Doctoral Candidate 2 - Deep learning-augmented super resolution reconstruction for accelerated relaxometry

Host Institution	Siemens Healthineers, Belgium
PhD enrolment	University of Antwerp, Belgium
Primary Supervisor	Dr. Thomas Janssens, Siemens Healthineers
Subject area	Simulations and modelling, Programming AI software

About this doctoral project and your tasks

You will develop a novel **super-resolution reconstruction (SRR) framework for relaxometry**, extending a model based SRR framework that was recently developed within our consortium (*Beirinckx et al., Comput Med Imaging Graph 100, 2022)*. The aim is that the framework will, within minutes, directly estimate isotropic, high resolution relaxation parameter maps from a set of differently oriented T1/T2-weighted multi-slice images, while accounting for motion. Thereby, we will target a **physics-aware** (e.g., recurrent inference machines or RIM) Deep Learning approaches, in which the above-mentioned model-based SRR is integrated.

Your tasks will include:

- Develop a computationally efficient framework for motion compensated SRR relaxometry
- Implementation of the developed methodology as a working syngo.via Frontier prototype
- Benchmark the method in a clinical setting in the context of Multiple Sclerosis

Foreseen secondments

For this project, we foresee secondments to:

- Prof. dr. Ben Jeurissen (5 months) at **University of Antwerp** (Belgium)
- Prof. dr. Matthan Caan (1 month) at **AMC Amsterdam** (The Netherlands)
- Prof. Pieter Van Dyck (5 months) at **Antwerp University Hospital** (UZA, Belgium)

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