

UT Southwestern Medical Center
Advanced Imaging
Research Center

Four PhD positions in Ultra High-Field MRI & MRS

The Advanced Imaging Research Center (AIRC) at the UT Southwestern Medical Center in Dallas / Texas / US invites applications for four PhD positions in the field of methodological development for ultra-high-field MRI and MRS. The global aim is the development of 7T MRI and MRSI methods for neuroscientific applications with focus on brain cancer, psychiatric, neurodegenerative and neuroinflammatory as well as traumatic brain and spinal cord disorders in humans as part of a larger neuroscience initiative at UTSW.

Potential topics include (i) sequence development (MRI & MRSI, non-proton imaging); (ii) image reconstruction (MRI & MRSI, non-proton imaging); (iii) data analysis algorithm & pipeline development (MRS/MRSI, CEST, non-proton imaging, machine learning); (iv) parallel transmission (RF coils, RF pulses, pTX sequences); (v) B₀ shimming (hardware and software) and (vi) motion correction. Modalities of interest include anatomical imaging, ¹H/³¹P/¹³C/²H MRS/MRSI, CEST, non-proton imaging (²³Na, ³⁹K). Target regions are the human brain, spinal cord and myocardium

Since its creation in 2005, the AIRC has established a track record of excellence in metabolic imaging including the development of MRI contrast agents, a hyperpolarization program, magnetic resonance spectroscopy as well as the investigation of tissue extracts by NMR after ¹³C labelled isotope infusion. Due to the recent establishment of the O'Donnell Brain Institute at UTSW and to better support an active clinical and basic science neuroimaging community at UTSW, UTD and UTA we aim to develop a strong MRI methodology and neuroimaging expertise to complement the existing focus. UTSW has an international reputation in clinical and basic science excellence. There have been six Nobel Prize recipients since 1985.

AIRC has provided access to imaging equipment for faculty and students at the three University of Texas academic institutions in north Texas to advance human imaging studies and translational research in animals. The AIRC currently consists of 10 core faculty and more than 20 adjunct faculty and is expanded by about 5 core faculty in near future. AIRC is equipped with three small animal MR scanners (4.7T, 7T, 9.4T), three human research-only 3T MR scanners (Philips Ingenia, Siemens Prisma, GE 750w), one human 7T MR scanner (Philips), two hyperpolarization setups (HyperSense for preclinical and SpinLab for human application), 7 NMR spectrometers and a MRI contrast agent chemistry lab. The instrumentation inside the AIRC is undergoing a major upgrade that includes the installation of a parallel transmission system, a major upgrade of the spectrometer, receive channels and B₀ shimming hardware and extended multi-nuclear capability at the human 7T. In the nearby Radiology Department, there is access to a cyclotron for producing radiotracers, small animal and human PET/CT and SPECT/CT scanners and to highly focused ultra-sound (HIFU) systems integrated with small animal MRI. The installation of a new generation UHF human MRI possibly > 7T (AIRC), an integrated human PET-MRI system (Radiology) and an integrated MR-LINAC (Radiation Oncology) are foreseen in future.

Applicants for these programs should have an electrical engineering, physics, computational science, biomedical engineering or applied mathematics background. Candidates are expected to be able to work independently as well as contribute to a team comprised of RF engineers, postdoctoral fellows, other PhD students and clinical collaborators. Successful candidates will be expected to get acquainted with new methods and knowledge quickly, have good communication skills and be willing to work with experimental hardware. Good programming skills (C++, MATLAB, PYTHON, IDL), knowledge in optimization and numerical math or experience with self-build electronics is required. Previous experience in either MRI sequence development, MR image reconstruction, RF pulse design, EM simulation (CST) or hardware development (RF coils, B₀ shimming, PCB boards, control circuits, amplifiers) is advantageous.

Funding is available for 5 years, depending on satisfactory performance and research progress. Student stipend is according to the guidelines of UTSW for PhD students.

UT Southwestern Medical Center is an Equal Opportunity/Affirmative Action Employer. Women, minorities, veterans and individuals with disabilities are encouraged to apply.

Applications should include a letter of interest, a curriculum vitae, a list of publications if applicable (peer-reviewed original articles; review articles; book chapters; conference contributions; other); a short summary of past research experience and future research interests (max 1 page); Bachelor/Master and High School certificates and respective transcripts; PDF copy of Bachelor and/or Master thesis and three references (contact details only).

All materials should be sent **electronically as a single PDF** file to Anke Henning, Director, Advanced Imaging Research Center, UT Southwestern Medical Center, Dallas, Texas, US: Anke.Henning@UTSouthwestern.edu.