UNIVERSITY of HOUSTON | ENGINEERING

Department of Biomedical Engineering

MRI Seminar: A Brief Introduction to MRI and fMRI

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4:00 PM – 5:30 PM
SEC - 203

Abstract: Magnetic resonance imaging (MRI) is a non-invasive imaging method used routinely in the clinic, in clinical research, and in preclinical research. In this lecture, the theoretical basis of MRI will be presented. Topics covered will include NMR, T1-relaxation, T2-relaxation, the links between NMR and MRI, the concept of a pulse sequence, and rudimentary image reconstruction. Current MRI methods, with a special emphasis on functional magnetic resonance imaging (fMRI), will also be presented. In fMRI, the MRI pulse sequence is manipulated such that rapidly acquired, serial MRI images are sensitized to blood oxygenation in the brain. The foundational tenant that areas of brain activation correlate with increased blood flow allows fMRI to be used to monitor brain activity in response to subject tasks. Resting state fMRI, that is fMRI in the absence of a subject task, will also be reviewed.

Bio: Jeff R. Anderson, PhD is a medical imaging scientist that specializes in MRI methods development. He received his PhD from Washington University under the mentorship of Joseph Ackerman and Joel Garbow and was named an NIH Imaging Sciences Pathway Fellow during that time. After graduating from Washington University, Dr. Anderson pursued postdoctoral research as an American Diabetes Association Postdoctoral Fellow in the lab of Dr. Dean Sherry at UT Southwestern. Currently, Dr. Anderson is a research associate in the MR Core Facilities at the Houston Methodist Research Institute. His publications include peer-reviewed scientific articles and a co-authored chapter on MRI in a forthcoming text about medical imaging, In Vivo Biomedical Imaging: Principles, Technologies and Methods; Cherry SR, Qi J, Badawi RD, ed.