The Hong Kong Polytechnic University
Department of Applied Mathematics

Seminar

Brain cognition and neuropsychiatric disorders: implications of network segregation and integration

By

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Abstract

Brain is a complex network, embedded with multiple functional communities. Segregated system enables the brain to activate specific areas for simple cognitive stimulus, and to release other areas to perform more general cognitive processes. But the brain also needs to integrate information of different communities to generate higher-order cognitive functions. Thus, functional segregation and integration are two basic processes in the brain, which are closely related to cognitive behaviors and neuropsychiatric disorders. In this lecture, I will introduce our eigenmode-based framework to analyze brain functional segregation and integration across multiple levels, and discuss how this framework can be utilized to study several mechanisms of brain cognitive abilities and neuropsychiatric disorders. Comparing to classically graph-based technique at a single level, our method is more effective in relating brain to cognition and clinical symptoms.

Bibliography

Dr. Rong Wang received his BS and PhD in mechanics from Xi’an Jiaotong University. In 2017, he joined the school of science in Xi’an university of science and technology as an associate professor. In 2020, he received the excellent doctoral dissertation of Shaanxi province and was funded by the Hong Kong Scholars Program. His research interest is the complex brain network, large-scale dynamic model, cognition and brain disorders. In recent years, he and collaborators developed the eigenmode-based method to analyze complex networks. Related works have been published in Physical Review Letters and PNAS. (Currently visiting School of Science, Hong Kong Baptist University as a Post-doc researcher.)