

Scientific Computing

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CBC Talk on Diffusion MRI by Jan Sijbers - June 11, 2014

On Wednesday, June 11, at 11:00 (Bakrommet), we will have a talk on diffusion MRI by Jan Sijbers, VisionLab — University of Antwerp, Belgium.

Total number of participants: 13
 Total number of guests outside of CBC: 1
 Number of different nationalities represented: 6
 Total number of speakers: 1
 Total number of talks: 1

Diffusion MRI

Diffusion MRI (or dMRI) is a magnetic resonance imaging (MRI) method which came into existence in the mid-1980s. It allows the mapping of the diffusion process of molecules, mainly water, in biological tissues, in vivo and non-invasively. Molecular diffusion in tissues is not free, but reflects interactions with many obstacles, such as macromolecules, fibers, membranes, etc. Water molecule diffusion patterns can therefore reveal microscopic details about tissue architecture, either normal or in a diseased state.

The first diffusion MRI images of the normal and diseased brain were made public in 1985. Since then, diffusion MRI, also referred to as diffusion tensor imaging or DTI (see section below) has been extraordinarily successful. Its main clinical application has been in the study and treatment of neurological disorders, especially for the management of patients with acute stroke. Because it can reveal abnormalities in white matter fiber structure and provide models of brain connectivity, it is rapidly becoming a standard for white matter disorders. The ability to visualize anatomical connections between different parts of the brain, noninvasively and on an individual basis, has emerged as a major breakthrough for neuroscience's so-called Human Brain Connectome project. More recently, a new field has emerged, diffusion functional MRI (DfMRI) as it was suggested that with dMRI one could also get images of neuronal activation in the brain. Finally, the method of diffusion MRI has also been shown to be sensitive to perfusion, as the movement of water in blood vessels mimics a random process, intravoxel incoherent motion (IVIM). IVIM dMRI is rapidly becoming a major method to obtain images of perfusion in the body, especially for cancer detection and monitoring.

About the speaker

Professor Jan Sijbers graduated in Physics in 1993. In 1998, he received a PhD in Physics from the University of Antwerp, entitled Signal and Noise Estimation from Magnetic Resonance Images", for which he received the Scientific Award BARCO NV in 1999. He was an FWO Postdoc at the University of Antwerp and the Technical University of Delft from 2002-2008. In 2005, he became a lecturer and in 2010 senior lecturer. In 2013, he was appointed full professor at the University of Antwerp. Jan Sijbers is the head of iMinds-Vision Lab and co-founder of IcoMetrix.

What	
When	Jun 11, 2014 from 11:00 AM to 12:00 PM
Where	Bakrommet @ simula
Contact Name	August Johansson
Attendees	August Johansson Glenn T. Lines Jan Sijbers Karen H. Støverud Kent-Andre Mardal Magne Nordaas Marie Rognes Martin Alnæs Owais Khan Øyvind Evju Simon Funke Sjur Gjerals Valeriya Naumova
Add event to calendar	 vCal  iCal