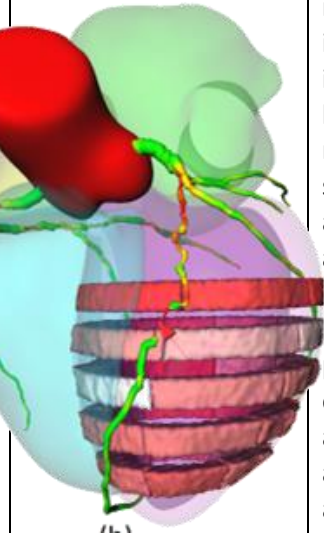


Erasmus MC / EUR CSC PhD 2014 Project Description

School / Department	The PhD candidate will be embedded in the Biomedical Imaging Group Rotterdam (BIGR), which is a technical institute within the Erasmus MC, university medical center, Rotterdam, the Netherlands.
Project Title	Quantitative image analysis of cardiac MRI
Abstract	 <p>Magnetic resonance imaging (MRI) is a powerful technique to analyse the structure and function of the heart. It plays an important role in the diagnosis of cardiac pathologies. Traditionally, the images are assessed in a rather qualitative way by the radiologist, by visual inspection. There is an increasing interest in more quantitative approaches, using automated image analysis for accurate and reproducible quantification of imaging biomarkers. For this purpose, advanced MRI protocols, such as T1 and T2 mapping, diffusion tensor imaging, and perfusion imaging are especially suitable. To capture the motion of the heart, CINE cardiac scans (movies) are also acquired. Dedicated image processing methods are needed for the analysis of such imaging data.</p> <p>In this project, the PhD candidate will develop and evaluate novel image processing methods for quantitative analysis of cardiac MRI, thereby explicitly taking into account underlying physics of the acquisition process and physiological models of the heart. He/she will be involved in modifying and investigating novel MRI sequences, using simulations and state-of-the-art MRI scanners in collaboration with the MR manufacturer. This research should enable accurate and reproducible quantification of imaging biomarkers for cardiac diseases, which can serve as outcome measures in large-scale clinical studies and patient care.</p>
Requirements of candidate	<ul style="list-style-type: none"> • Master degree in physics or engineering. • Good command of English language (IELTS grade 6.5). • Ability to work in a multidisciplinary team. • Experience with programming.
Supervisor information	<p>The project will be supervised by Prof. dr. Wiro J. Niessen, Dr. Dirk H.J. Poot, and Dr. Stefan Klein, in close collaboration with MRI physicists and expert radiologists and cardiologists. For questions, please contact Stefan Klein at s.klein@erasmusmc.nl.</p> <p>Website: http://www.bigr.nl</p>
Selected recent publications by the supervisory team: <ul style="list-style-type: none"> • H. Smit, R. Pellicer Guridi, J. Guenoun, D.H.J. Poot, G.N. Doeswijk, M. Milanese, M. Bernsen, G.P. Krestin, S. Klein and G. Kotek, T1 Mapping in the Rat Myocardium at 7 Tesla Using a Modified CINE Inversion Recovery Sequence, <i>Journal of Magnetic Resonance Imaging</i>, 39:901-910, 2014. • W. Sun, W.J. Niessen, M. van Stralen and S. Klein, Simultaneous Multiresolution Strategies for Nonrigid Image Registration, <i>IEEE Transactions on Image Processing</i>, 22:4905-4917, 2013. • D.H.J. Poot, G. Kotek, W.J. Niessen and S. Klein, Bias correction of maximum likelihood estimation in quantitative MRI, <i>Proceedings of SPIE Medical Imaging 8669: Medical Imaging 2013: Image Processing</i>, 2013. 	

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