

Advances in Neuroscience and Clinical Research using Ultra-High Speed fMRI

Organizer:

Stefan Posse

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This symposium brings together leading experts who are at the forefront of the development and application of ultra-high speed fMRI data acquisition and statistical analysis, which have increased temporal resolution of fMRI to time scales on the order of 100 ms and faster. This symposium aims to highlight major advances in neuroscience and clinical research made possible by unprecedented increases in temporal resolution and sensitivity using these high-speed fMRI to map task-based activation and the temporal dynamics of brain-states. Ultra-high speed fMRI methods are now gaining widespread acceptance in the brain imaging community and are expected to replace conventional fMRI methods in selected applications, such as resting state fMRI.

The topic of this workshop is timely as there is rapidly increasing need for faster and more sensitive data acquisition methods to map functional connectivity in distributed networks in the context of the Connectome Project and related endeavors. The symposium will discuss the utility of ultra-high speed fMRI for selected applications, highlight the potential for future advances and discuss the physiological basis of novel contrast in ultra-high speed fMRI.

Learning Objectives:

1. Identify neuroscience and clinical applications that will benefit from the use of ultra-high speed fMRI.
2. Understand the capabilities and limitations of different ultra-high speed fMRI methods, and their hardware requirements
3. Have an awareness of statistical analysis approaches that take into consideration autocorrelations in the data and high-frequency physiological noise.

Presurgical mapping of task based and resting state network dynamics using ultra-high-speed fMRI

Stefan Posse, University of New Mexico, Department of Neurology, Albuquerque, NM, USA

Functional neuroimaging applications of generalized inverse imaging (GIN)

Rasim Boyacioglu, Radboud University Nijmegen, Donders Institute for Brain, Cognition and Behaviour Nijmegen, Netherlands

Measurement of dynamic fast functional activity using MR-Encephalography

Pierre LeVan, University Medical Center Freiburg, Medical Physics, Freiburg, Germany

Pushing Speed and Squeezing Resolution of fMRI

David Feinberg, Advanced Technologies, UC Berkely Helen Wills Neuroscience Institute, Berkley, CA, USA