

Doctoral Candidate 11 - Multiparametric MRI with quantification of the microstructural integrity and iron content in the diseased brain

Host Institution	University of Antwerp, Belgium
PhD enrolment	University of Antwerp, Belgium
Primary Supervisor	Prof. Dr. Marleen Verhoye, Bio-Imaging Lab
Subject area	Preclinical MRI, MR Physics, animal models of neurodegeneration

About this doctoral project and your tasks

First in collaboration, with UAntwerp imec-Vision Lab, you will develop and implement **super-resolution reconstruction for quantitative susceptibility mapping (QSM) mapping** to study regional iron content. Second, in collaboration with Bruker and imec-Vision Lab, you will implement **intra-scan modulated multi-shot EPI based diffusion MRI sequences** to enable fast and flexible diffusion MR to study brain microstructure. Finally, you will develop an end-to-end AI-based method to automatically **segment the rodent brain in aging and diseased state** from the multi-parametric (diffusion and QSM) MRI images. You will validate the new developed methodologies, in **animal models of neurodegeneration** (Alzheimer's disease, Huntington's disease or multiple sclerosis).

You tasks will include:

- You will work actively on the preparation and defense of a **PhD thesis** in the field of magnetic resonance imaging.
- You will write several high-quality **scientific articles** related to the research project and publish them in peer-reviewed journals.
- You will carry out a limited number of teaching and research support tasks for the Bio-Imaging Lab of the Department of Biomedical Sciences.

Foreseen secondments

For this project, we foresee secondments to:

- Dr. Sascha Koehler (4 months) at **Bruker BioSpin** (Germany)
- Dr. Ana-Maria Oros-Peusquens (3 months) at **Forschungszentrum Jülich** (Germany)