Research Project

Name of Institution and department: Institute for Diagnostic and Interventional Radiology, University Hospital Zurich

Link to website: https://www.usz.ch/en/department/diagnostic-and-interventional-radiology/

City and Country of Institution: Zurich, Switzerland

RESEARCH GROUP

The Musculoskeletal Imaging Research Group is an interdisciplinary research group, aiming to integrate research and build collaborations between basic scientists, clinical scientists, physicians, and radiologists to establish a strong resource for musculoskeletal imaging-based research at the University of Zurich. There is also close collaboration with the Institute for Biomedical Engineering, an institution of the Swiss Federal Institute of Technology (ETH Zurich). Ongoing projects include studies on new developments in all imaging modalities with focus on CT (including photon-counting CT and cone-beam CT) and MR imaging (incl. quantitative MRI, MR Neurography, Zero echo time MRI).

TITLE OF PROPOSED RESEARCH PROJECT

Innovative Imaging-based Techniques for Body Composition Analysis and Metabolic Profiling

OBJECTIVES

- Develop and validate quantitative MRI and Ultrasound techniques for body composition profiling and metabolic risk stratification, in the setting of a clinical obesity trial with access to an in-house biobank with close clinical phenotyping (incl. blood testing and tissue biopsies).
- Establish novel biomarkers using advanced MRI (whole-body Dixon MRI, MR spectroscopy) and Ultrasound techniques, assessing muscle and fat depots.
- Develop a deep learning-based prediction model integrating imaging and clinical data for metabolic health signatures and personalized risk assessment

APPLICANT'S DUTIES

- Close teamwork with the other research group members, including clinical colleagues, and MRI and Ultrasound physicists, and biomedical imaging analysists

- Supervise advanced Imaging Acquisition and support Post-Processing of quantitative MRI data
- Correlate imaging data with clinical study outcomes, using the established biobank and validating with an external population-scale databank
- Support development of deep learning-based prediction model in collaboration with the Biomedical Computing Group

APPLICANT'S BENEFITS

- Participation on scientific outcomes of the project i.e. presentations to congresses and publications of papers
- Seamless integration into an ongoing multidisciplinary project with access to acquired imaging and clinical data
- Access to state-of-the-art equipment, including scanners and software in a research-supportive institution
- Close Mentoring by the hosts with possibilities to expand the personal career network

- Project Leader: Falko Ensle
- Members: Ulf Bach, Carina Obermueller, Elizabet Nikolova, Franziska Heidt
- Collaborators: Felix Beuschlein, Philipp Gerber, Ender Konukoglu, Ertunc Erdil, Güney Tombak, Thomas Uslar