

## HEIDELBERG

### Institutions

The German Center for Cancer Research (DKFZ) and Heidelberg University Hospital build the core of the imaging efforts in Heidelberg. While the primary focus of DKFZ is on oncology, the Division of Medical Physics in Radiology pursues imaging technology for diverse health applications. In the area of neurodegenerative disease research, the imaging efforts are closely linked to the clinical services and research projects of the Department of General Psychiatry of Heidelberg University Hospital.

### Principal Investigators



Christian Wolf



Mark Ladd

### 7T equipment

**Hardware** Whole-body MR (Siemens)- research only (8Tx32Rx head coil, 1Tx24Rx head coil, parallel transmission, 30ch sodium head coil, 170 / 35Cl / 37Cl / 39K head coils)  
**Operational since** 2008  
**Other equipment (human imaging):** 3T MR-PET (Siemens)\* / 3T MR (Siemens Prisma)\* / 1.5T MR (Siemens Aera)\* / 1.5T MR (Siemens Symphony)\*  
 \* = research only

### 7T Methods (as relevant for EUFIND)

#### Acquisition

- SWI/QSM
- TOF imaging
- Sodium / chlorine / potassium / oxygen imaging
- Short-TE, density-adapted radial acquisitions
- MR safety (SAR, temperature, implants)
- MR side effects (dizziness, nausea, cognitive effects)
- Resting-state fMRI

#### Analysis

- QSM
- **Automatic venous segmentation**
- Medical Imaging Interaction Toolkit (MITK)
- Iterative reconstruction
- Reconstruction based on priors
- Multivariate data analysis techniques for structural and functional data
- Multivariate data fusion
- Effective connectivity modelling

### Research in neurodegeneration

#### Clinical and basic research topics

- Multi-center studies in preclinical and manifest AD, PD, HD
- Imaging pathology (i.e. iron deposition)
- Functional imaging of cognitive and affective systems
- Resting-state neuroimaging

#### Cohorts

- Healthy young and older controls
- Individuals with subjective memory complaints
- Preclinical AD, MCI, HD
- Vascular and mixed dementia AD, FTD, PD, MSA, HD

### Ethics Procedures

Approval for healthy volunteers and patients in place (age 18 or older). Approval for 17O gas inhalation and blood sampling to determine ion concentrations also in place. Approvals are only valid for limited feasibility and reproducibility studies (approx. 10 subjects). Larger cohorts require dedicated approval.