



Bruker BioSpin PreClinical Imaging is a leading manufacturer of MRI, PET, SPECT, micro-CT and MPI systems for pre-clinical research. Our products range from desktop systems to ultra-high field MR instruments using latest technological advances.

We offer a master thesis position in an innovation-oriented industrial environment with strong links to academia. You will be integrated into our development team implementing novel MR sequences and reconstruction methods.

Motivation:

AI has the potential to revolutionize pre-clinical imaging in many ways. Especially automated image segmentation or atlas mapping would tremendously facilitate the conduct of high throughput studies.

However, in contrast to clinical imaging, the high variety of imaging situations and the lack of a high-quality annotated database hinders the development of robust automated segmentation tools.

Research topic:

In the past, several automated generators for MRI data have been developed, simulating clinical 2D images with different contrast behavior. An initial literature review will provide a first overview of the existing methods.

In this thesis, the goal is to design, develop and evaluate a generator for 3D pre-clinical MRI data, e.g., based on a physics enforced generative adversarial network. In a first step, anatomy and contrast behavior will be validated by real MRI measurements in collaboration with our MR scientists. In a second step, the generator will then be extended to provide segmentation masks together with the MRI data.

Outlook:

The simulated MRI data will allow to train a neural network for automated 3D image segmentation. The network will then be used to segment real 3D MRI data. The generated segmentation masks will be manually corrected, thus providing additional data for the training process.

If you are interested or have any questions, please do not hesitate to contact us:

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