

# Advanced Brain Imaging - Brain Function

## Group Members

## Projects

## Publications

The Advanced Functional Brain Imaging Group of the Department of Diagnostic Radiology Medical Physics is working in the fields of sequences and methods development for the investigation of neuronal activity (fMRI, MREG) and Spectroscopy by means of magnetic resonance imaging. An important focus lies also on the application of these methods in the field of neurobiology investigating for example eye movements and motion processing and in the clinical field performing diverse patient studies with different cooperation partners. A third focus of interest is the development of methods optimizing the post-processing of MR-Data for scientific Neuro-Imaging applications.

## Members

Group Leaders	Dr. Thomas Lange Dr. Pierre LeVan
Post-Doc	Dr. Hsu-Lei Lee
PhD students	Jakob Assländer Michael Burdumy
Master's student	Mehdi Ordikhani-Seyedlar
Former Group Members	Dr. Arsene Ella Dr. Thimo Hugger Dr. Kuan Jin Lee Dr. Qing Mao Dr. Michael von Mengershausen Dr. Sabine Ohlendorf Dr. Jochen Rick Prof. Dr. Oliver Speck Dr. Benjamin Zahneisen Dr. Lei Zhang Dr. Kai Zhong

## Projects

- Ultra-fast functional MRI / MR-Encephalography (MREG)
  - MREG sequence development
  - Simultaneous EEG-fMRI with MREG
  - Fast resting state fMRI
- Advanced spectroscopic methodology

## Publications

2012

- Zahneisen B, Hugger T, Lee KJ, LeVan P, Reiser M, Lee HL, Assländer J, Zaitsev M, Hennig J Single shot concentric shells trajectories for ultra fast fMRI Magn Reson Med. (In press)

2011

- Hugger T, Zahneisen B, LeVan P, Lee KJ, Lee HL, Zaitsev M, Hennig J Fast undersampled functional magnetic resonance imaging using nonlinear regularized parallel image reconstruction PLoS One. 2011;6(12):e28822
- Zahneisen B, Grotz T, Lee KJ, Ohlendorf S, Reiser M, Zaitsev M, Hennig J Three-dimensional MR-encephalography: fast volumetric brain imaging using rosette trajectories Magn Reson Med. 2011;65(5):1260-8

2010

- Rick J, Speck O, Maier S, Tüscher O, Dössel O, Hennig J, Zaitsev M Optimized EPI for fMRI using a slice-dependent template-based gradient compensation method to recover local susceptibility-induced signal loss Magn Reson Mater Phy 2010;23(3):165-176.

2009

- Grotz T, Zahneisen B, Ella A, Zaitsev M, Hennig J Fast functional brain imaging using constrained reconstruction based on regularization using arbitrary projections Magn Reson Med. 2009;62(2):394-405

2008

- Haller S, Bonati LH, Rick J, Klarhöfer M, Speck O, Lyrer PA, Bilecen D, Engelter ST, Wetzel SG Reduced Cerebrovascular Reserve at CO<sub>2</sub> BOLD MR Imaging Is Associated with Increased Risk of Periinterventional Ischemic Lesions during Carotid Endarterectomy or Stent Placement: Preliminary Results *Radiology* 2008;249:251-58.
- Kimmig H, Ohlendorf S, Speck O, Sprenger A, Rutschmann RM, Haller S, Greenlee MW fMRI evidence for sensorimotor transformations in human cortex during smooth pursuit eye movements. *Neuropsychologia*. 2008 Jul;46(8):2203-2213.

2007

- Ohlendorf S, Kimmig H, Glauche V, Haller S. Gaze pursuit, attention pursuit and their effects on cortical activations. *Eur J Neurosci* 2007;26(7):2096-2108.
- Ball T, Rahm B, Eickhoff SB, Schulze-Bonhage A, Speck O, Mutschler I. Response properties of human amygdala subregions: evidence based on functional MRI combined with probabilistic anatomical maps. *PLoS ONE* 2007;2:e307.
- Hennig J, Zhong K, Speck O. MR-Encephalography: Fast multi-channel monitoring of brain physiology with magnetic resonance. *Neuroimage* 2007;34(1):212-219.
- Mutschler I, Schulze-Bonhage A, Glauche V, Demandt E, Speck O, Ball T. A rapid sound-action association effect in human insular cortex. *PLoS ONE* 2007;2:e259.
- Zhong K, Leupold J, Hennig J, Speck O. Systematic investigation of balanced steady-state free precession for functional MRI in the human visual cortex at 3 Tesla. *Magn Reson Med* 2007;57(1):67-73.
- Ziyeh S, Rick J, Reinhard M, Hetzel A, Mader I, Speck O Blood oxygen level-dependent MRI of cerebral CO<sub>2</sub> reactivity in severe carotid stenosis and occlusion *Stroke* 2005;36(4):751-6

2005

- Chang L, Ernst T, Speck O, Grob CS Additive Effects of HIV and Chronic Methamphetamine use on Brain Metabolite Abnormalities *Am J Psychiat*, 2005; 162(2):361-369
- Dold C, Zaitsev M, Speck O, Firls EA, Hennig J, Sakas G Prospective Head Motion Compensation for MRI by Updating the gradients and Radio Frequency during Data Acquisition *Lect Notes Comput Sc*, 2005; 1(1):482-489
- Jung B, Zaitsev M, Hennig J Improved Navigator Technique for the Assessment of Cardiac Function with Balanced SSFP during Free-Breathing *J Cardiovasc Magn Reson*, 2005; 7(1):300-302
- Kiselev V, Strecker R, Speck O, Ziyeh S, Hennig J Vessel Size Imaging in Humans *Magnet Reson Med*, 2005; 53(3):553-563
- Zaitsev M, D'Arcy J, Collins DJ, Leach MO, Zilles K, Shah NJ Dual-contrast EPIK: application to dynamic contrast-enhanced perfusion studies *Phys Med Biol*, 2005; 50:4491-4505
- S. Ziyeh, J. Rick, M. Reinhard, A. Hetzel, I. Mader, O. Speck BOLD-MR imaging of cerebral CO<sub>2</sub> reactivity in severe carotid stenosis and occlusion *Stroke*, 2005;36(4):751-6

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- Ziyeh S, Rick J, Weber J, Mader I, Speck O BOLD-Kontrast-MRT und zerebrovaskuläre Reservekapazität *Klinische Neuroradiologie* 2004;14:213-217.