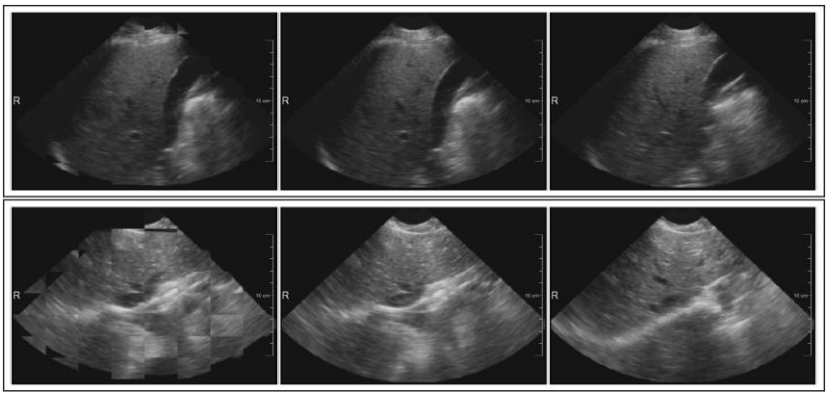
ERASMUS UNIVERSITEIT ROTTERDAM

Erasmus University Rotterdam, the Netherlands
CSC PhD 2015 Project Description

School/Department:	Biomedical Imaging Group Rotterdam
Project Title:	Improved image guidance in minimally invasive liver interventions
Abstract:	Whereas minimally invasive interventions are advantageous for the patient, the limited visualization possibilities of interventional modalities such as X-ray and US may hamper efficient and effective treatments. Goal of the work performed in the Image Guidance in Interventions and Therapy Theme Group at BIGR is to enable improved image guidance in minimally invasive interventions in the liver. The focus of this work is to integrate information from diagnostic 3D modalities such as MR and CT(A) in the intervention. This requires appropriate modeling using the pre-operative images, registration of this information to the interventional scene, and keeping this registration up-to-date during the course of the intervention. In this project, we will investigate novel approaches for image-based registration and tracking for improving image guidance in liver interventions, building on novel methods developed by the BIGR group, such as real-time registration of 3D US volumes (see below). The project will be done in close collaboration with the Department of Radiology of the Erasmus MC  Real-time registration of 3D US volumes
Requirements of candidate:	Master degree: Yes *(if No, review per incident)* Background: Computer Science / Biomedical Imaging / Biomedical Engineering IELTS Grade: 7.0 (minimal 6.0 per component) *or* TOEFL: 100 (minimal 20 per component)

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	GMAT/GRE: (if applicable)
Supervisor information:	Prof. dr. W.J. Niessen / Dr.Th. van Walsum / Dr. A. Moelker Email address: t.vanwalsum@erasmusmc.nl Personal website: www.bigr.nl/people/TheovanWalsum **Recent publication list Th. van Walsum, since 2010** 1. H. Tang, M Selwaness, K. Hameeteman, A.C. van Dijk, A. van der Lugt, J.C.M. Witteman, **W.J. Niessen**, L. J. van Vliet and **T. van Walsum**, Semi-automatic MRI segmentation and volume quantification of intra-plaque hemorrhage, *International Journal of Computer Assisted Radiology and Surgery*, in press. 2. G. Dibildox, N. Baka, M. Punt, J.P. Aben, C. Schultz, **W.J. Niessen** and **T. van Walsum**, 3D/3D registration of coronary CTA and biplane XA reconstructions for improved image guidance, *Medical Physics*, 2014 3. V.F. Fortunati, R.F. Verhaart, F. Angeloni, A. van der Lugt, **W.J. Niessen**, J.F. Veenland, M Paulides and **T. van Walsum**, Feasibility of multi-modal deformable registration for head and neck tumor treatment planning , *International Journal of Radiotherapy, Biology and Physics*, 2014 4. R.F. Verhaart, Z Rijnen, V.F. Fortunati, G.M. Verduijn, J.F. Veenland, **T. van Walsum** and M Paulides, Temperature simulations in head and neck hyperthermia treatment planning: rigorous tissue property optimization , *Strahlenterapy und Onkology*, 2014 5. R.F. Verhaart, V.F. Fortunati, G.M. Verduijn, **T. van Walsum**, J.F. Veenland and M Paulides, CT-Based Patient Modelling for Head and Neck Hyperthermia Treatment Planning: Manual versus Automatic Normal-Tissue-Segmentation, *Radiotherapy and Oncology*, 2014 6. N. Baka, C.T. Metz, C. Schultz, R.J. van Geuns, **W.J. Niessen** and **T. van Walsum**, Oriented Gaussian mixture models for non-rigid 2D/3D coronary artery registration, *IEEE Transactions on Medical Imaging*, 2014 7. H.A. Kirisli, V. Gupta, R. Shahzad, I. al Younis, A.S. Dharampal, R.J. van Geuns, A. Scholte, M.A. de Graaf, R. Joemai, K. Nieman, L. J. van Vliet, **T. van Walsum**, B.P.F. Lelieveldt and **W.J. Niessen**, Additional diagnostic value of integrated analysis of cardiac CTA and SPECT/MPI using the SMARTVis system in patients with suspected coronary artery disease, *Journal of Nuclear Medicine*, 2014

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