

# **Modulating functional brain systems with non-invasive brain stimulation**

## **Organizer:**

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Brain networks dynamically reconfigure across multiple timescales, both spontaneously and in response to non-invasive brain stimulation, to support cognition or due to brain injury and disease. In all these circumstances, functional neuroimaging combined with network science has become a popular approach to map changes in time-resolved functional connectivity. This symposium brings together four internationally recognised experts in the analysis of dynamic functional brain connectivity and network reconfiguration, as applied to investigate the neural mechanisms of non-invasive brain stimulation (Cocchi and Stagg), cognitive training (Bassett) or brain injury and disease (Zalesky). Our speakers will use the language of networks to describe how focal perturbations in brain activity (e.g., due to transcranial stimulation) can selectively propagate to distant but functionally related brain regions, demonstrate the utility of functional neuroimaging combined with network science as framework to map dynamic changes in functional connectivity and give examples of these approaches in neuroscience and clinical practice. Attendees will gain an understanding for the neural mechanisms thought to underpin popular non-invasive brain stimulation techniques and learn best practices for designing functional neuroimaging experiments and analyses to investigate dynamic changes in functional connectivity following brain stimulation, cognitive training or brain injury and disease. The focus of the symposium will be on whole-brain, data-driven approaches.

Why this topic is timely: Time-resolved analysis of functional neuroimaging data, particularly as a proof-of-mechanism for non-invasive brain stimulation techniques, has gained significant prominence in the last few years. Updating the neuroimaging community about recent advances in brain stimulation and best practices for mapping dynamic changes in functional brain connectivity resulting from stimulation is therefore timely and appeals to a broad cross-section of attendees. Our symposium appeals to both methodologists focussed on mapping network dynamics and neuroscientists interested in understanding recent developments in non-invasive brain stimulation and network plasticity.

## **Understanding and modulating long-range functional connectivity using MR imaging and non-invasive brain stimulation**

*Charlotte Stagg, University of Oxford, Oxford, United Kingdom*

## **Using non-invasive brain stimulation to study the emergence of interactions across the visual hierarchy**

*Luca Cocchi, Queensland Brain Institute, Brisbane, Australia*

## **Reconfiguration of brain networks in support of cognition**

*Danielle Bassett, University of Pennsylvania, Philadelphia, PA, United States*

## **Reconfiguration of brain networks in support of cognition**

*Andrew Zalesky, University of Melbourne, Melbourne, Australia*