

The added value of simultaneous multimodal recordings in neurosciences

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Importantly, simultaneous recordings permit to have access to the exact same brain activity, which is not guaranteed with different sessions. Moreover, they open new venues in the analysis of data, in particular using spontaneous fluctuations of activity on one modality in order to inform the analysis of another modality, while offering the avenue of elegant and promising new data analysis strategy through multimodal fusion approaches. Simultaneous recordings, as for instance EEG/MEG, EEG/fMRI, EEG/fNIRS or PET/fMRI, offer unique perspectives to further understand neurovascular coupling processes in physiological and pathological conditions, functional network organization at different temporal and spatial scales, with the ability to shed light on quite promising and largely unknown processes such as resting state functional connectivity.

For this workshop, we aim at presenting the main rationale for choosing multimodal simultaneous recordings when addressing a specific question in neurosciences. What are the main advantages but also the inherent additional challenges associated to these approaches? We will provide an overview of some of the latest promising developments in this field of multimodal neuroimaging research, covering diverse modalities (EEG, MEG, NIRS, fMRI, PET), focusing on the additional value of simultaneous recordings to capture a global dynamic and multimodal understanding of brain activity.

Simultaneous recordings of MEG, EEG and intracerebral EEG

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Mapping brain networks with high density EEG and fMRI

Serge Vulliémot, Hôpitaux Universitaires de Genève, Genève, Switzerland

Monitoring of neurovascular coupling processes using simultaneous EEG/fNIRS recordings

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PET-fMRI: Analysis of brain connectivity on multiple scales

Hans Wehr, Department of Preclinical Imaging and Radiopharmacy, Werner Siemens Imaging Centre, University of Tuebingen, Tubingen, Germany