University of Wisconsin-Madison
Medical Physics Seminar
Monday, March 27, 2017
1309 HSLC — 4:00 PM

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Molecular Imaging with Spins:

A Path to High Resolution through Subspaces

MR spectroscopic imaging (MRSI or spatially-resolved MR spectroscopy) has been recognized as a powerful tool for label-free molecular imaging of biological systems but clinical and research applications of this technology have been developing very slowly. Conventional MRSI methods represent the desired spatiospectral function as a vector in a very high-dimensional space. As a result, the number of spatiospectral encodings required for decoding (or image reconstruction) can be huge, resulting in long data acquisition time, or poor spatial resolution, or low signal-to-noise ratio. It can be justified that the spatiospectral functions of real biological systems reside in a very low-dimensional subspace. This property can be effectively utilized to significantly accelerate MRSI experiments and achieve high resolution. In this this talk, I will discuss our recent advances in MRSI data acquisition and processing and show some exciting preliminary results we have obtained.

Biography:

Zhi-Pei Liang is the Franklin W. Woeltge Professor of Electrical and Computer Engineering at the University of Illinois at Urbana-Champaign (UIUC). He also co-chairs the Integrative Imaging Theme of the Beckman Institute for Advanced Science and Technology at UIUC. Dr. Liang's research covers spin dynamics, image formation theory, algorithms, and biomedical applications. Work from his research group has received a number of recognitions, including the Sylvia Sorkin Greenfield Award (Medical Physics, 1990), an NSF CAREER Award (1995), the University Scholar Award from UIUC (2001), the Isidor I. Rabi Award from the Int'l Society of Magnetic Resonance in Medicine (2009), an IEEE-ISBI Best Paper Award (2010, 2015), the IEEE-EMBC Best Paper Awards (2010, 2011), the Otto Schmitt Award from the Int'l Federation for Medical and Biological Engineering (2012), and the Technical Achievement Award from the IEEE Engineering in Medicine and Biology Society (2014). Dr. Liang is a Fellow of IEEE, the Int'l Society for Magnetic Resonance in Medicine, and the American Institute for Medical and Biological Engineering. He was elected to the International Academy of Medical and Biological Engineering in 2012. Dr. Liang served as President of IEEE Engineering in Medicine and Biology Society from 2011-2012 and received its 2015 Distinguished Service Award.

1309 Health Science Learning Center (HSLC) 4:00 - 5:00 P.M.