Seminar

Artificial Intelligence and Brain Stimulation in Depression: From Adaptive Cognition to Treatment-Related Change



Dr Nan Qiu

Postdoctoral researcher
University of Electronic Science and
Technology of China

11:00a.m. – 12:00n.n.

Room 715, 7/F

The Jockey Club Tower

Centennial Campus

The University of Hong Kong

Abstract

AI offers new opportunities to integrate behavioral and neurobiological information for treatment-relevant prediction and adaptive intervention. However, a prerequisite is to identify cognitive and neural features that capture meaningful variation and are sensitive to clinical change. Real-world environments are dynamic, with useful regularities coexisting with uncertainty and change. Adaptive cognition therefore depends on learning from experience while flexibly updating attentional priorities and decision criteria. Our work used statistical learning and environmental volatility to characterize these processes through behavioral, electrophysiological, eye-tracking, network, and computational measures. In MDD, patients showed impaired use of learned regularities and altered neural dynamics of attentional control. Subsequent iTBS work showed clinical improvement accompanied by changes in evidence accumulation and suppression-related neural activity. Together, these findings suggest how AI could refine adaptive cognitive testing, integrate multimodal signals, and evaluate treatment-sensitive features, ultimately linking cognitive assessment to response prediction and adaptive brain stimulation in depression.

About the Speaker

Nan Qiu (PhD in Psychology, Ludwig-Maximilians-Universität München, Germany) is a postdoctoral researcher at the University of Electronic Science and Technology of China, jointly supervised by Prof. Dezhong Yao at UESTC and Prof. Benjamin Becker at The University of Hong Kong. Her research focuses on cognitive dysfunction and emotional regulation in affective disorders, integrating EEG/ERP, brain-network analysis, computational modeling, and fMRI-guided rTMS to identify mechanistically informed targets for cognitive and neuromodulatory interventions. Her current work focuses particularly on depression, while her broader research examines cognition and brain function in healthy individuals and those with psychiatric disorders, with the aim of developing mechanism-based, individualized neuromodulation strategies. She has published more than 20 peer-reviewed articles, including first-author work in Psychotherapy and Psychosomatics, Translational Psychiatry, Journal of Affective Disorders, PLOS Computational Biology, and Psychophysiology.

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

<https://hku.zoom.us/j/92433364675?pwd=JVC1Fu5Np6ds2CxqItycMqzog7kJtR.1>

Meeting ID: 924 3336 4675 Password: 633529

~ All are Welcome ~

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