Publications

Journal articles

N. T. Doan, S. J. A. van den Bogaard, E. M. Dumas, A. G. Webb, M. A. van Buchem, R. A. C. Roos, J. van der Grond, J. H. C. Reiber, and J. Milles, "Texture analysis of ultrahigh field T_2^*-weighted MR images of the brain: application to Huntington's disease," *Journal of Magnetic Resonance Imaging*, vol. 39, no. 3, pp. 633–640, 2014

N. T. Doan, S. van Rooden, M. J. Versluis, A. G. Webb, J. van der Grond, M. A. van Buchem, J. H. C. Reiber, and J. Milles, "Combined magnitude and phase-based segmentation of the cerebral cortex in 7T MR images of the elderly," *Journal of Magnetic Resonance Imaging*, vol. 36, no. 1, pp. 99–109, 2012.

N. T. Doan, S. van Rooden, M. J. Versluis, M. Buijs, A. G. Webb, J. van der Grond, M. A. van Buchem, J. H. C. Reiber, and J. Milles, "Group-wise cortical feature analysis using high field T_2^*-weighted MR images highlights local differences between young and elderly healthy subjects," *Submitted*

S. van Rooden[*], **N. T. Doan**[*], M. J. Versluis, J. D. C. Goos, A. G. Webb, A. M. Oleksik, W. M. van der Flier, P. Scheltens, A. W. E. Weverling – Rynsburger, F. Barkhof, G. J. Blauw, J. H. C. Reiber, M. A. van Buchem, J. Milles, and J. van der Grond, "Cortical analysis using 7T MR phase images reveals regional differences between early and late onset Alzheimer's disease," *Submitted*, [*] shared first authorship

Conference proceedings

N. T. Doan, B. van Lew, B. P. F. Lelieveldt, M. A. Van Buchem, J. H. C. Reiber, and J. Milles, "Deformation texture-based features for classification in Alzheimer's disease," in *Proc. SPIE 8669, Medical Imaging 2013: Image Processing*, 866927.

O. Soldea, **N. T. Doan**, A. Webb, M. Van Buchem, J. Milles, and R. Jasinschi, "Simultaneous brain structures segmentation combining shape and pose forces," in *Proc. Multimodal Brain Image Analysis 2011*, 143–151.

N. T. Doan, M. J. Versluis, S. van Rooden, J. van der Grond, A. Webb, M. A. van Buchem, J. H. C. Reiber, and J. Milles, "Combined magnitude and phase-based segmentation of the cerebral cortex in 7T MR images of the elderly," in *Proc. ASCI Conference 2010*.

N. T. Doan, J. Orban de Xivry, and B. Macq, "Effect of inter-subject variation on the accuracy of atlas-based segmentation applied to human brain structures," in *Proc. SPIE 7623, Medical Imaging 2010: Image Processing*, 76231S

Abstracts and presentations

S. van Rooden, **N. T. Doan**, M. J. Versluis, J. D. C. Goos, A. G. Webb, A. M. Oleksik, W. M. van der Flier, P. Scheltens, A. W. E. Weverling – Rynsburger, F. Barkhof, G. J. Blauw, J. H. C. Reiber, M. A. van Buchem, J. Milles, and J. van der Grond, "7T T_2^*-weighted MRI reveals cortical phase differences between early- and late- onset AD," *Alzheimer's Association International Conference*, Copenhagen, Denmark, 2014

M. Buijs, **N. T. Doan**, S. van Rooden, M. J. Versluis, J. Milles, J. van der Grond, and M. A. van Buchem, "Cortical phase shifts in healthy aging at 7 Tesla," *International Society for Magnetic Resonance in Medicine Annual Meeting*, Milan, Italy, 2014

N. T. Doan, S. van Rooden, M. J. Versluis, A. G. Webb, J. van der Grond, M. A. Van Buchem, J. H. C. Reiber, and J. Milles, "Quantitative comparison of the informational content of T_2^*-weighted magnitude, phase and SWI 7T MR data by means of texture analysis of the cortical ribbon in elderly subjects," *International Society for Magnetic Resonance in Medicine Annual Meeting*, Melbourne, Australia, 2012.

N. T. Doan, M. J. Versluis, S. van Rooden, J. van der Grond, A. G. Webb, and M. A. van Buchem, "Automated phase-based segmentation of the cerebral cortex in 7T MR images of the elderly," *International Society for Magnetic Resonance in Medicine Annual Meeting*, Stockholm, Sweden, 2010.

Acknowledgements

In 2009, I joined the Division of Image Processing (LKEB), Leiden University Medical Center (LUMC), Leiden, to pursuit my PhD in brain image analysis. Looking back over the last few years, I believe it was one of the best decisions that I have made, thanks to the wonderful team that I have had the privilege to be a part of and the stimulating environment that I have been exposed to. I would like to thank all of my co-authors and colleagues for their invaluable help with my work at LUMC as well as my stay in the Netherlands.

First and foremost, I would like to express my sincere thanks to my two promotors, Prof. Boudewijn P. F. Lelieveldt and Prof. Mark A. van Buchem, for their continued support and thorough supervision. Boudewijn, thank you for convincing me that I should have my thesis ready for submission before the "big event" of my life, and for helping me achieve that goal. Mark, I am grateful to you for giving me the chance to work on the fascinating 7 Tesla MR data and for the motivating discussions we had.

I would like to further express my deep gratitude to Prof. Johan H. C. Reiber for the opportunity to do a PhD at LKEB and for his supervision in the first half of my PhD period. Hans, to me, the energy and dedication you have for research and development have always been admirable.

Julien, I am deeply thankful for the opportunity to work closely with you during my PhD. As my daily supervisor, you gave me freedom in my research, yet providing me with timely guidance to keep me on track. Your continued encouragement has helped me remain motivated, and your swift response with great sense of responsibility to project-related matters has helped me go through difficult phases. From you I learned to be determined in finishing what I started. Discussion with you has not only been fruitful but also enjoyable, thanks to your openness and sense of humour. Beyond PhD research projects, you have also given me great support and advices in my career development. Thank you!

My roommates in Terminaalzaal, Ronald, Qian, Baldur, Paulien, Luca, Ece, thank you for creating such a charming and open atmosphere in our office, where share, care and help are among the dominating features. You have been so kind and cheerful to me. I appreciate all the chats, laughs, cookies, coffee, etc., which have made work a lot more fun.

Baldur, to me, you are not only a wonderful colleague but also a trustworthy and caring friend. Thank you for your great work in running the extensive image registration jobs. You have also helped me out with numerous computer-related problems and tons of non-work related issues, for which I am forever grateful. I am glad that you agreed to be my paranymph. Zhuo, I am happy to be assisted by the NIP crew in my defense, thank you for kindly agreeing to be my other paranymph. Martijn, we did not have the chance to work on the same project; nevertheless, thank you for the constructive discussions we had on my 7 Tesla work. Michèle, thanks for having done a great job in IT support. Talking with you was so much fun. Shengnan, Shan, Paulien, Oleh, Mohammed, Walid, Changgong, Jasper, Yuchuan, Marius, Jos, Rob, thank you for the enthusiasm and spirits that you brought to the LKEB football team. I think we had demonstrated that, in addition

to doing good image processing research, team sporting is yet another competence of LKEB. Vikas, thank you for kindly sharing your experiences on thesis related subjects. I would also like to thank Erna, Bertie, and Anna-Carien for the thoughtful help with the administration. To the rest of LKEB, I feel honoured to be in the same group with you, thank you!

During my PhD research, I have had the opportunity to collaborate with brilliant researchers from the CJ Gorter Center for High-field MRI, Radiology Department and Neurology Department at LUMC. I would like to express my sincere thanks to all of them, without whom the work presented in this thesis would not have been possible. Sanneke, it has been my great pleasure to work with you in several projects. I appreciate the effort you put in data collection, which is certainly a prerequisite to our analysis projects. Thank you very much, Andrew, Maarten, and Jeroen for the insightful suggestions as well as the constructive and critical comments on my work. Mathijs, thank you for the nice collaboration on the aging data. Helpful discussions with Louis and Thijs are gratefully acknowledged. Furthermore, I would like to thank Eve, Simon and Prof. Roos for the fruitful collaboration on the Huntington's disease work. My gratitude is further extended to Radu (Philips Healthcare) and Octavian for the nice collaboration during my first year.

Special thanks to all of my friends in Netherlands who have made my PhD stay an enjoyable and unforgettable experience. Thuy and Stephan, thank you for the warm and helping hands during my transition from Leiden to Oslo. Dawn, Thuy and Nhung, Dai, Thao and Ronald, thank you for your company and the fun we have had together over the last few years. Thanks to many of my Vietnamese friends in Delft for the joyful activities. Particular thanks go to members of the Vietnamese student football team in Delft and the football team at Leiden University sport centre.

I would like to express my deepest gratitude to my parents, whose love has been the strongest foundation of my academic endeavours. My heartfelt thanks go to my beloved sister and other family members for their persistent encouragement.

Bao Nam, my life has turned to a new exciting chapter since you were born, and I enjoy every bit of it.

Finally, I am greatly indebted to my wife, who offered me to take away considerable family time for my PhD work. Phuong Anh, I feel blessed to have you beside me. Thank you for your unconditional support and your patience. Your love, care, and dedication have been crucial factors to the completion of this work.

Curriculum Vitae

Nhat Trung Doan was born on the 17th of August 1983 in Tien Giang, Vietnam. He received his bachelor degree from the Faculty of Electrical and Electronics Engineering, Ho Chi Minh University of Technology (Vietnam) in 2006. From 2006 to 2007, he worked as a teaching assistant at the same faculty. Subsequently, he followed the European Master of Science in Research on Information and Communication Technologies program with an Erasmus Mundus grant: first year at Universitat Politècnica de Catalunya (Spain), second year at Université Catholique de Louvain (Belgium), and graduated with high distinction. In 2009, Nhat Trung Doan joined the Division of Image Processing, Leiden University Medical Center (the Netherlands) as a PhD student to work on quantitative analysis of ultrahigh field MR images.

He is currently working as a postdoctoral researcher at the Norwegian Center for Mental Disorders Research (NORMENT), Faculty of Medicine, University of Oslo, Norway.