

PhD Thesis in MRI Physics:

## Functional lung imaging

The DZL research group for lung imaging research headed by Prof. Dr. Julien Dinkel in collaboration with the LMU Department of Radiation Oncology is looking for a PhD candidate as soon as possible.

### Background

The focus of our team which is embedded in the German Center for Lung research (DZL) is to establish Magnetic Resonance Imaging as a non-invasive diagnostic tool for lung examinations. Creating diagnostically valuable MR images of the lung morphology and function, however, is a challenging task. Motion due to ventilation and pulsation of the heart, the intricate microstructure of the pulmonary parenchyma and the diversity of lung pathologies are just a few of the hurdles that must be overcome when imaging the lung. By employing novel developments such as Fourier decomposition MRI [1,2,3], techniques using ultra-short echo times [4] and a push towards lower MRI field strengths we have set out to overcome these challenges in order to develop MRI's full potential as a diagnostic lung imaging tool.

### Task & Goals

The proposed project aims to further develop *functional lung imaging using MRI* to become a viable clinical tool. In many cases subjects exhibit *irregular* breathing and/or *irregular* heartbeat resulting in reduced quality of Fourier decomposition. The PhD candidate is expected to mitigate the effects of these irregularities by employing modern signal processing techniques. Resulting applications are to be implemented in a way to be accessible for clinical staff and other researchers. The candidate will get the chance to implement and verify these techniques in close collaboration with the Department of Radiation Oncology, in order to evaluate the benefit of modern MR techniques for radiation therapy.

### Your profile

- Highly motivated candidate with a strong interest in medical imaging
- Experience in programming with Python and ideally also C/C++
- Knowledge of magnetic resonance imaging and ideally but not necessarily practical knowledge of Siemens MRI scanners
- Scientific curiosity and creativity and a self-sufficient work attitude

### What we offer

- A friendly, non-hierarchical research environment with a focus on collaborative projects
- Extensive scientific and clinical track record in pulmonary imaging
- A broad spectrum of imaging devices including high-end 1.5T and 3.0T scanners and a 0.35T MR-Linac, situated at the Klinikum Großhadern
- High-end computing hardware
- A team embedded in the clinical environment at the Klinikum Großhadern
- Thriving inter-departmental collaborations on multi-modality projects
- Competitive salary according to TVL standards

### Contact

If you are interested in this position, please contact Dr. Thomas Gaass and Prof. Dr. Julien Dinkel. The email should include a short CV, relevant certificates, and a letter of motivation. We are looking forward to getting to know you.

#### DIREKTOR

Prof. Dr. med. Jens Ricke

#### ANSPRECHPARTNER

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#### Vorstand

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(Vorsitz)

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Pflegedirektor:  
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[1] Bauman et al., 2009, <https://doi.org/10.1002/mrm.22031>

[2] Bondesson et al., 2019, <https://doi.org/10.1002/mrm.27803>

[3] Behrendt et al., 2019, <https://doi.org/10.1002/jmri.27027>

[4] Heidenreich et al., 2020 <https://doi.org/10.1148/radiol.2020192251>