Home institution: VU University Amsterdam, The Netherlands
Host institution: Nuffield Department of Clinical Neurosciences, University of Oxford, UK
Supervisors: dr. C.R. Butler & dr. Y.D. Van der Werf
Period: February till October 2016

I am grateful to have received the NENS stipend to help fund my training stay in the Memory Research Group at the Nuffield Department of Clinical Neuroscience, University of Oxford. During my stay, I worked on a project aiming to investigate the relationship between functional and structural connectivity and (interictal) memory problems in patients with transient epileptic amnesia (TEA).

In order to investigate functional and structural connectivity in these patients, I learned a range of magnetic resonance imaging (MRI) processing and analyses techniques that were developed locally. First, I learned from the experts in the field how to use their widely available image processing toolbox, FSL, to perform (pre)processing of resting-state-functional and structural MRI scans, as well as DTI data. Importantly, I learned how to perform a decent quality check of the data, and explored various cleaning approaches to get rid of confounders. Then, to investigate whether functional networks were different and related to memory problems in TEA, I was taught several approaches of constructing and examining functional networks: (1) data-driven, ICA-based decomposition of functional data into resting-state networks, and (2) seed-based, functional connectivity analysis, which requires prior selection of regions of interest.

In addition, I learned how to examine the brain white matter connections, using two techniques that were developed locally, but are used worldwide: Tract-Based Spatial Statistics and Probabilistic Tractography. Working together with the people who developed these tools, I got acquainted with the up- and downsides of each technique, and got in depth knowledge of the code that supports each technique, thereby greatly improving my knowledge on programming, allowing me to write my own scripts for imaging analyses. To be able to compare imaging measures between groups and to investigate relationships with memory problems, I learned how to use PALM – permutation analysis of linear models – from its developer dr. A. Winkler. PALM is a novel permutation method that allows for joint analysis of imaging data as well as appropriate correction for multiple comparisons, thereby greatly extending the possibilities for imaging analysis. The combination of MR imaging knowledge as well as analysis skills that I acquired during my time in the memory research group, will enable me to perform high-level analyses in my home-institution and will greatly aid me in my future career.

In addition to having gained valuable experience in novel MRI processing and analysis techniques, I also improved my communication and presentation skills by attending and presenting in weekly lab meetings and journal clubs, as well as co-hosting public engagement workshops. Moreover, I developed my writing skills by writing several reports about my findings, one of them being in the form of a research article. Finally, working alongside experts in the field and being challenged by great researchers further improved my critical thinking skills and greatly stimulated my personal and professional growth.

Sincerely,

Thomas Wassenaar