

Rapid Brain MRI: *more speed and more information*

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This talk will focus on a number of innovative rapid MRI acquisition methods aim to help address important brain function issues in Healthcare and Health science. The study of subtle changes in brain function and structure is limited by the inefficiency of MR image encoding and the limited sensitivity of MR detection. Here a number of rapid and efficient acquisition methods will be described including Simultaneous MultiSlice (SMS) with blipped-CAIPI, Wave-CAIPI and compressed sensing. These techniques have been specifically designed to make full use of highly sensitive cutting-edge hardware such as massively parallel receiver array, ultra-high field MRI and the “Connectome” system with ultra high gradient strength. Such acquisition technologies have enabled an unprecedented order of magnitude gain in speed and sensitivity of brain MRI acquisitions. This talk will describe a few brain imaging areas that these technologies have already had a big impact, including *(i)* diffusion and fMRI acquisitions for Connectomics, *(ii)* Rapid anatomical brain imaging, *(iii)* Quantitative Susceptibility Mapping (QSM) and *(iv)* Magnetic Resonance Fingerprinting (MRF).