

Title: Quantitative Susceptibility Mapping for Quantifying Biomarkers, Removing Artifacts and Revealing Magnetic Source behind Hypointensity and Phase in MRI by Solving the Field to Source Inverse Problem

Speaker:

Professor Yi Wang
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Time: 3:30 pm

Venue: Room 603, Chow Yei Ching Building

Abstract:

In MRI, the susceptibility inhomogeneity so far has been regarded as a source of artifacts, such as causing hypointensity in the gradient echo imaging. Traditional methods for quantification of biomarkers or contrast agents in MRI are based on the T1/T2 relaxation, which fail as T1/T2 quench when contrast agents aggregates and are frequently prone to large errors inherent in the conversion from signal intensity to contrast agent concentration. We propose to make use of the magnetic field information in the typically ignored phase data in MRI to generate quantitative susceptibility mapping (QSM) by solving the magnetic field to susceptibility source inverse problem. This QSM removes blooming artifacts in T2* hypointensity and SWI and blurring in R2* map, and enables accurate quantification of biomarkers with magnetic susceptibility such as iron, calcium, deoxyhemoglobin, gadolinium.

Biography of the speaker:

Yi Wang received his B.S. degree in 1986 in Nuclear Physics from Fudan University, Shanghai, China, and Ph.D. degree in 1994 in Medical Physics from University of Wisconsin, Madison, USA. Then he completed a postdoctoral fellowship and became an Assistant Professor at Mayo Clinical Medical School. In 1997, he joined the faculty of Medical School of Cornell University as Director of Magnetic Resonance Imaging (MRI) Research Laboratory. Currently Dr. Wang is a Fellow of American Institute for

Medical and Biological Engineering, Director of Cardiovascular MRI Research Laboratory, Director of Biomedical Engineering Program at Weill Medical College Campus, the Faculty Distinguished Professor of Radiology and Biomedical Medical Engineering at Cornell University.

Dr. Wang's major research interests have been in the area of MRI technology development and clinical and biological applications, particularly cardiovascular MRI. His work includes the cardiac navigator motion correction method that forms the foundation for high resolution cardiac MRI, time resolved MRA and bolus chase peripheral MRA that have become routinely used in clinical practice. Recently, his group has developed an accurate segmentation method that enables automatic analysis of large image data, and the quantitative susceptibility mapping approach to tissue magnetic property imaging that opens a new field of MRI with applications including quantitative mapping of nanoparticles in molecular imaging and brain iron deposits.

Organizer: Prof. E. X. Wu