PhD Positions (100%)
in MR Methods Development for Functional Lung MRI

The Center for MR Research at the University Children's Hospital in Zurich, Switzerland, invites applications for two PhD positions within an interdisciplinary project aimed at the investigation of novel functional lung MR biomarkers in pediatric patients. The project, funded by the SNSF and the Vontobel Foundation, will be conducted in collaboration with the *Pediatric Pulmonology* and the *Diagnostic Imaging & Intervention* departments of the University Children's Hospital in Zurich as well as the *Biomedical Engineering* department of the University of Basel, Switzerland.

Project summary

In pediatric patients with chronic lung diseases, who require regular lung examination for disease monitoring, likely from early childhood, imaging biomarkers should necessarily be non-invasive and ionizing radiation-free. In recent years, promising contrast agent-free MR methods have emerged, allowing the regional assessment of pulmonary perfusion and ventilation as well as of novel markers such as the pulmonary pulse wave transit time. The technique is based on fast dynamic MR acquisitions in free-breathing and subsequent spectral analysis of the acquired time series data by employing a matrix-pencil decomposition. In this project, we aim at the methodological validation of contrast agent-free functional matrix-pencil MRI (MP-MRI) versus the standard contrast-enhanced dynamic (DCE) MR technique for multi-parametric regional lung function assessment in pediatric patients with cystic fibrosis and severe asthma. To this end, we will design an automated pipeline for the processing of MP-MRI and DCE-MRI data for the quantitative evaluation of the functional parameters.

Your responsibilities

- Design automated MP / DCE pipelines for an objective comparison between the two methods
- Train advanced neural network models (e.g. for lung lobe segmentation)
- Contribute to the methodological validation of novel functional MRI markers such as the pulmonary pulse wave transit time
- Recruit a healthy control group and perform lung MR measurements (contrast agent-free) at the in-house 1.5 Tesla MR scanner
- Participate in a PhD programme at the UZH/ETHZ

Your profile

- Master of Science degree in physics, biomedical engineering, computer science, or a related field
- Programming skills in Matlab/Python (essential) and C++ (desirable)
- Experience with data science (essential) and machine learning, e.g. TensorFlow or PyTorch libraries (desirable)
- Ability to work independently as well as in a collaborative, interdisciplinary team
- Interest in open source software development
- Fluency in English (written and spoken), knowledge of German is a plus

Start of Employment: earliest in February 2026, funding is available for 3-4 years according to the SNSF PhD salary scale

Application: please submit your CV, diplomas, transcripts of Bachelor's and Master's degrees, references, and motivation letter to:
Dr. Rahel Heule (by e-mail: rahel.heule@kispi.uzh.ch). Please feel free to contact Dr. Rahel Heule in case of any questions or inquiries related to the position.