Special Issue on Computational Diffusion MRI
IEEE Transactions on Medical imaging

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Guest Editors

Diffusion MRI has exploded over the last decade since the introduction of diffusion-tensor MRI by Peter Basser and colleagues in 1994. The technique provides a unique insight into the microstructure of living tissue. In fibrous tissue, diffusion MRI provides estimates of fibre orientations in each image voxel and thus allows post-processing algorithms to reconstruct global fibre trajectories and infer global connectivity. In-vivo connectivity mapping using diffusion MRI provides fundamental neuroscientific insights into the workings of the human brain. The variety of clinical applications is expanding rapidly and includes detection of lesions and damaged tissue, prognosis of functional impairment and neurosurgical planning.

Computational techniques are key to the continued success and development of diffusion MRI and to its widespread transfer into the clinical arena. They are essential for addressing issues at each stage of the diffusion MRI pipeline: acquisition, reconstruction, modelling and model fitting, image processing, fibre tracking, connectivity mapping, visualization, group studies and inference. This Special Issue will highlight new approaches to these existing challenges and new research directions in the area by collecting together technical papers in areas including, but not limited to, the following topics:

- Diffusion-weighted image acquisition: sampling schemes and acquisition optimisation.
- Modelling diffusion within biological tissue and other materials.
- Reconstruction methods: high angular resolution and q-space methods.
- Model fitting and optimisation in diffusion MRI.
- Fibre tractography.
- Connectivity mapping.
- Network analysis.
- Visualization.
- Image registration and spatial normalization for diffusion MRI.
- Group mapping and voxel-based morphometry techniques.
- Tensor similarity measures, statistics and inference.
- Validation.
- Clinical and neuroscience applications involving novel computational techniques.

The IEEE Transactions on Medical Imaging seeks high-quality original research papers for this Special Issue. Authors should submit their manuscripts electronically, by the deadline below, through the IEEE Manuscript Central Office (http://mc.manuscriptcentral.com/tmi-ieee) following the TMI Instructions for Authors and indicating in the *Author Comments to the Editor-in-Chief* that the manuscript be considered for the special issue on *Computational Diffusion MRI*. Authors intending to submit articles are encouraged to discuss their submissions with the Guest Editors to determine suitability for this Special Issue.

Schedule:

Submission of manuscripts	January 1, 2007
Acceptance notification	April 1, 2007
Revised manuscripts due	June 1, 2007
Publication of special issue	October, 2007

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