Real-time fMRI: Fundamental Principles for Clinical Applications

Organizer:
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While there is a large interest in real-time fMRI (rtfMRI), its potential as a clinical neurotheraputic tool has remained largely un-realized. Part of the problem is there is still a relatively small number of groups who have access to rtfMRI capabilities and a framework for designing clinically focused experiments. The aim of this course is to increase the community of rtfMRI researchers by decreasing the learning curve required for entry into clinically-focused use of rtfMRI. This research area is inherently appealing, but knowing how to get started can be overwhelming. This course will cover the fundamental technical requirements and approaches for rtfMRI. Additionally we will focus on the potential that rtfMRI has to be used as a clinical neuroimaging tool in diagnosis, monitoring of disease, tracking of therapeutic response, and as a neurofeedback treatment. This will include a discussion of potential psychiatric and neurological targets, the experimental flexibility provided by rtfMRI (within the biophysical constraints of BOLD fMRI), as well as pitfalls and limitations of existing studies, including control conditions and sample sizes.

Course Schedule:
13:00-13:30
Technical Aspects of Real-Time fMRI
Nikolaus Weiskopf, Department of Neurophysics, Max Planck Institute for Human Cognitive and Brain Sciences, Leipzig, Germany

13:30-14:00
Real-time processing and analysis of fMRI data
Rainer Goebel, Maastricht University, Netherlands

14:00-14:30
Multivoxel pattern-based real-time fMRI
Stephen LaConte, Virginia Tech, Roanoke, VA, United States

14:30-15:00
Learning control over brain networks using connectivity-based neurofeedback
Yury Koush, EPFL, Lausanne, Switzerland

15:00-15:30
Break

15:30-16:00
Clinical applications of real-time fMRI neurofeedback
David Linden, Cardiff University, Cardiff, United Kingdom

16:00-16:30

fMRI neurofeedback and its potential for stroke rehabilitation

Cassandra Sampaio-Baptista, FMRIB, University of Oxford, Oxford, United Kingdom