Electromagnetical Neuroimaging

Organizers:
Thomas Koenig
University Hospital of Psychiatry Bern, Bern 60, Switzerland

Laura Astolfi
Department of Computer, Control, and Management Engineering, University of Rome "Sapienza", Rome, Italy

Neuroimaging is becoming increasingly multimodal, and the integration of hemodynamic, electromagnetic, structural and behavioral data is offering insights unavailable to a single method alone. For conclusions to converge across modalities, the analysis strategies must however contain sufficient conceptual and statistical vigor. Aim of this educational course is to give a critical introduction to the available theories, models and methods to analyze multichannel electromagnetic data recorded from the human scalp in an unambiguous, explicit and coherent way. Particular care is given to present methods that offer explicit junctions to other imaging modalities, allowing converging and/or complementary conclusions.
In addition, there is a rapidly increasing demand for non-invasive human neuroimaging tools to be applicable in translational research. Electromagnetic signals, and in particular the EEG, are exceptionally suitable to be used at the patients' bedside, in critical clinical conditions, or outside hospitals, and their low cost also makes them a prime instrument under economically constrained conditions. The teachers of the course and the content of their presentations will promote a sound methodological basis for the global audience attracted to the OHBM meeting to conduct neuroimaging where the usage of large and expensive scanners is not feasible.

Course Schedule
8:00- 8:45
Basics of electromagnetic field mapping
Thomas Koenig, University Hospital of Psychiatry Bern, Bern 60, Switzerland

8:45-9:30
Scalp field dynamics of evoked and spontaneous EEG
Christoph Michel, Department of Neuroscience, University of Geneva, Switzerland

Blind Source Separation of Electrophysiological Data
Scott Makeig, *Swartz Center for Computational Neuroscience, University of California San Diego*
La Jolla, CA, United States

10:15 – 11:15
Break

11:15-12:00
Baselines and state dependent processing
Daniel Brandeis, Department of Child and Adolescent Psychiatry, University of Zürich
Zurich, Switzerland

12:00-13:00
Lunch

13:00-13:45
Confronting noninvasive measures to intracerebral EEG
Christian-G. Bénar, *INSERM, Aix-Marseille Université, Marseille, France*

13:45-14:30

Estimation of cortical connectivity in the source space: general principles, practical considerations and future perspectives

Laura Astolfi, Department of Computer, Control, and Management Engineering, University of Rome "Sapienza", Rome, Italy

14:30-15:15

Non-invasive imaging of cortical electric neuronal activity for the localization of function and for connectivity inference

Roberto Pascual-Marqui, Kansai Medical University, Osaka, Japan

15:10-15:30

Break

15:30-16:15

Multimodal Brain Databases and Model Driven Information Integration

Pedro Valdes-Sosa, *Cuban Neuroscience Center, Havanna, Cuba*

16:15-16:30

Wrap up and Discussion