Bocconi

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Room 2-E4-SR03
Via Röntgen 1, Milan, 2° floor

Connectome-based modeling of a multiregional brain: Distributed dynamics and cognitive modularity

Speaker

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Abstract

With technological advances in connectomics and neurophysiology, studies of whole-brain circuits have come to the fore. Recent observations of widespread information processing and memory storage have raised questions about functional specialization in the brain, which I will address using large-scale modeling of cortex based on connectomic data for monkeys and mice. I will highlight macroscopic gradients of synaptic excitation and inhibition as a general principle of the cortical organization; and discuss findings ranging from a hierarchy of timescales to distributed working memory and simple decision-making. This line of work suggests that a new concept dubbed "bifurcation in space" can explain functional modularity compatible with distributed neural representations in the neocortex that is made of repeated canonical local circuits à la Kevan Martin and Rodney Douglas.

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