Functional ASL: Perfusion based functional MRI using arterial spin labeling

Organizer:
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ASL techniques have been around for over twenty years but have not been widely adopted by the community because of the technical challenges they pose. Additionally, the community of ASL users was largely fragmented until recently because of the many variants of the technique, which created a great deal of confusion among those investigators trying to adopt ASL. While the field has ample experience and expertise with BOLD imaging, ASL is still in the fringes of the community although it is rapidly gaining popularity.

Fortunately, recent developments in ASL acquisition and processing schemes as well as greater consensus in the community have greatly overcome those challenges, putting ASL in a position to be a very powerful tool for mapping human brain function.

Given these circumstances, this is the right time to offer the community a short course that covers all the key aspects of ASL techniques, from labeling and acquisition schemes to pre-processing and quantification.

It is our hope to provide the audience of this course the theoretical foundation of the technique as well as a set of tools and guidelines for collecting and analyzing ASL data.

Learning Objectives:
1. To understand the physics and physiology of arterial spin labeling (ASL)
2. To understand the statistical analysis tools necessary to detect and quantify brain activity using ASL
3. To understand what sort of studies are best and worst suited for ASL imaging.

Target Audience:

The target audience is composed of neuroscientists and psychologists with an interest in using perfusion as a marker for brain activity.

The target audience also includes statisticians and engineers with an interest in developing and implementing ASL acquisition and processing schemes.
Course Schedule:
8:00-8:30  
The basics of arterial spin labeling  
*Matthias Gunther, Institute for Medical Image Computing, Bremen, Germany*

8:30-9:00  
Modeling and Quantification  
*David Thomas, University College London, London, United Kingdom*

9:00-9:30  
Blood flow, blood Volume, oxygen consumption and the BOLD effect  
*Alberto Vazquez, Ph.D., University of Pittsburgh, Radiology and Bioengineering, Pittsburgh, PA, United States*

9:30-10:00  
Statistical Analysis of functional ASL images  
*Daniel Rowe, Marquette University, Milwaukee, WI, United States*

10:00-10:30  
Break

10:30-11:00  
Artefacts and pre-processing in ASL  
*Gregory Lee, PhD, Cincinnati Children’s Hospital Medical Center, Cincinnati, OH, United States*

11:00-11:30  
Applications of ASL in neuroscience  
*Luis Hernández-García, University of Michigan, Ann Arbor, MI, United States*

11:30-12:00  
How can I use ASL? An interactive panel discussion  
*Laura Parkes, Dr, Imaging Sciences, School of Cancer and Enabling Sciences, The University of Manchester, Manchester, United Kingdom*