Title: Brain Function Research Using Arterial Spin Labeling Perfusion MRI and Brain-Behavior Mapping

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Abstract: Arterial spin labeling perfusion MRI is a non-invasive technique for measuring cerebral blood flow or brain perfusion. Because perfusion is tightly coupled with brain metabolism, measuring perfusion through ASL MRI provides a non-invasive way to directly assess regional brain function. To perform ASL-based research, one needs both an ASL MRI sequence and a post-processing tool. Over the past decade, our group has been working on both areas and developed several methods. In this talk, I will introduce some of our work in both directions. It will cover the parallel imaging reconstruction work, 3D background suppressed fast spin echo spiral readout ASL imaging sequence, post-processing pipeline, our recent work in ASL + deep machine learning. In addition to ASL, our group has been intensively working on neuroimaging analysis to identify novel brain activity patterns that are related to brain function or disease. In the end, I will briefly introduce a new brain activity pattern mapping method: brain entropy mapping. I will show a few translational projects using this method in brain disorders including addiction, depression, and schizophrenia.

About the speaker: Ze Wang, PhD, IEEE Senior Member. Dr. Wang's research focuses on MR technique development, image processing, biosignal processing, neuroimaging in Alzheimer's Disease and drug addiction. His recent research interest also includes brain modulations and deep machine learning. Dr. Wang got his PhD from Shanghai Jiao Tong University in 2003 and his post-doc training by Dr. John A Detre at the University of Pennsylvania (Upenn). He was a Research Assistant Professor at Upenn from 2009-2014, and then a Principal Investigator and Professor of Center of Cognition and Brain Disorders in Hangzhou Normal University from 2014-2016. He is now an Associate Professor of Radiology in University of Maryland School of Medicine. He has published 96 peer-reviewed journal papers mostly as the first author, corresponding author, last author, or sole author. His H-index is 36. Dr. Wang has developed 4 software packages: 3D Fast spin echo spiral readout ASL perfusion MRI sequence and online reconstruction program, ASL signal processing toolbox(ASLtbx), Brain entropy mapping toolbox (BENtbx), multivariate-lesion symptom mapping toolbox (SVR-LSM). All are freely available from https://cfn.upenn.edu/~zewang. In 2005, Dr. Wang has been awarded with the 2005 Shanghai Excellent Thesis Award, and the Nomination Award of 2005 National 100 Excellent PhD Thesis. He has been a board member or associate editors for several international journals.