



## 9<sup>th</sup> TcSUH STUDENT/POSTDOC SEMINAR

February 17, 2020 - 5:00 pm, HSC 102

*RSVP: Vietnamese Sandwiches and soft drinks will be served*

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### A Simplified Phantom to Evaluate Intra-Voxel Incoherent Motion (IVIM) Effect in Diffusion Weighted Imaging (DWI)

**Erick Buko**

TcSUH and Department of Physics

**Abstract:** Application of multiple diffusion weightings ( $b$ -values) in Magnetic Resonance Imaging (MRI) allows both tissue microstructure and microcirculation (Perfusion) to be investigated at once using a two-compartment model damped as Intra-Voxel Incoherent Motion (IVIM). Since its initial description by Le Bihan in 1988, several groups have suggested various phantom models to mimic physiologic conditions. This has been a challenging issue as tissue diffusion ( $D_t$ ) and fluid diffusion ( $D_f$ ) are separated by one or more order of magnitude and creation of physical models with well-defined perfusion volume fractions ( $f$ ) has remained a challenge. In this talk, I will present a simple phantom set-up to model IVIM effect in the Diffusion Weighed Imaging (DWI). The model provides means to control both the perfusion fraction ( $f$ ) as well as the fluid diffusion coefficient ( $D_f$ ) independently. This can be used to evaluate the performance of various analysis algorithms such as Segmented (S) and Oversegmented (OS) in the estimation of parameters such as  $f$ , and  $D_f$ .

**Bio:** Mr. Erick Buko is currently a graduate student in Dr. Pei-Herng Hor's group in the department of Physics and Texas Center for Superconductivity at University of Houston.

### Unraveling the Redox Mechanism of an Organic Multi-Carbonyl Compound as the Cathode for Li Battery

**Dr. Jibo Zhang**

TcSUH, Department of Electrical and Computer Engineering

**Abstract:** Organic redox-active compounds have gained a significant amount of attention as the electrode materials for rechargeable batteries, on account of their structural versatility, sustainability and flexibility. The knowledge regarding the effects of structure on the redox mechanism and possible intramolecular interactions between the redox centers is necessary. We select the high energy density compound PTO and its analog PDO as the model compounds to illustrate the redox processes and chemical/electrochemical properties of multi-carbonyl compounds and their intermediates. Our findings reveal the potential-dependent and stepwise reduction of the multi-carbonyl moieties, demonstrating the formation of stable intermediates during the multi-electron redox process. The relationship between molecular structure and dissolution in electrolytes was further studied. Our results may contribute to the fundamental understanding of organic compounds for energy storage and provide guidance for the design and optimization of organic electrode materials for rechargeable batteries.

**Bio:** Dr. Jibo Zhang is currently a postdoc in Dr. Yan Yao's group in the department of Electrical & Computer Engineering and Texas Center for Superconductivity at University of Houston.

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*Persons with disabilities who require accommodations to attend this seminar should call 713-743-8213.*