

CURRICULUM VITAE --- B.C.M. VAN WIJK



PERSONAL DETAILS

Surname, initials: van Wijk, B.C.M.
First Name: Bernadette
Title: PhD
Date of Birth: 27-06-1985
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RESEARCH INTEREST

My work centers on the study of oscillatory activity and functional connectivity in the human brain, in particular during motor control. Using MEG, EEG and EMG, I look at local and long-range synchronization patterns in the cortex and spinal cord. In addition to this experimental work, I have a strong methodological interest. I have expertise in graph theory to characterize network properties and dynamic causal modeling to study effective connectivity. In my current position, I investigate cross-frequency coupling patterns within and between the subthalamic nucleus and motor cortex in Parkinson's disease patients with implanted deep brain stimulation electrodes.

DOCTORAL THESIS (DEFENDED ON 26-11-2012)

Neural synchronization within and between regions of the motor system

EDUCATION

<i>Doctoral degree</i> 2008-2012	Faculty of Human Movement Science VU University Amsterdam, The Netherlands	<i>cum laude</i> (top 5%)
<i>Master degree</i> 2006-2007	Human Movement Sciences VU University Amsterdam, The Netherlands	<i>cum laude</i> (top 5%)
<i>Bachelor degree</i> 2003-2006	Human Movement Sciences VU University Amsterdam, The Netherlands	<i>cum laude</i> (top 5%)

RESEARCH EXPERIENCE

Post-doctoral

Research Associate	June '13 – May '15 (2 years)	Deep brain stimulation in Parkinson's disease Supervisors: Dr. V Litvak, Prof. KJ Friston Wellcome Trust Centre for Neuroimaging University College London, UK
Research Officer	Jan – March 2013 (2.5 months)	Systems Neuroscience group - Prof. M Breakspear Queensland Institute of Medical Research Brisbane, Australia Topic: EEG correlates of emotions

During PhD

Research assistant	June – Aug 2012 (3 months)	Project 'ULTRA-stroke' VU University Amsterdam, The Netherlands Preprocessing of MEG data (Neuromag system)
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Working visit	March – June 2010 (4 months)	Group Professor KJ Friston Wellcome Trust Centre for Neuroimaging University College London, UK
PhD student	June '08 – May '12 (4 years)	Supervisors: Prof. A Daffertshofer & Prof. PJ Beek Faculty of Human Movement Science VU University Amsterdam

Before PhD

Research assistant	Feb – May 2008 (4 months)	Faculty of Human Movement Science VU University Amsterdam
Research Internship	Feb – July 2007 (5.5 months)	Supervisor: Dr. P Praamstra School of Psychology University of Birmingham, UK Part of the HMS Master's curriculum
Student assistant	Sep '05 – June '06 (10 months)	Research group 'Coordination Dynamics' Faculty of Human Movement Science VU University Amsterdam

PUBLICATIONS

- Friston KJ, Bastos AM, Oswal A, **van Wijk B**, Richter C, Litvak V (2014). Granger causality revisited. *Neuroimage*
- van Wijk BCM**, FitzGerald THB (2014). Thalamo-cortical cross-frequency coupling detected with MEG. *Front Hum Neurosci* 8:187.
- Boersma M, de Bie HMA, Oostrom KJ, van Dijk BW, Hillebrand A, **van Wijk BCM**, Delemarre-van de Waal HA, Stam CJ (2013). Resting-state oscillatory activity in children born small for gestational age: an MEG study. *Front Hum Neurosci* 7:600.
- van Wijk BCM**, Litvak V, Friston KJ, Daffertshofer A (2013). Nonlinear coupling between occipital and motor cortex during motor imagery: a dynamic causal modeling study. *Neuroimage* 71:104-113.
- van Wijk BCM**, Beek PJ, Daffertshofer A (2012). Neural synchrony within the motor system: what have we learned so far? *Front Hum Neurosci* 6:252.
- van Wijk BCM**, Willemse RB, Vandertop WP, Daffertshofer A (2012). Slowing of M1 oscillations in brain tumor patients in resting state and during movement. *Clin Neurophysiol* 123:2212-2219.
- van Wijk BCM**, Beek PJ, Daffertshofer A (2012). Differential modulations of ipsilateral and contralateral beta (de)synchronization during unimanual force production. *Eur J Neurosci* 36:2088-2097.
- Daffertshofer A, **van Wijk BCM** (2011). On the influence of amplitude on the connectivity between phases. *Frontiers in Neuroinformatics* 5(6).
- van Wijk BCM**, Stam CJ, Daffertshofer A (2010). Comparing brain networks of different size and connectivity density using graph theory. *PLoS ONE* 5:e13701.
- Antiqueira L, Rodrigues FA, **van Wijk BCM**, Costa L da F, Daffertshofer A (2010). Estimating complex cortical networks via surface recordings – a critical note. *Neuroimage* 53:439-449.
- Boonstra TW, **van Wijk BCM**, Praamstra P, Daffertshofer A (2009). Corticomuscular and bilateral EMG coherence reflect distinct aspects of neural synchronization. *Neurosci Lett* 29:17-21.
- van Wijk BCM**, Daffertshofer A, Roach N, Praamstra P (2009). A role of beta oscillatory synchrony in biasing response competition? *Cereb Cortex* 19:1294-1302.

BOOK CHAPTERS

- Daffertshofer A, **van Wijk BCM** (2012). Transient motor behavior and synchronization in the cortex. In: *Principles of brain dynamics*. Chapter 12. Editors: Rabinovich M, Friston KJ, Varona P. MIT Press.
- van Wijk BCM**, Daffertshofer A, Praamstra P (2008). Local and long-range beta synchrony in motor control. In: *Biomagnetism: interdisciplinary research and exploration*. Sapporo, Japan: Hokkaido University Press p. 185-187. [Conference proceedings]

RESEARCH GRANTS AND PRIZES

Data analysis competition Biomag 2010: Connectivity and multivariate classification approaches

BCM van Wijk, V Litvak, KJ Friston.

Winner of "Competition 2. Real data set on functional connectivity" (500 EURO)

NWO Toptalent 2008

(The Netherlands Organisation for Scientific Research)

Personal grant for financing the salary of a 4-year PhD project. **180.000 EURO**

Competitive national grant scheme with several selection rounds aiming at excellent Master students from all scientific disciplines for financing their own PhD at a Dutch university.

Hersenstichting Nederland

(Dutch Organization for Brain Research)

Grant for students to support an international research internship related to brain research. (2007)
500 EURO

INVITED TALKS

- Unravelling synchronization patterns within and across frequency bands* 30-04-2014
Prof. Peter Brown's experimental neurology group, University of Oxford, UK
- Synchronization in the brain: from neural populations to functional networks* 25-03-2014
Bristol Centre for Complexity Sciences, University of Bristol, UK
- Synchronization within and between different frequency bands in Parkinson's disease* 06-03-2014
SyMoN lab group meeting, School of Psychology, University of Birmingham, UK
- Dynamic causal modeling for time-frequency - SPM course on M/EEG* 14-05-2013
Institute of Neurology, University College London, UK
- Dynamic causal modeling for time-frequency - SPM course on M/EEG* 15-05-2012
Institute of Neurology, University College London, UK
- Characterizing complex brain networks using graph theory: benefits and pitfalls* 17-06-2011
Workshop on functional connectivity, Donders Institute, Nijmegen, NL
- Dynamic causal modeling for time-frequency - SPM course on M/EEG* 10-05-2011
Institute of Neurology, University College London, UK

ORAL PRESENTATIONS AT INTERNATIONAL CONFERENCES

- **van Wijk BCM**. Estimating directional cross-frequency coupling from time-frequency spectra using dynamic causal modelling. Biomag 2014, Halifax, Canada.
- **van Wijk BCM**. Detection of cross-frequency interactions. Satellite symposium on Biomagnetic signal processing, Biomag 2014, Halifax, Canada.
- **van Wijk BCM**, Litvak V, Friston KJ, Daffertshofer A. Dynamic causal modelling of time-frequency modulations during motor imagery. *MEG UK 2014*, Nottingham, UK.
- **van Wijk BCM**. Dynamic causal modeling of time-frequency modulations. *Brainmodes 2012*, Brisbane, Australia.

- **van Wijk BCM**, Stam CJ, Daffertshofer A. Characterizing complex brain networks using graph theory. *Brainmodes 2010*, Copenhagen, Denmark.
- **van Wijk BCM**, Boonstra TW, Praamstra P, Daffertshofer A. Time-frequency analysis reveals distinct synchronization patterns within the motor system. *7th NFSI & ICBEM 2009*, Rome, Italy.

POSTER PRESENTATIONS

- **van Wijk BCM**, Brown P, Friston KJ, Litvak L. Movement-related cross-frequency coupling between M1 and STN in Parkinson's disease. UCL Neuroscience Symposium, 13 June 2014, London, UK.
- **van Wijk BCM**, Brown P, Friston KJ, Litvak L. Movement-related cross-frequency coupling between M1 and STN in Parkinson's disease. HBM 2014, Hamburg, Germany.
- **van Wijk BCM**, Litvak V, Friston KJ, Daffertshofer A. Dynamic causal modelling of time-frequency modulations during motor imagery. *MEG UK 2014*, Nottingham, UK.
- **van Wijk BCM**, Litvak V, Friston KJ, Daffertshofer A. Dynamic causal modelling of time-frequency modulations during motor imagery. *Brainmodes 2013*, Amsterdam, NL.
- **van Wijk BCM**, Stam CJ, Daffertshofer A. Using graph theory to study anatomical and functional networks in the brain: prospects and limitations. *7th FENS forum of European Neuroscience, 2010*, Amsterdam, NL.
- **van Wijk BCM**, Beek PJ, Daffertshofer A. Unimanual and bimanual movements are accompanied by different cortical network organization. *7th edition of Progress in Motor Control, 2009*, Marseille, France.
- **van Wijk BCM**, Daffertshofer A, Praamstra P. Local and long-range beta synchrony in motor control. *Biomagnetism: interdisciplinary research and exploration, 2008*. Sapporo, Japan: Hokkaido University Press p. 185-187.

OTHER PARTICIPATION IN INTERNATIONAL CONFERENCES

Regular attendance of international conferences (>1 day) with presentations by invited speakers only: *Brainmodes* (Amsterdam 2008 & Marseille 2011), *Brain Connectivity Workshop* (Maastricht 2009 & Berlin 2010), *FENS Satellite Symposium on Motor Control* (Nijmegen 2010).

REVIEWER ACTIVITIES

Peer reviewed for: *PLoS ONE*, *Neuroimage*, *Journal of Neuroscience*, *Journal of Neuroscience Methods*, *Schizophrenia Bulletin*, *European Journal of Applied Physiology*, *Chaos*, *Neuroscience Letters*, and *Human Movement Science*.

TEACHING EXPERIENCE

Various *teaching assistant jobs* at the Faculty of Human Movement Sciences, VU University Amsterdam, for courses in the Bachelor's curriculum.

As a Bachelor & Master student

- Introduction to Matlab (computer seminars)
- Introduction to research methods (computer seminars)
- Simulation models of neuromuscular systems (computer seminars)

As a PhD student

- Assistant in the Neuroanatomy course (dissection classes)
- Supervision of Bachelor research projects
- Supervision of Bachelor thesis

In addition, I contribute to the annual **SPM course** organized by the Institute of Neurology, UCL. The students in this course are primarily PhD students and post docs from universities across Europe.

- Lecture on dynamic causal modeling (SPM course on M/EEG in 2011, 2012, 2013, 2014)
- Supervision during computer seminars (SPM course on M/EEG in 2011, 2012, 2013, 2014)

ORGANIZING ACTIVITIES

- Co-organizer of the weekly 'brain meeting' seminars at the Wellcome Trust Centre for Neuroimaging for the year 2013-2014. Organization involves inviting and hosting national and international speakers working on various neuroscientific topics.
- Co-organizer of the SPM course for MEG/EEG 2014, May 12-14, London. The course consists of two days lectures and demonstrations, and a one day hands-on computer seminar. Organization involves constructing the course program and inviting local and external speakers.

RESEARCH METHODS

Experienced with data acquisition and signal processing of: MEG (CTF system), EEG (Biosemi), EMG (surface bipolar and high-density grids), force sensors, accelerometers, and motion capturing (Optotrak).

Experienced with various signal processing methods: e.g., spectral analysis, event-related potentials, coherence, phase synchronization, source localization, principal component analysis, graph theory, dynamic causal modeling.

COMPUTER SKILLS

- Matlab programming
- Experienced with grid computing
- Experienced with Windows and Linux
- Familiar with *SPM* and *Fieldtrip* toolboxes

ATTENDED EXTRA-CURRICULAR ACADEMIC COURSES

- Linear Algebra (first year bachelor Mathematics, VU University Amsterdam)
- Non-linear dynamics (second year bachelor Mathematics, VU University Amsterdam)
- Probabilistic and Unsupervised Learning, Approximate Inference and Learning in Probabilistic Models (Gatsby Unit for Computational Neuroscience, University College London)

LANGUAGE SKILLS

Dutch (native speaker)

English (fluent)

German, French, Swedish (basic knowledge)