

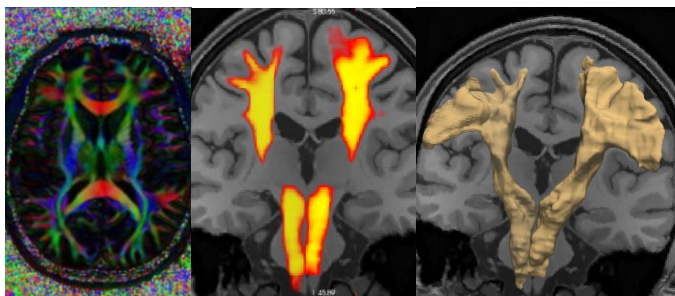


# Master Thesis

## *„How accurately can we repeatedly measure nerve fiber structures in human brain?“*

### Project description

With the help of diffusion-weighted MRI imaging, we are able to record and image complex neural pathway systems (e.g. in the human brain) non-invasively. This technique is used in a variety of research questions, especially in the field of neuroscience, and allows conclusions to be drawn about connectivity as well as quantitative tissue parameters.



The aim of this work is to determine with which repeatability and thus measurement uncertainty these quantitative parameters can be determined. For this purpose, already collected data will be used as well as new data will be acquired. The data preprocessing is done with existing and tested software. The statistical analysis and evaluation is partly to be developed in the project.

### Place of work

Medical Physics Group  
Institute for Diagnostic and Interventional Radiology  
University Hospital Jena  
Philosophenweg 3  
07743 Jena  
[www.mrt.uni-jena.de](http://www.mrt.uni-jena.de)

### Your profile

- B.Sc. degree in computer science, mathematics, physics, biomedical engineering or related fields
- Interest in medical image processing and analysis
- good programming skills
- Ability to handle complex mathematical and geometrical problems
- Ability to study scientific literature

### Working environment

The Medical Physics Group at the Institute for Diagnostic and Interventional Radiology (IDIR) at the University Hospital Jena conducts interdisciplinary research in tomographic imaging methods, especially MRI. The group consists of a multidisciplinary team of ambitious young scientists from the fields of physics, engineering and biology. The aim of our research activities is the development and provision of new methods to qualitatively and, where possible, quantitatively assess morphologic and functional parameters and thereby contribute to improved diagnostics and therapy.

You will be working at our MRI research center with two state-of-the-art 3T whole-body clinical MRI system, a 9.4T animal system and our high performance computation system. All required image reconstruction and analysis will be performed in-house.

### Project leader

Dr.-Ing. Daniel Güllmar  
[daniel.guellmar@med.uni-jena.de](mailto:daniel.guellmar@med.uni-jena.de)

### Group leader

Prof. Dr. rer. nat. med. habil. Jürgen Reichenbach  
[Juergen.Reichenbach@med.uni-jena.de](mailto:Juergen.Reichenbach@med.uni-jena.de)