INSTITUTE OF VISUAL COMPUTING

TU Graz
SCIENCE PASSION TECHNOLOGY

Figure 1: me, searching for the best students out there.

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Primal-Dual Approaches for MR-CDI

- Applying Suitable Optimisation Algorithms to a Primal-Dual Formulation of the Magnetic Resonance (MR) Current Density Imaging (CDI) problem.
- Idea and relevance of CDI: reconstructing conductivity ρ (a material constant) from a measurement for usage in clinical environments.
- The goal is to find the current density $\boldsymbol{j}$ (hence the name *Current Density Imaging*) and ρ from 'inverting' the Biot-Savart law,

$$\boldsymbol{B}(\boldsymbol{x}) = \frac{\mu_0}{4\pi} \int_\Omega \frac{\boldsymbol{j}(\boldsymbol{y}) \times (\boldsymbol{x} - \boldsymbol{y})}{\|\boldsymbol{x} - \boldsymbol{y}\|^3} \, \mathrm{d}\boldsymbol{y} \,.$$

- Goal: is reconstruction of the magnetic field $\boldsymbol{B}$ and conductivity ρ possible, or more efficient using a Primal-Dual formulation?

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