

UNIVERSITY OF TEXAS AT DALLAS - DEPARTMENT OF PHYSICS
PHYSICS COLLOQUIUM

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Wednesday, October 11, 2006; 4:00-5:00 PM
Kusch Auditorium, FN 2.102

**From physics to physiology: non-invasive
evaluation of human brain using nuclear magnetic
resonance imaging**

Professor Hanzhang Lu

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Magnetic resonance imaging is a non-invasive tool to evaluate biological tissue in vivo. The MR signal originates from nuclear magnet moment, which, when placed in an external field, tends to align either parallel or antiparallel with the field. The net magnetization can be measured by a receiver coil and spatial information can be obtained by gradient encoding. The MR image contrast in biological tissue can be modulated by multiple factors, including spin density, T1 relaxation rate, T2 relaxation rate, chemical shift, molecular exchange, spin diffusion, etc., rendering MRI a versatile imaging technique for medical applications, as different diseases might be best detected using different MRI protocols. In addition to providing anatomical information, MRI has been used to study dynamic events associated with brain function. This provides a unique window to study the functional organization of our brain without using any invasive procedures. This technique, often called functional MRI (fMRI), has revolutionized several fields such as cognitive neuroscience, psychology, psychiatry and neurology. Examples of MRI applications in human brain imaging will be discussed.

About the speaker: Dr. Hanzhang Lu obtained his Bachelor's degree from Shanghai Jiao Tong University in China and his Ph.D. degree from Johns Hopkins University School of Medicine. He was a post-doctoral fellow at New York University Medical Center before joining the faculty at UT Southwestern Medical Center as an assistant professor at the Advanced Imaging Research Center. His research interest is to use MR imaging technologies to study brain vascular and metabolic physiology.