

Personalized body models for MRI dosimetry

Are you looking for a MSc Thesis project in Image Processing and MRI? Do you want to learn more about image registration in *time-critical* applications?

Then this project is for you!

Background

Safe MRI scanning is currently based on statistical models of the radiofrequency energy absorption, with large “one-size-fits-all” margins that reduce image quality. The goal of this MSc project is to generate subject-specific body models at the start of the MRI examination to tailor the safety margins to the individual patient.

Research objectives

- Goal: to develop a fast and accurate image registration pipeline for mapping an atlas body model to the actual subject based on MRI image data (Fig. 1).
- Dosimetric assessment: quantify the resulting radiofrequency energy absorption in terms of specific absorption rate (SAR) using EM simulation software.
- Validate the method against a segmented model based on full 3D data (1,2).

The framework will be based on the in-house developed image registration package *elastix*. We hypothesize that a suitable trade-off between dosimetric accuracy, registration speed and input data requirements will enable future integration in the MR workflow.

A technical background and affinity with programming is required. Your research will result in a MSc thesis and we will aim for a conference submission. The project will be in collaboration with dr.ir. Marius Staring from the image processing group at LUMC.

Project duration: 9 months

References

1. Homann H et al. Toward individualized SAR models and in vivo validation. *Magn Reson Med* 2011;66:1767–76.
2. Jin J et al. Improving SAR estimations in MRI using subject-specific models. *Phys Med Biol* 2012;57:8153–71.

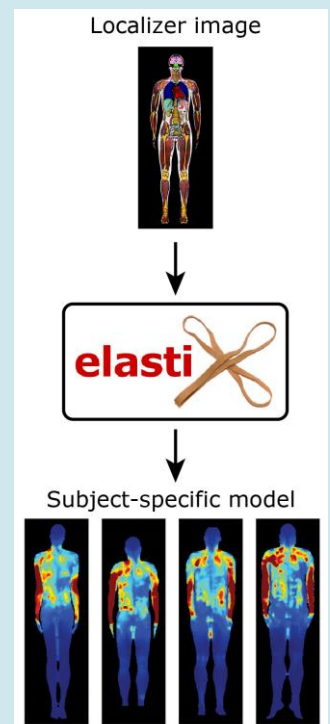


Fig. 1. Project outline.

Contact: **Dr.ir. Wyger Brink**
C.J. Gorter Center dept. Radiology
w.m.brink@lumc.nl 071-5265497

