Max Delbrück Center for Molecular Medicine in the Helmholtz Association - Experimental Ultrahigh Field and Experimental and Clinical Research Center – Charité – Universitätsmedizin Berlin

Our group is continuously seeking motivated candidates to contribute to cutting-edge research in Magnetic Resonance (MR)—leveraging state-of-the-art imaging and spectroscopy techniques at ultra-high magnetic fields. We operate one of the most advanced MR infrastructures available for research, utilizing ultra-high-field magnets up to 9.4 Tesla, paired with cryogenically cooled radiofrequency (RF) coils to maximize sensitivity and signal-to-noise ratio (SNR). This setup enables us to push the boundaries of both structural and functional MRI, including advanced diffusion-weighted imaging, novel contrast mechanisms, and high-resolution MR spectroscopy. Our research extends beyond conventional proton (^1H) MRI. We have a strong focus on non-proton (X-nucleus) MRI, and in particular, we are pioneering new methods in fluorine (^19F) MRI. ^19F MRI offers exceptional specificity due to the negligible endogenous background signal in biological tissues, making it a powerful tool for targeted imaging. However, it also presents technical challenges due to inherently low sensitivity. To overcome these limitations, we are developing and optimizing novel acquisition protocols, hardware solutions, and post-processing methods to enhance ^19F SNR and enable broader applications in molecular imaging, drug tracking, and metabolic studies. If you are passionate about MR physics, imaging technology, spectroscopy, and translational biomedical research, we welcome your interest. Our projects range from method development to preclinical and translational applications and often involve interdisciplinary collaboration. Typical candidate profiles include: – Backgrounds in physics, biomedical engineering, electrical engineering, chemistry, or related fields – Interest or experience in MR methods, RF systems, image reconstruction, or quantitative imaging – Familiarity with non-proton MRI and/or molecular imaging is a plus

Masterarbeit: Advancing Organoid Magnetic Resonance Imaging with Custom Micro-MRI Technology

Aiming to reduce animal use in research by enabling high-resolution, non-invasive MRI technologies in 3D human-derived organoid models

City: Berlin; Starting date (earliest): 01/10/25; Remuneration: no; Reference number: AR213JRD; Closing date: 31/12/25

Working field

Biomedical Engineering
Medical Imaging / Magnetic Resonance Imaging (MRI)
Biophysics
Electrical Engineering (specifically for RF coil development)
Neuroscience / Brain Research (organoids are brain-derived)
Bioengineering / Tissue Engineering
Preclinical Imaging
Physics (applied or medical physics)
Translational Medicine
Reduction and Replacement in Animal Research (3Rs)

Requirements

A tertiary level of education is required i.e. ideally Master but also Bachelor degree (in progress)

What we offer

Research Training
Hands-on experience with cutting-edge micro-MRI systems (including 9.4T ultra-high field MRI)
Training in magnetic resonance imaging and spectroscopy methods
Exposure to X-nucleus MRI, especially fluorine MRI
Work with cryogenically cooled RF coils and advanced imaging hardware

Lab & Technical Skills
Participation in the design, testing, or optimization of custom RF coils (in collaboration with Bruker)
Experimental work with 3D organoid models as alternatives to animal research
Opportunities for data analysis, image processing, and method development

Collaborative Research Environment
Involvement in a multidisciplinary team with physicists, engineers, and biologists
Interaction with industry partner Bruker and international collaborators (e.g., University of Lyon)

Academic Benefits
Supervision of a Bachelor's or Master's thesis
Potential to co-author conference abstracts or publications
Support for academic credits (ECTS) if applicable

Impact-Oriented Research
Contribution to 3Rs-compliant research (Reduction, Refinement, Replacement of animal use)
Work on translational methods that bridge technology and biomedical applications

Application

Please send an email to sonia.waiczies@mdc-berlin.de

More information at https://stellenticket.de/197369/TUBS/
Offer visible until 21/09/25