In the Institute of Imaging and Computer Vision, we research and explore the physical limits of current and future medical imaging technologies, amongst other imaging areas. In the medical imaging group, our research areas range from simulations of new imaging concepts, hardware prototypes, high speed data processing, image reconstruction algorithms and applications using our research imaging prototypes. Doing this, we bring together students and researchers from different disciplines: physics, engineering, computer science and medicine. We are a group with a large international network and close links to industry and RWTH spin-offs.

2 PhD Positions in Advanced Magnetic Imaging

Low-Field **Magnetic Resonance Imaging** (LFMRI) and **Magnetic Particle Imaging** (MPI) are two complementary Magnetic Imaging Technologies with significant biomedical potential. LFMRI offers cost-effective, portable imaging solutions with improved accessibility, while MPI utilizes the non-linear magnetization of superparamagnetic nanoparticles to achieve real-time, high-speed imaging. Despite their different principles, both modalities share a **key challenge: limited sensitivity,** which has a direct impact on spatial resolution, signal quality and therefore diagnostic accuracy.

Overcoming this limitation demands **bold innovation** and **creative problem-solving** at the intersection of physics, engineering, and artificial intelligence. Pushing the limits of sensitivity requires revolutionary hardware designs, such as novel coil architectures, adaptive gradient systems, and unconventional resonant circuits. At the same time, cutting-edge signal processing techniques, including AI-driven reconstructions, intelligent multi-channel acquisition, and advanced noise suppression, must be explored and reimagined.
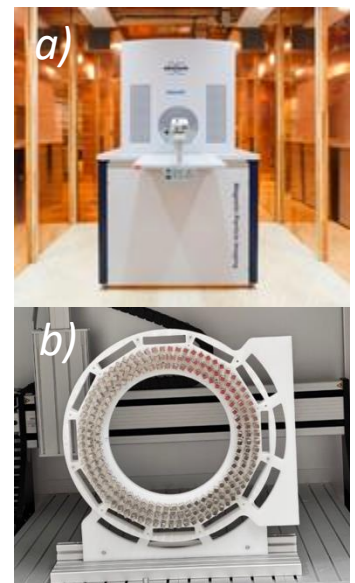
Fig.: a) Commercial MPI scanner and b) magnet of our Low-Field MRI scanner.

Your Key Responsibilities:
- Develop and optimize hardware components to maximize signal sensitivity.
- Investigate multi-channel and resonance-based techniques for improved imaging.
- Implement AI-driven signal enhancement strategies.
- Collaborate in an interdisciplinary research environment.

Your Profile:
- Passion for advancing magnetic medical imaging technologies.
- Background in hardware design, signal processing, or magnetic systems.
- Programming skills (Python, C++/C#) beneficial.
- Strong interest in interdisciplinary collaboration.

What We Offer:
- Research opportunities in cutting-edge magnetic imaging technologies.
- Access to advanced MPI and LFMRI imaging systems.
- A collaborative research environment with leading scientists.
- The chance to contribute to next-generation medical imaging solutions website.

Univ.-Prof. Dr.-Ing. Volkmar Schulz
Institute of Imaging and Computer Vision
Kopernikusstr. 16, 52074 Aachen, Germany
✉ application@lfb.rwth-Aachen.de   +49 241 80 27860