

The behavioral relevance of time-varying functional connectivity

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It is now well-established that brain functional connectivity during an awake, task-free state largely reflects ‘intrinsic’ operations that are independent of current behavioral state. Recent studies reveal that functional connectivity fluctuates spontaneously on short time-scales (e.g. seconds), spawning growing interest among neuroimaging researchers in characterizing time-varying connectivity in health and disease. These connectivity dynamics are on similar time scales as ongoing fluctuations in mental and behavioral states such as mind-wandering, sensory replay, vigilance and attention. Therefore it is important for researchers to understand which aspects of dynamic resting-state connectivity reflect purely intrinsic operations, and which reflect spontaneous fluctuations that directly encode or impact a subject’s current behavior and experience. Demonstrating the behavioral relevance of time-varying functional connectivity is also a crucial step in establishing the validity of neuroimaging tools (e.g. fMRI) in assessing ongoing brain-network dynamics.

In these talks, we will introduce novel findings that demonstrate the relevance of spontaneous fluctuations in functional connectivity to ongoing behavior and experience. Using novel, diverse approaches, each speaker will describe how the monitoring of behavioral and cognitive processes in subjects at “rest” challenges the view that spontaneous network dynamics reflect purely intrinsic operations.

Dynamic changes in functional connectivity supporting memory consolidation

Arielle Tambini, University of California, Berkeley, CA, United States

Quasiperiodic patterns, infraslow brain activity and task performance

*Shella Keilholz, Georgia Institute of Technology and Emory University School of Medicine
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The role of intrinsic functional connectivity dynamics in perception

Sepideh Sadaghiani, University of Illinois Urbana-Champaign, Champaign, IL, United States

Tracking spontaneous attentional fluctuations in dynamic functional connectivity

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