

## **Diffusion MRI imaging for brain connectivity analysis: principles and challenges**

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Magnetic resonance (MR) imaging is the reference imaging modality both for functional and structural study of the human brain. Diffusion MR imaging allows measuring the water diffusion properties in every voxel of a volume. When considering the white matter of the brain, this low level information allow to infer higher-level information, namely about the orientation of the neuronal fiber bundles, and therefore about brain connectivity as a whole. In this talk we will first give a brief introduction to the physical phenomenon of diffusion and the different scenes used to measure it by MR imaging. Then we will discuss the signal and image processing challenges that need to be addressed to provide the neuro-scientific community with advanced methods for global macroscopic brain connectivity analysis from diffusion MR imaging.