

Curriculum Vitae Martijn van den Heuvel

Researcher Unique ID: [Google Scholar Profile](#)



I am a computational neuroscientist with a background in Artificial Intelligence, Neuroimaging, and Cognitive Neuroscience. As a professor of Computational Neuroscience at the CNCR, VU Amsterdam I study the human connectome, the 'road map' of connections of the human brain, in health, disease and development. With my team of enthusiastic and talented MSc, Phd students and Postdoctoral researchers we bridge several disciplines, such as computer science, psychology, mathematics, genetics, and psychiatry.

Inspired by the notion of brain functions to emerge from interactions between brain regions, my early work focussed on the development of methods for the reconstruction and study of high resolution functional and structural connectome maps from MRI data (Neuroimage, 2008, Human Brain Mapping 2008). My studies were one of the first to link connectomics to brain functioning (J Neuroscience, 2009) and as a Postdoc, I postulated the existence of a 'rich-club organization of the human connectome', describing a collective of densely connected hubs that act as a central communication and integration backbone in the human (and animal) brain. In a series of studies I showed the rich club to play an important role in global brain communication and functional integration (J Neuroscience 2011, 2013, 2013, 2014, JAMA Psychiatry 2013, PNAS 2012, Neuroimage 2014). I propose the rich club to include a fundamental structure (a 'rule of wiring') of nervous system organization across species, and to play an important role in a variety of brain dysfunctionality (TiCS 2013, Nature Reviews Neurosciences 2020).

Continuing along the line of connectome research, I apply structural and functional connectomics in the field of mental health, in particular the application to neurodevelopmental psychiatric and neurological conditions (J Neuroscience 2010, JAMA Psychiatry 2013, Biological Psychiatry, 2015, 2016). Working in close collaboration with neonatologists we mapped and studied the early neonatal connectome during healthy and preterm conditions (Cerebral Cortex 2015).

My current work focusses on linking connectomics to behaviour, genetics, cell biology and brain evolution. These include cross-scale investigations in which I link micro- and macroscale features of brain connectivity in health, disease and development (J Neuroscience 2013, 2015, Biological Psychiatry 2015, HBM 2016) and studies in the field of 'comparative connectomics' (TiCS 2017) in which we examine the evolutionary background of human brain connectivity in relationship to human cognition and brain diversity (PNAS 2019, 2023, Nat Comm 2021, BRAIN 2020). I am particularly interested in exploring the genetic background of human brain connectivity (GWAS), and the role of the connectome in shared disease effects *across* disorders (ongoing ERC Consolidator project).

Positions

- 2020 - current Professor of Computational Neuroscience and Brain Systems, Department of Neuroscience, Vrije Universiteit Amsterdam
- 2018 - current Associate Professor CG, AMC Amsterdam
- 2018 - 2020 Associate Professor at the Department of Neuroscience, Vrije Universiteit Amsterdam; PI of Connectomics Lab
- 2009 - 2018 Assistant Professor and (2009-2016) and Associate Professor at the Brain Center Rudolf Magnus, UMC Utrecht

2011 - 2014 Multiple Periods of Visiting researcher at the lab of prof dr. Olaf Sporns, Department of psychology and brain sciences at Indiana University (IU, Bloomington, USA)

2006 - 2009 PhD Student Department of Psychiatry, UMC Utrecht, Promotors: Prof RS Kahn, Prof HE Hulshoff Pol

2004 - 2005 unior researcher TNO

Training

- SQL (2023) and BQL (2019)
- Academic Leadership, University Medical Center Utrecht, University of Utrecht, The Netherlands
- PhD (cum laude), Thesis: 'The connected brain', University Medical Center Utrecht, University of Utrecht, The Netherlands (2006-2009). Promotor: prof dr RS Kahn, prof dr HE Hulshoff Pol
- Rudolf Magnus Institute of Neuroscience Graduate School (2009)
- BSc/MSc Cognitive Artificial Intelligence, University of Utrecht, The Netherlands (1999-2004, extended 5 year track).

Teaching

- 2023 - current, Computational Neurosciences, BSc Biomedical Sciences, VU, Amsterdam
- 2020 - current, Big data for Biomedical sciences, BSc Biomedical Sciences, VU, Amsterdam
- 2019 - current, Minortrack Cognitive Neuroscience, VU, Amsterdam
- 2018 Minortrack Omics in psychiatry, VUmc and VU, Amsterdam
- 2018 - current Teacher in Master of Neuroscience, VU Amsterdam
- Principal organiser of the 10Kin1day connectome workshop on data sharing and mass data analysis, 3 days, October 2016
- Principal organiser of the Utrecht Summerschool Course Exploring the brain network 5 days, 2015, 2016, 2017
- 2014 - 2018. Coordinator of 'Anatomy and Development' of the Master course 'Fundamentals of Neuroscience', University Utrecht
- 2014 - 2018 Course Lecturer on Neuroimaging for Master course 'Fundamentals of Neuroscience' and for Bachelor course 'Introduction to Neuroscience', University Utrecht

Science Statistics

- graduated 11 PhD students, currently supervising 6 PhD students, 2 postdocs
- h-index: 85 (google scholar)
- 145 publications | 43 last | 22 first | 80+ without promotor
- 13,000+ citations | 10 first/last author papers with 500+ citations | 36 with 100+
- 19 Thomson Reuters Highly-cited papers (13 first, 1 last)
- 13 papers with IF > 10 as first/last author, 3 as second
- 15 grants as main applicant, 4.5M+ in total
- Thomson Reuters Highly-cited researcher 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023
- 100+ international lectures, 5 keynote lectures, including keynote lecture OHBM 2018 ([link to lecture](#))



Honors and Fellowships

- Top 1 (2017) and Top 2 (2018) Editor for Human Brain Mapping 2017 and 2018
- MQ Fellowship, 2016 (4-6 per year out of 300 applications)
- 2017 Top 15 most cited researchers of the University Utrecht (previous employer, across all disciplines of science)
- First position in the Dutch Science Breakthrough Battle NPO, Dutch Television, 2014
- Most cited Elsevier paper in Neuroscience and Behavior by a Dutch author, 2005 - 2015

- Talent Award ENP 2013
- Dutch Brain Award, Brain Society The Netherlands, Dutch Brain Organization, 2013
- 2009 PUG Thesis Prize of Utrecht for best thesis
- Associate Professor Fellowship UMCU, 2016
- 2015 MQ Fellowship Award,
- Brain Center Rudolf Magnus Talent Fellowship

Selection of grants as applicant

2021 - 2025 ERC Consolidator, EU, Personal Grant, main PI

2020 - 2030 NWO Gravitation, BrainScapes, co-applicant

2016 - 2020 VIDI Grant, NWO, Personal Grant, main PI

2017 - 2019 ALW Open, NWO, main PI

2015 WESTON, main PI

2014 WKZ Foundation, main PI

2014 ALS Foundation, main PI

2012 - 2014 VENI grant, NWO, Personal Grant, main PI

2012 ALS Foundation, main PI

Organizer of scientific meetings

7 international workshops on connectomics and neuroimaging, 5 symposia and 3 international summerschools on brain connectomics.

Commissions of trust

2023 - current Deputy Editor for Human Brain Mapping

2021, 2023 ERC Advanced selection committee

2015 - 2022 Handling Associate Editor for Human Brain Mapping

2019 - 2023 Member of the Editorial board of Psychiatry Research: Neuroimaging

2019 - 2020 Advisory board Wiley journal *Neuroscience Next*

2017 - current Handling Editor for Network Neuroscience

2016 - 2023 Member of the editorial board of Neuroimage

2015 Member of the European FLAG-ERANET HBP grant evaluation committee 2015

2013 - 2015 Handling Associate Editor BMC Neuroimaging

2016 - 2018 Member of the Utrecht Young Academy

2013 - current Occasional grant reviewer for Wellcome Trust, Research Council of Hong Kong, Swiss National Science Foundation, NWO, Netherlands Brain Association

2008 - current Reviewer (300+ manuscripts) for PNAS, Nature Neuroscience, Science, Current Biology, Neuron, Biological Psychiatry, JAMA Psychiatry, BRAIN, Schizophrenia Bulletin, PLoS Computational Biology, Journal of Neuroscience, Human Brain Mapping, Neuroimage

Publications (selection / reflection of work over the years)

Van den Heuvel MP. .., Rilling JK (2024). Human and Chimpanzee shared and divergent neurobiological systems for general and specific cognitive brain functions. **PNAS**. In press. *In this study we examined overlapping cognitive systems in the chimpanzee and human brain, showing that human cognitive networks are evolutionary older than humans. We show the human connectome to be more tuned to features of language and the default-mode system, while the chimpanzee connectome is more tuned to working memory and salience processing.*

Helweggen K, Libedinsky I, van den Heuvel MP (2022). Statistical Power in Network Neuroscience. **Trends in Cognitive Sciences** 27(3). 282-301. *Technical review on the current status of statistical power in the field of brain imaging and connectomics.*

- Tissink E, ..., van den Heuvel MP (2022). The genetic architectures of functional and structural connectivity patterns within cerebral resting-state networks. **Eneuro** 10(4). *A GWAS discovery paper on underlying genes of human brain connectivity networks.*
- Repple J, ..., van den Heuvel MP & Dannlowski U, van den Heuvel MP (2022). Shared and Specific patterns of structural connectivity across affective and psychotic disorders. **Biological Psychiatry**. 93(2) 178-186. *Long-term collaboration with Muenster (prof Dannlowski) and Frankfurt (prof Repple) where we apply brain connectomics to a clinical setting where we combine fundamental science with the study of the use of prediction models (Machine Learning) for clinical outcome.*
- Pang J, Rilling JK, Roberts J, van den Heuvel MP & Cocchi L (2022). Evolutionary shaping of human brain dynamics. **Elife** 11, e80627. *Computational simulation studies on Chimpanzee brain activation patterns.*
- Meier JM, ..., van den Heuvel MP (2020). Connectome-based Propagation Model in Amyotrophic Lateral Sclerosis. **Annals of Neurology** 87(5) 725-738. *Study where we examined the use of MRI and prediction models for clinical outcome.*
- Repple J, Mauritz M, .., Dannlowski U & van den Heuvel MP (2019) Severity of current depression and remission status associated with structural connectome alterations in major depressive disorder. **Molecular Psychiatry** 7: 1550-1558
- Wei YB, de Lange SC, .., van den Heuvel MP (2019). Genetic mapping and evolutionary analysis of human-expanded cognitive networks. **Nature Communications** 10: 4839. *Here we studied the genetic background of human-expanded cognitive networks across evolution.*
- De Lange SC, Scholtens LH, ..., van den Heuvel MP (2019). Shared vulnerability for connectome alterations across psychiatric and neurological brain disorders. **Nature Human Behavior** 3(9) 988-998. *A milestone study where we performed (at that time) one of the largest cross-disorder studies comparing brain (dis)connectivity patterns across a wide range of neuropsychiatric and neurological brain disorders.*
- Van den Heuvel MP, Sporns O. (2019). A cross-disorder landscape of brain dysconnectivity. **Nature Review Neuroscience** 20(7) 435-446. *Review paper in which we introduced the concept of a cross-disorder landscape of brain dysconnectivity effects shared across disorders, to pave the way for more specificity in connectome research.*
- Ardesch DJ, Scholtens LH, Li L, Preuss TE, Rilling J, Van den Heuvel MP (2019). Evolutionary expansion of cortical connectivity between multimodal association areas in the human brain compared to chimpanzees. **PNAS**. 116(114):7101-7106. *First chimpanzee connectome reconstruction and comparison to human brain connectivity systems.*
- Collin G, Scholtens LH, Kahn RS, Hillegers MH, van den Heuvel MP (2017). Affected anatomical rich club and structural–functional coupling in young offspring of schizophrenia and bipolar disorder patients. **Biological psychiatry**. 82(10): 746-755.
- Van den Heuvel MP, de Lange SC, Zalesky A, Sequin, C, Yeo BT, Schmidt R. (2017). Proportional thresholding in resting-state fMRI functional connectivity networks and consequences for patient-control connectome studies: Issues and Recommendations. **Neuroimage** 152:437-449.
- Romme I, de Reus MA, Ophoff RA, Kahn RS, van den Heuvel MP (2017). Connectome disconnectivity and cortical gene expression in patients with schizophrenia. **Biological psychiatry**. 81(6): 495-502. *One of the first studies that combined brain transcriptomic data to disease related brain patterns.*
- Van den Heuvel MP, Scholtens LH, de Reus MA, Kahn RS. (2016). Associated Microscale Spine Density and Macroscale Connectivity Disruptions in Schizophrenia. **Biological Psychiatry**. 80(4):293-301. *In this paper I linked cortical microscale neuronal changes in schizophrenia to macroscale changes in connectivity as observed by means of MRI. This paper featured the Editorial's pick at the journal.*

- Van den Heuvel MP, Bullmore ET, Sporns O. (2016). Comparative Connectomics. **Trends in Cognitive Sciences**. 20(5):345-361. *This paper introduces the field of comparative connectomics, with the aim to explore commonalities and differences in wiring structure across species. This paper functioned as the basis for my ALW open 2016 project.*
- Scholten LH, Schmidt R, de Reus MA, van den Heuvel MP (2014). Linking macroscale graph analytical organization to microscale neuroarchitectonics in the macaque connectome. **Journal of Neuroscience**. 34(36):12192-205. *In this paper I examined the link between neuronal organization and macroscale connectome organization in the macaque cortex.*
- Van den Heuvel MP, Sporns O (2013). Network hubs in the human brain (2013). **Trends in Cognitive Sciences**. Dec;17(12):683-96. *This review discusses the existence of macroscale hub organization in human and animal nervous systems and the implication of this type of organization for disease. This paper was honourably selected by the editor in the top 40 most influential papers of TiCS in the last 40 years.*
- Van den Heuvel MP, Sporns O, Collin G, Scheeuwe T, Mandl RCW, Cahn W, Goni J, Hulshoff Pol HE, Kahn RS (2013). Abnormal rich-club organization and functional brain dynamics in schizophrenia. **JAMA Psychiatry/Archives of General Psychiatry**. Aug;70(8):783-92. *This paper showed for the first time affected rich club organization in schizophrenia. 1500+ citations.*
- Van den Heuvel MP, Kahn RS, Goni J, Sporns O (2012). A high-cost, high-capacity backbone of brain communication. **Proc Nat Acad Sci**. 109(28):11372-7. *Here we further studied rich club organization of the human connectome and its effect on efficient communication.*
- Van den Heuvel MP & Sporns O (2011). Rich-club organization of the human connectome. **Journal of Neuroscience**. Nov 31(44): 15775-15786. *This paper introduced the concept of rich club organization in the human brain. Rich club organization has become a well studied network feature in the healthy and diseased brain. This paper received 1000+ citations.*