NEURO GLOBAL Seminar

Date & Time

Friday, June 5, 2026
17:15 – 18:45 (including Q&A)

Speaker

Keiichi Kitajo, PhD

Professor, Division of Neural Dynamics, Department of System Neuroscience, National Institute for Physiological Sciences, Physiological Sciences Program, Department of Advanced Studies, SOKENDAI
Visiting Professor, Tohoku University

Title

Understanding Individual Differences in the Human Mind through EEG Metastable Synchrony Networks

Venue

Lecture Room, Graduate School of Life Sciences,
/ Life Sciences Project Research Laboratory [D04] 1F, Katahira Campus
生命科学研究科講義室 (生命科学プロジェクト総合研究棟 [D04] 1F 片平キャンパス)

https://www.tohoku.ac.jp/map/ja/?f=KH_D04

Format On-site

【Neuro Global生・[先進] 脳科学セミナーシリーズEx】【NGP students, [Advanced] brain science seminar series Ex】1 point
【医学系研究科・医学履修課程】国際交流セミナー【Medical Science Doctoral Course】 International Interchange Seminar 1回分
【生命科学研究科・イノベーションセミナー（留学生）、単位認定セミナー】【Innovation seminar, Credit-granted seminar】2 points

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NEURO GLOBAL
Tohoku University

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Seminar

Title

Understanding Individual Differences in the Human Mind through EEG Metastable Synchrony Networks

Abstract

The human brain is not a static information-processing device, but a highly dynamic system. Even at rest, brain activity continuously changes over time, showing rhythmic oscillations, synchronization among brain regions, and transitions between different activity patterns. These dynamics are thought to support networks that mediate perception, cognition, behavior, and individual differences in the human mind.

In this talk, I will introduce our research on large-scale EEG dynamics in the human brain, with a particular focus on metastable synchrony networks. Metastability refers to a dynamical property of the brain in which neural activity does not remain fixed in a single stable state, but instead transiently visits multiple coordination patterns over time. This property may allow the brain to balance stability and flexibility, thereby supporting adaptive information processing.

I will discuss how metastable EEG synchronization dynamics are related to individual differences in psychological traits, including autism spectrum traits. Our findings suggest that the way brain networks dynamically synchronize and reorganize over time may reflect, and possibly contribute to, differences in cognition, behavior, and personality. I will also briefly discuss how this perspective may provide insights into the pathophysiology of psychiatric and neurological disorders.

Finally, I will introduce our recent data-driven computational neuroscience approach, which combines EEG data with mathematical modeling using data assimilation. This method allows us to estimate hidden neural states and physiological parameters from observed brain activity. Through these studies, I will discuss how nonlinear dynamics, network neuroscience, and computational modeling can help us better understand the human brain, the human mind, and brain disorders.

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