



PhD Course  
06. to 09. October 2009

Hvidovre Hospital - University of Copenhagen



## Advances in magnetic resonance imaging of human brain structure and function

Introduction into currently available magnetic resonance imaging (MRI) techniques to study the human brain with a focus on structural and functional MRI

### Aims

- to acquire an in-depth understanding of the various neuroscientific MRI tools
- to be able to efficiently plan and conduct neuroscientific MRI studies
- to select the optimal MRI protocol and analytical method for individual projects
- to be able to critically interpret published MRI studies

### Content

- Morphometric analyses of high-resolution structural MRI images of the brain
- Diffusion weighted MRI - assessing anatomical connectivity *in vivo*
- Functional MRI - mapping the brain at rest and at work
- New developments (high-field MRI, fusion with TMS and EEG, mind reading)

### Participants

PhD students (medicine, physics, biophysics, neuroscience) interested in MRI neuroimaging. No specific qualifications required, but some basic knowledge of MRI and some background in statistical image analysis would be helpful.

### Teachers

Multidisciplinary panel of national (KU, DTU, Ålborg University, Århus University) and international experts in the field (Canada, France, Germany, UK, USA)

**Language** English

**Form** Interactive teaching with illustrative examples.

**Dates** 06. to 09. October 2009

**Place** Auditorium 1, Hvidovre Hospital, Kettegård Allé 30, DK-2650 Hvidovre

### Course organization

William Barré, Mark S. Christensen, Tim B. Dyrby, Kristoffer H. Madsen, Olaf B. Paulson, Hartwig R. Siebner

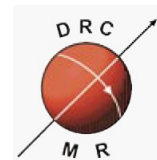
### Course secretary

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### Registration

**We still have some free slots !**

**Use special form** via Ph.D. Administration, Blegdamsvej 3B, 2200 Copenhagen N





# Advances in magnetic resonance imaging of human brain structure and function



## Tuesday 6th of October 2009 Structural MRI (Organizer: William Baaré)

Time	Speaker	Title
09:00 - 09:15	Welcome	
09:15 - 10:00	Lars Hanson, Copenhagen, DK	Basic Principles of MRI
10:00 - 10:30	Arnold Skimminge, Copenhagen, DK	Image artifacts and image distortions
10:30 - 11:00	Coffee break	
11:00 - 11:45	Christian Gaser, Jena, Germany	Image processing
11:45 - 12:30	Christian Gaser, Jena, Germany	Voxel based versus tensor based morphometry
12:30 - 13:30	Lunch break	
13:30 - 14:15	Simon Fristed Eskildsen, Ålborg, DK	Analysis of the cerebral cortex: Thickness and shape
14:15 - 15:00	Oliver Granert, Kiel, Germany	Classification approaches applied to structural MRI data
15:00 - 15:30	Coffee break	
15:30 - 16:15	William Baaré, Copenhagen, DK	VBM studies on brain maturation
16:15 - 17:00	Bogdan Draganski, Leipzig, Germany	Longitudinal VBM: Activity driven plasticity in adults

## Wednesday 7th of October 2009 Diffusion based MRI (Organizer: Tim Dyrby)

Time	Speaker	Title
09:00 - 09:15	Tim Dyrby, Copenhagen, DK	Introduction
09:15 - 10:00	Mark Burke, Montreal, Canada	How does the neuroanatomy look like?
10:00 - 10:30	Henrik Lundell, Copenhagen, DK	From micro to macro
10:30 - 11:00	Coffee break	
11:00 - 11:30	Mark Tittgemeyer, Cologne, Germany	Diffusion Tensor Imaging (DTI)
11:30 - 12:00	Kathrine Skak Madsen, Copenhagen, DK	Group analysis of DTI using TBSS
12:00 - 12:30	Saad Jbabdi, FIMRIB, Oxford, UK	Tractography and brain connectivity
12:30 - 13:30	Lunch break	
13:30 - 14:00	Mark Tittgemeyer, Cologne, Germany	Group analysis in tractography
14:00 - 14:30	Tim Dyrby, Copenhagen, DK	Validation of tractography
14:30 - 15:00	Stephane Lehericy, Paris, France	Clinical applications
15:00 - 15:30	Coffee break	
15:30 - 16:00	Bogdan Draganski, Leipzig, Germany	Cortico- basal ganglia connectivity
16:00 - 17:00	Round table discussion	Future directions

## Thursday 8th of Oct. 2009 Functional MRI (Organizer: K.H. Madsen / M.S. Christensen)

Time	Speaker	Title
09:00 - 09:45	Karam Sidaros, Copenhagen, DK	Principles of perfusion- and BOLD sensitive MRI
09:45 - 10:30	Mark S. Christensen, Copenhagen, DK	fMRI paradigm design
10:30 - 11:00	Coffee break	
11:00 - 11:45	Finn Årup Nielsen, Lyngby, DK	Meta-analysis and databasing of neuroimaging studies
11:45 - 12:30	Christian Büchel	Second level models, Correlation with performance
12:30 - 13:30	Lunch break	
13:30 - 14:15	James Rowe, Cambridge, UK	Connectivity analysis: PPI, SEM, DCM, Granger causality
14:15 - 15:00	Morten Mørup, Lyngby, DK	Unsupervised multi-way decompositions
15:00 - 15:30	Coffee break	
15:30 - 16:15	Torben E. Lund, Århus, DK	Resting state fMRI and physiological noise modelling
16:15 - 17:00	Stephen Laconte, Texas, USA	Recent developments in real-time fMRI

## Friday 9th of October 2009 New frontiers in MRI (Organizer: H.R. Siebner)

Time	Speaker	Title
09:00 - 09:45	Lars Hanson, Copenhagen, DK	High-field human MRI
09:45 - 10:30	Til Ole Bergmann, Kiel, Germany	Combining EEG and fMRI
10:30 - 11:00	Coffee break	
11:00 - 11:45	Axel Tielscher, Tübingen, Germany	Combining TMS and fMRI
11:45 - 12:30	Lars Kai Hansen, Lyngby, DK	Mind reading