



# Jeroen Van Schependom

## Curriculum Vitae

### Personalia

Nationality Belgian  
Orcid ID 0000-0003-1200-5872

### Experience

2022-Present **Member of the Jonge Academie.**  
2021-Present **Fellow of EUTOPIA Young Leadership Academy, VUB.**  
2021-2022 **Sidekick Vice Rector Research and Development, VUB.**  
2020-Present **Vice Chair AI Supported Modelling in Clinical Sciences (AIMS), VUB.**  
2019-Present **Onderzoekersprofessor (docent), Vrije Universiteit Brussel.**  
2018-2019 **Secretary, Scientific steering group National MS Centre Melsbroek.**  
2019-2019 **Visiting Researcher, Computational Neuroscience Group, UPF Barcelona.**  
2016-2019 **FWO Post-Doc, Vrije Universiteit Brussel, Center for Neurosciences.**  
2016-2017 **Visiting Researcher, University of Oxford, Oxford Centre for Human Brain Activity.**  
2014-2016 **Internship, IcoMetrix NV, R&D.**  
2012-2016 **FWO Aspirant (PhD candidate), Vrije Universiteit Brussel - UMONS, Center for Neurosciences-Faculté de Psychologie et des sciences de l'Education.**  
2011-2012 **PhD candidate, UMONS, Faculté de Psychologie et des sciences de l'Education.**

### PhD Thesis

Joint PhD - Vrije Universiteit Brussel - Université de Mons

Title **Cognitive Impairment in MS: Statistical and Neurophysiological aspects**

Supervisors Prof. Dr. Marie-Claire Haelewyck, Prof. Dr. Marie B D'hooghe, Prof. Dr. Jacques De Keyser & Prof. Dr. ir. Guy Nagels

Description This thesis assessed the evolution of cognitive impairment in MS and explored the possibility of using EEG as a biomarker for this cognitive decline using advanced classification schemes.

Defended on 5 May 2015

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## Supervision

PhDs **Supervisor**, *VUB-Faculty of Engineering*.

- Chiara Rossi, FWO Aspirant, MEG brain dynamics in MS patients
- Fahimeh Akbarian, E-I inhibition ratio in neurodegenerative diseases
- Saba Panah, FWO Project on the development of novel neuromodulation paradigms to enhance remyelination

PhDs **Supervisor**, *VUB-Faculty of Medicine and Pharmaceutical sciences*.

- Thomas Scheinok, FWO Project on the development of novel neuromodulation paradigms to enhance remyelination.

**Co-supervisor**, *VUB-Faculty of Medicine and Pharmaceutical Sciences*, On-going.

- Johan Baijot, Master of Sciences in Biomedical Engineering (VUB) works on the graph-theoretical analysis of resting-state fMRI data and their link with cognitive functioning in healthy controls and people with MS. Start date: 1-Oct-2017;
- Stijn Denissen, Master of Sciences in Physical Therapy (KULeuven) works on the application of deep learning methods to predict cognitive impairment in MS. Start date: 1-Mar-2019;

**Co-supervisor**, *VUB-Faculty of Medicine and Pharmaceutical Sciences*, Defended.

- Lars Costers, Master of Sciences in Psychology (UGent) works as FWO-aspirant on the advanced analysis of working memory in healthy controls and people with multiple sclerosis. Public PhD Defense scheduled: 13-April-2020.
- Jorne Laton, Machine learning techniques to improve the value of neurophysiological measurements for individual patients, 2017, Vrije Universiteit Brussel
- Jeroen Gielen, MRI measures in the assessment of cognitive function in MS, 2018, Vrije Universiteit Brussel.

Master theses **Supervisor**.

I have supervised 3 master thesis at the Faculty of Engineering (Master of science in biomedical engineering) on GPU processing to speed up permutation tests, assessment of the intracerebral conduction velocity in vivo and transient brain dynamics. Further, I have co-supervised several students from the Faculty of Medicine and Pharmacy with different topics on the application of neuroimaging to different neurological pathologies.

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## Education

2020 **FELASA - Cat C**, *UGent*.

2019 **Certificate of Good Clinical Practice**, *UZ Leuven*.

2011–2015 **Joint PhD**.

- Medical Sciences, VUB, Brussels
- Psychological Sciences, UMONS, Mons

2009–2011 **Master of Science in Engineering Physics**, *UGent*, Ghent.  
Highest distinction

2006–2009 **Bachelor of Science in Engineering Physics**, *UGent*, Ghent.  
High distinction

2001–2006 **Greek-Mathematics**, *Sint-Jozef-Klein-Seminarie*, Sint-Niklaas.  
Highest distinction

- 2011-2015 **Workshops.**
- 2015 - MEG workshop - Oxford Centre for Human Brain Activity (OHBA)
  - 2012 - EEGlab workshop - Tsinghua University - Beijing
  - 2012 - SPM8 workshop - University College London
- 2011-2015 **PhD Training, Vrije Universiteit Brussel/UMons.**  
Project planning, Presentation Skills
- 2011-2015 **Extra Courses.**
- Datamining and machine learning (KULeuven, prof. J Suykens)
  - Least-Squares Support Vector Machines (KULeuven, prof. J Suykens)
  - Statistical Foundations of Machine Learning (VUB/ULB, prof. G. Bontempi)
  - Coursera.org: Statistical analysis of fMRI data (Prof. Martin Lindquist), Machine Learning (Prof. Andrew Ng), Computing for Data Analysis (Prof. Roger Peng), Computational Neuroscience (Prof. Rajesh Rao)
- 2010-2011 **Extra Courses, UGent, Ghent.**  
Group Theory, NMR
- 2010-2010 **7<sup>th</sup> International Esarda course: Nuclear safeguards and non-proliferation,**  
*Joint Research Center Ispra, Italy.*
- 2009-2010 **Erasmus, Universidad Complutense de Madrid, Madrid.**

## Awards/Grants

- Promoter **2022 - Innoviris: DetectDem - A novel test strategy to follow up patients at risk of developing dementia, 1.2M EUR**
- 2020 - Flanders Research Foundation: FWO-Project (G042821N) - Prolonged transcranial alternating current stimulation leveraging new stimulation paradigms and set-ups as a treatment to promote remyelination in cuprizone treated mice (492.250 EUR)**
- 2020 - VUB: IOF PoC: aSOMI - a State of Minds Interface (68.151 EUR)**
- 2020 - Flanders Research Foundation: FWO-aspirant mandate - Chiara Rossi (11K2821N) - Unravelling cognitive functioning in healthy and multiple sclerosis through the analysis of transiently bursting brain networks at milliseconds time scale**
- 2019 - Belgian Charcot Foundation: Application of transcranial Alternating Current Stimulation to enhance remyelination (39.000 EUR)**
- Personal **2019 - Marie Curie Individual Fellowship - Seal of Excellence**
- 2018 - Belgian Neurological Society - Research Prize 2018**
- 2017 - Flanders Research Foundation - Krediet aan Navorsers (38.300 EUR)**
- 2016 - Flanders Research Foundation - Postdoc: How brain structure influences brain functioning, a mechanistic model to improve our understanding of cognitive impairment in Multiple Sclerosis**
- 2011 - Flanders Research Foundation - Research scholarship (FWO-Aspirant): On the neurophysiology of cognitive deterioration in Multiple Sclerosis**
- Co-promoter **2021 - FWO aspirant - Telerehabilitation in MS (Delphine Van Laethem)**

**2021 - FWO Postdoctoral fellowship** - Development of a neurovascular coupling biomarker for cognitive impairment in MS by a novel multimodal data fusion framework (Frederik Van de Steen)

**2020 - Innoviris** - Joint R&D - Data governance in the development of machine learning algorithms to predict neurodegenerative disease evolution

**2019 - VLAIO** - Creating the MS compass of the future: imaging AI to predict disease progression. Stijn Denissen

**2017 - Flanders Research Foundation** - Research scholarship (FWO-Aspirant): Lars Costers

**2014 - Belgian Charcot Foundation:** *Graph-theoretical analysis of magnetoencephalographic recordings as biomarker for cognitive deterioration in Multiple Sclerosis (37.000 EUR)*

**2014 - Genzyme-Sanofi:** *Graph-theoretical analysis of magnetoencephalographic recordings as biomarker for cognitive deterioration in Multiple Sclerosis (430.000 EUR)*

Travel Grants **Flanders Research Foundation** - Six month research at University of Oxford - Six month research stay at Universitat Pompeu Fabra - European Science Open Forum **ECTRIMS** - Based on paper merit

## Computer skills

Matlab, R, Python, Linux, SPM, EEGLab, PsychToolbox

## Communication Skills

2016 **Invited Talk:** "Brain atrophy in Multiple Sclerosis" - 12<sup>th</sup> Workshop of the International School of Magnetic Resonance and Brain Function, Erice, Sicily

2016 **Invited Talk:** "From neuronal firing to whole-brain cortical networks - Application to MS" - 12<sup>th</sup> Workshop of the International School of Magnetic Resonance and Brain Function, Erice, Sicily

2013 **Oral Presentation** at the 2<sup>nd</sup> International Conference of the MS Cognition Society (IMSCOGS), Zürich, Switzerland

2011–Present Many oral presentations in an informal setting to a variety of audiences

2011–Present Posters at several conferences (Engineering, Psychology, Medical)

## Teaching

2019–2020 **Erasmus Mundus programme, Neurasmus**, Charité-Universitätsmedizin.

- Neurophysiological signal processing

2015–Present **Faculty of Medicine and Pharmaceutical Sciences (VUB).**

- Cellular Neurophysiology. Partim. Chemical and electrical communication
- New therapeutic approaches to disorders of the central nervous system
- Medical information and communication systems
- Capita selecta voor de ziekenhuisarts, inclusief praktische oefeningen (co-titularis) - 3u HOC - ManaMa in de Specialistische Geneeskunde.

2015–Present **Faculty of Engineering - Master Biomedical engineering (VUB-UGent).**

- Modeling of physiological systems
- Measurements and analysis of biomedical signals
- Neurophysiological signal processing and graph network analysis
- Computational Neurophysiology

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## Languages

Mother tongue **Dutch**

Fluent **English**

*ITACE C1 level*

**French**

Basic **German, Spanish**

*Level: B1, B2*

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## Interests

Piano, Volleyball, Running

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## Papers

- 2022 Sadeghi, N; Eelen, P; Nagels, G; Cuvelier C; Van Gils K; D'hooghe MB; Van Schependom J; D'haeseleer M **Innovating care in multiple sclerosis: feasibility of synchronous internet-based teleconsultation for longitudinal clinical monitoring**, *Journal of Personalized Medicine* , 12(3):433
- 2022 Temmerman J, Van Der Veken, F; Engelborghs, S; Gudolf, K; Nagels, G; Smeets, D; Allemeersch GJ; Costers L; D'hooghe MB; Vanbinst AM; Van Schependom J; Bjerke M; D'haeseleer, M; **Brain Volume Loss Can Occur at the Rate of Normal Aging in Patients with Multiple Sclerosis Who Are Free from Disease Activity**, *Journal of Clinical Medicine* , 11(3):523
- 2021 Denissen S; Chen, OY; De Mey, J; De Vos, M; Van Schependom J; Sima, D; Nagels G; **Towards multimodal machine learning prediction of individual cognitive evolution in multiple sclerosis Authors**, *Journal of Personalised Medicine* , 11(12):1349
- 2021 Van Schependom J, Vidaurre D, Costers L, Sjogard M, Sima D, Smeets D, D'hooghe MB, D'haeseleer M, Deco G, Wens V, De Tiège X, Goldman S, Woolrich M; Nagels G; **Increased brain atrophy and lesion load is associated with stronger lower alpha MEG power in multiple sclerosis patients**, *NeuroImage Clinical* , 30:102632
- 2021 Baijot J, Denissen S, Costers L, Gielen J, Cambron M, D'haeseleer M, D'hooghe MB, Vanbinst AM, De Mey J, Nagels G, Van Schependom J **Signal quality as Achilles' heel of graph theory in functional magnetic resonance imaging in multiple sclerosis**, *Scientific Reports* , 11(1):7376
- 2021 Sjogard M; Wens V; Van Schependom J; Costers L; D'hooghe MB; D'haeseleer M; Woolrich M; Goldman S; Nagels G; Detiege X **Brain dysconnectivity relates to disability and cognitive impairment in multiple sclerosis**, *Human Brain Mapping*, 2021 Feb 15; 42(3):626-643, IF:4.9 [Q1]

- 2020 Costers L; Van Schependom J; Baijot J; Sjogard M; Wens V; Detiege X; Goldman S; D'haeseleer M; D'hooghe MB; Woolrich M; Nagels G; **The role of hippocampal theta oscillations in working memory impairment in multiple sclerosis**, *Human Brain Mapping*, 2020 Nov 28, IF:4.9 [Q1]
- 2020 D'haeseleer M; Eelen P; Sadeghi N; D'hooghe MB; Van Schependom J; Nagels G **Feasibility of real-time internet-based teleconsultation in patients with multiple sclerosis: a pilot study**, *Journal of Medical internet research*, 22(8), e18178, IF:5.1 [Q1], # Citations: 6
- 2020 Costers L; Van Schependom J; Laton J; Baijot J; Sjogard M; Wens V; Detiége X; Goldman S; D'haeseleer M; D'hooghe MB; Woolrich M; Nagels G **Spatiotemporal and spectral dynamics of multi-item working memory as revealed by the n-back task using MEG**, *Human Brain Mapping*, 41(9), 2431-2446, IF:4.9 [Q1], # Citations: 3
- 2019 Van Schependom J; Guldof K; Nagels G; D'haeseleer M **Detecting neurodegenerative pathology in multiple sclerosis before irreversible brain tissue loss sets in**, *Translational Neurodegeneration*, 8 (37), IF:5.9 [Q1]; # Citations: 7
- 2019 Denissen S; De Cock A; Meurrens T; Vleugels L; Van Remoortel A; Gebara B; D'haeseleer M; D'hooghe MB; Van Schependom J; Nagels G; **The impact of cognitive dysfunction on locomotor rehabilitation potential in multiple sclerosis**, *Journal of Central Nervous System Disease*, Nov 6; 11:1179573519884041, IF:4.3 [Q1]
- 2019 Van Schependom J, Vidaurre, D; Costers L; Sjogard, M; D'hooghe, MB; D'haeseleer M; Wens, V; De Tiége, X; Goldman, S; Woolrich M; Nagels G; **Altered transient brain dynamics in multiple sclerosis: treatment or pathology?**, *Human Brain Mapping*, Nov 1; 40(16): 4789-4800, IF:4.9 [Q1], # Citations: 5
- 2019 Sjogard M; De Tiége X; Mary A; Peigneux P; Goldman S; Nagels G; Van Schependom J; Quinn AJ; Woolrich MW, Wens V **Do the posterior midline cortices belong to the electrophysiological default-mode network?**, *Neuroimage*, 2019 Jun 22; 200:221-230 IF:5.4 [Q1], # Citations: 10
- 2018 Van Schependom J, Niemantsverdriet E, Smeets D, Engelborghs S; **Callosal circularity as an early marker for Alzheimer's disease**, *NeuroImage-Clinical*, 19 516-526, IF:4.4 [Q1], # Citations: 3
- 2018 Gielen J, Wiels W, Van Schependom J, Laton J, Van Hecke W, Parizel P, D'hooghe MB, Nagels G **The effect of task modality and stimulus frequency in paced serial addition tests on functional brain activity**, *PLOS-One*, 13(3), e0914388, IF: 2.8 [Q1], # Citations: 3
- 2017 Van Schependom J, Nagels G; **Targeting cognitive impairment in MS - the road towards an imaging-based biomarker**, *Frontiers in Neuroscience - Brain Imaging Methods*, Oct, IF: 3.7 [Q1], # Citations: 7
- 2017 Van Schependom J, Gielen J, Laton J, Sotiropoulos G, Vanbinst AM, De Mey J, Smeets D, Nagels G; **The effect of morphological and microstructural integrity of the corpus callosum on cognition, fatigue and depression in mildly disabled MS patients**, *Magnetic Resonance Imaging*, Oct, IF: 2.2 [Q1], # Citations: 9

- 2017 Costers L, Gielen J, Eelen P, Van Schependom J, Laton J, Van Remoortel A, Vanzeir E, Van Wijmeersch B, Seelldrayers P, Haelewyck MC, D'Haeseleer M, D'hooghe MB, Langdon D, Nagels G; **Does including the full CVLT-II and BVM-T-R improve BICAMS? Evidence from a Belgian (Dutch) validation study**, *Multiple Sclerosis and related disorders*, 18:33-40, IF:2.5 [Q1], # Citations: 14
- 2017 Goossens J, Laton J, Van Schependom J, Gielen J, Struyfs H, Van Mossevelde S, Van den Bossche T, Goeman J, De Deyn PP, Sieben A, Martin JJ, Van Broeckhoven C, van der Zee J, Engelborghs S, Nagels G; **EEG dominant peak frequency differentiates between Alzheimer's disease and frontotemporal lobar degeneration**, *Journal of Alzheimer's Disease*, 55(1):53-80, IF:3.8, # Citations: 2
- 2016 Van Schependom J, Jain S, Cambron M, Vanbinst AM, De Mey J, Smeets D, Nagels G; **Reliability of measuring regional callosal atrophy in neurodegenerative diseases**, *NeuroImage: Clinical*, Oct, IF: 4.3 [Q1], # Citations: 9
- 2015 Van Schependom J, Weiping Y, Gielen J, Laton J, De Keyser J, De Hert M, Nagels G; **Do advanced statistical techniques really help in the diagnosis of the Metabolic Syndrome in patients treated with anti-psychotics?**, *Journal of Clinical Psychiatry*, Oct, IF: 5.5 [Q1], # Citations: 7
- 2015 Van Schependom J, Gielen J, Laton J, Nagels G; **Assessing PML risk under immunotherapy: if all you have is a hammer, everything looks like a nail.**, *Multiple Sclerosis Journal*, Jul 21, IF: 4.5, 23/194 [Q1], # Citations: 15
- 2014 Van Schependom J, D'hooghe MB, Cleynhens K, D'hooge M, Haelewyck MC, De Keyser J, Nagels G; **Reduced information processing speed as primum movens for cognitive decline in Multiple Sclerosis**, *Multiple Sclerosis Journal*, Jan 21(1): 83-91, IF: 4.5, 23/194 [Q1], # Citations: 54
- 2014 Van Schependom J, D'hooghe MB, Cleynhens K, D'hooge M, Haelewyck MC, De Keyser J, Nagels G; **The Symbol Digit Modalities Test as sentinel test for cognitive impairment in MS**, *European Journal of Neurology*, Sep 21(9), pp 1219-1225, IF: 4.2, 36/149 [Q1], # Citations: 109
- 2014 Van Schependom J, Gielen J, Laton J, D'hooghe MB, De Keyser J, Nagels G; **Graph theoretical analysis indicates cognitive impairment in MS stems from neural disconnection**, *NeuroImage: Clinical*, 4, pp 403-410, IF: 2.5 [Q1], # Citations: 31
- 2014 Van Schependom J, D'hooghe MB, De Schepper M, Cleynhens K, D'hooge M, Haelewyck MC, De Keyser J, Nagels G; **Relative contribution of cognitive and physical disability components to quality of life in MS**, *Journal of the neurological sciences*, 336(1-2), IF: 2.8, 94/194 [Q1], # Citations: 10
- 2014 Laton J, Van Schependom J, Gielen J, Decoster J, Moons T, De Keyser J, De Hert M, Nagels G; **Single-subject classification of schizophrenia patients based on a combination of oddball and mismatch evoked potential paradigms**, *Journal of the Neurological Sciences*, Dec 347(1-2):262-7, IF:2.24, # Citations: 16
- 2014 Gielen J, Laton J, Van Schependom J, De Deyn PP, Nagels G; **The Squares test as a measure of hand function in Multiple Sclerosis**, *Clinical Neurology and Neurosurgery*, Aug, 123:55-60, IF:1.4, # Citations: 5



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## Preprints

Laton J; Van Schependom J; Decoster J, Moons T, De Hert M, Nagels G; De Vos M **Reduced interhemispheric and increased intrahemispheric connectivity in schizophrenia brain networks**, <https://doi.org/10.1101/755173>

Laton J; Van Schependom J; Goossens J, Wiels W, Sieben A, De Deyn PP, Goeman J, Streffer J, van der Zee J, Martin JJ, Van Broeckhoven C, De Vos M, Bjerke M, Nagels G; Engelborghs S, **Improved Alzheimer's disease versus frontotemporal lobar degeneration differential diagnosis combining EEG and neurochemical markers**, <https://doi.org/10.1101/19009316>

Sjogard M, Bourguignon M, Costers L, Dumitrescu A, Coolen T, Roshchupkina L, Destoky F, Bertels J, Niesen M, Vander Ghinst M, Van Schependom J, Nagels G, Urbain C, Peigneux P, Goldman S, Woolrich M, De Tiege X, Wens V, **Intrinsic/extrinsic duality of large-scale neural functional integration in the human brain**, <https://doi.org/10.1101/2020.04.21.053579>

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## Peer-reviewed conference proceedings

- 2014 Van Schependom J, Gielen J, Laton J, D'hooghe MB, De Keyser J, Nagels G; SVM aided detection of cognitive impairment in MS, *IEEE Conference Proceedings - 4<sup>th</sup> International Workshop on Pattern Recognition in NeuroImaging (PRNI)*, Tübingen
- 2013 Van Schependom J, D'hooghe MB, De Keyser J, Nagels G; Detection of Cognitive Impairment in MS based on an EEG P300 paradigm, *IEEE Conference Proceedings - 3<sup>rd</sup> International Workshop on Pattern Recognition in NeuroImaging (PRNI)*, Philadelphia, PA.

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## Reviewing duties

- 2012-Present I have served as a reviewer for *Molecular Psychiatry*, *Brain*, *Journal of Clinical Medicine* *Clinical Neurology and Neurosurgery*, *Journal of Alzheimer's Disease*, *Neuropsychological rehabilitation*, *Neurotherapeutics*, *NeuroImage*, *NeuroImage: Clinical*, *Multiple Sclerosis Journal*, *Brain and Behaviour*, *International Journal of Molecular Sciences*, *PLOS ONE*, *European Journal of Neurology*, *International Journal of Medical Informatics*, *Diabetes*, *Metabolic Syndrome and Obesity: Targets and Therapy*, *Archives of clinical neuropsychology*, *Journal of Medical Imaging and Health Informatics*, *Journal of the Neurological Sciences* and the Italian Ministry of Education, University and Research.

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## Outreach

- 2020- For an overview, see <https://aims.research.vub.be/en/blog> and <https://aims.research.vub.be/nl/blog>
- 2018 EOS-blog: De elementaire deeltjes van ons denken (2018-01-10), <https://www.eoswetenschap.eu/psyche-brein/de-elementaire-deeltjes-van-ons-denken>
- 2016 MS-symposium. Wat is het nut van beeldvorming van de hersenen in MS?



- 2016 International MS organisation (IMSO) - Jaargang 37, Nr. 3; Het opvolgen en opmeten van cognitieve achteruitgang tgv Multiple Sclerose - Een multidisciplinaire aanpak.
- 2014 Interview by EOS (Belgian popularising science journal).
- 2014 Interview by CM (A Belgian Health Insurance Company).