

**CONTACT  
INFORMATION**

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*Languages:* es, en, de (b.2.1)

**RESEARCH  
INTERESTS**

Neuroimaging, vision, computational and theoretical neuroscience, functional neuroanatomy, basic and applied biomedical research, blindness rehabilitation, bioinstrumentation, eye tracking, accessibility, education, biodiversity and sustainability.

**ACADEMIC  
APPOINTMENTS****Postdoctoral Researcher****April 2019 to present**

- Affiliations:
  - Department of Education and Psychology, Freie Universität Berlin, Germany.
  - Ernst Strüngmann Institute for Neuroscience, Frankfurt, Germany.
- Laboratories:
  - Neural Dynamics of Visual Cognition
  - Mechanisms and Functions of Rhythmic Neuronal Synchronization

**Visiting Researcher****September 2018 to January 2019**

Installation of MRI-safe eye tracker (LiveTrack-AV for fMRI) in the University Medical Center MRI scanner.

- Neuronal Circuits Laboratory, Department of Psychiatry, Faculty of Medicine, Catholic University of Chile, Santiago, Chile.

**Visiting Researcher****March 2016 to January 2017**

Brain-network modeling and computational connectomics

- Computational Neuroscience Group, Department of Biology, Universidad Pompeu Fabra, Barcelona, Spain.

**Doctoral Researcher****June 2013 to September 2018**

Development of anatomical MRI techniques and fMRI analysis methods

- Laboratory for Experimental Ophthalmology, Department of Ophthalmology, Groningen University Medical Center, The Netherlands.

**Research Assistant****March 2010 to March 2012**

Implementation of electrophysiological recording and closed-loop control equipment for behavioural experiments in rodents

- Neuronal Circuits Laboratory, Department of Psychiatry, Faculty of Medicine, Catholic University of Chile, Santiago, Chile.

**Research Assistant****March 2009 to December 2009**

Video-tracking of insect behavior

- Institute of Entomology, Department of Biology, Metropolitan University of Educational Sciences, Santiago, Chile.

**Teaching Assistant****March 2008 to March 2009**

Introduction to bio-instrumentation

- Laboratory of Biology of Cognition, Department of Biology, Faculty of Sciences, University of Chile, Santiago, Chile.

**EDUCATION**

**University of Groningen**, Groningen, The Netherlands.

Ph.D., Behavioral and Cognitive Neuroscience

**August 2013 to April 2018**

Universidad de Chile, Santiago, Chile.

Licentiate Degree in Sciences with Mention in Biology, (equivalent to a B.Sc. and M.Sc.)  
**March 2004 to December 2009**

**HARDWARE AND SOFTWARE SKILLS**

- Instrumentation, microcontrollers, data acquisition.
- Computer programming (Python, Matlab, Lab-View, KiCad, C++, Java).
- Analog and digital electronics, printed circuit board design.

**MANUSCRIPTS UNDER REVISION AND IN PREPARATION**

- [1] **Gravel N.**, Psarou, E., Grothe, I., Fries, P., Cichy, RM. Layer differences in V1 responses to naturalistic images in Macaque.
- [2] **Gravel N.**, Cichy, RM., Cornelissen, FW. Gilson, M. Network Dynamic Flow Analysis of retinotopic responses across V1, V2 and V3 using Human Connectome Project 7T dataset.
- [3] Jastrzębowska, MA., **Gravel N.**, Iamschchinina P., Haenelt D., Weiskopf N., Cichy RM. Cortical depth-based variation of population receptive field size in human V1, V2 and V3.

**PEER-REVIEWED JOURNAL PUBLICATIONS**

- [4] Invernizzi, A., **Gravel N.**, Haak KV., Renken, R., Cornelissen, FW. (2021) Assessing Uncertainty and Reliability of Connective Field Estimations From Resting State fMRI Activity at 3T. *Frontiers Neuroscience* 15, 625309
- [5] **Gravel, N.**, Renken, R., Harvey, B., Deco, G., Cornelissen, FW. , Gilson. M. (2020). Propagation of BOLD activity reveals task-dependent directed interactions across human visual cortex. *Cerebral Cortex* 200, 5899-5914.
- [6] Hindriks, R., Mantini, R., **Gravel, N.**, Deco, G. (2018). Latency analysis of resting-state BOLD-fMRI reveals traveling waves in visual cortex linking task-positive and task-negative networks. *NeuroImage* 200, 259-274.
- [7] Servaas, M., Kos, C., **Gravel, N.**, Marsman JB., van Tol, MJ. , Aleman, A. (2018). Rigidity in Motor Behavior and Brain Functioning in Patients With Schizophrenia and High Levels of Apathy. *Schizophrenia bulletin* 45 (3), 542-551.
- [8] **Gravel, N.**, Harvey, B., Renken, R., Dumoulin, SO. , Cornelissen, FW. (2018). Phase-synchronization-based parcellation of resting state fMRI signals reveals topographically organized clusters in early visual cortex. *NeuroImage* 170, 424-443.
- [9] Nordhjem, B., Petrozzelli, C., **Gravel, N.**, Renken, R. , Cornelissen, FW. (2015). Eyes on emergency: Fast detection yet slow recognition of emerging images. *Journal of Vision* 15, (9), 8.
- [10] **Gravel, N.**, Harvey, B., Nordhjem, B., Haak, K., Dumoulin, SO. Renken, R., Curcio-Blake, B. , Cornelissen, FW. (2014). Cortical connective field estimates from resting state fMRI activity. *Frontiers in neuroscience* 8, 339.

**INVITED SEMINARS AND LECTURES**

- [1] **Gravel, N.** (2019, 2020, 2021, 2012). Introduction to fMRI (lecture for the Cognitive Neuroscience PhD course). Catholic University, of Chile, Santiago, Chile.
- [2] **Gravel, N.** (2023). Linking Structure-Function Relationships in Human Visual Cortex through Computational Neuroimaging and Electrophysiology. Max-Planck-Institut für Kognitions- und Neurowissenschaften, Leipzig, Germany; Institut de Neurosciences de la Timone, Marseille, France.

- [3] **Gravel, N.** (2023). Cortical Neuronal Circuits Underlying Human Visual Perception: Insights from Neuroimaging and Laminar Electrophysiology. Laboratory for Experimental Ophthalmology, University Medical Center Groningen, The Netherlands.
- [4] **Gravel, N.** (2020). Sensory ethology: evolutionary accounts of animal cognition (lecture for the Cognitive Neuroscience MSc. course). Department of Education and Psychology, Freie Universität Berlin, Germany.
- [5] **Gravel, N.** (2019). Directed influences across human visual cortex revealed by fMRI. Department of Biomedicine, Aarhus University, Denmark; First Chilean Conference on Computational Neuroscience, Valparaíso, Chile; Department of Psychiatry, Catholic University, of Chile, Santiago, Chile.
- [6] **Gravel, N.** (2018). Dynamic systems theory as a framework for psychiatry. An enactive approach to psychiatry and (psycho)therapy. Berlin School for Brain and Mind, Berlin, Germany.

**CONFERENCE  
ABSTRACTS**

- [1] **Gravel, N.**, Gilson, M., Knapen, T., Cichy, RM., Cornelissen, FW. (2023). Task-dependent Directed Interactions Across Early Visual Cortex Measured with 7T fMRI. Organization for Human Brain Mapping, Montreal, Canada.
- [2] **Gravel, N.**, Gilson, M., Renken, R., Cornelissen, FW. Deco, G. (2017). Propagation of BOLD activity reveals directed interactions across human visual cortex. Organization for Human Brain Mapping, Vancouver, Canada.
- [3] **Gravel, N.**, Harvey, B., Dumoulin, SO., Renken, R., Cornelissen, FW. (2016). Spatial phase coherence analysis reveals discrete cortical modules within early visual cortex. 39th European Conference on Visual Perception, Barcelona, Spain.
- [4] **Gravel, N.**, Harvey, B., Dumoulin, SO., Renken, R., Cornelissen, FW.(2015). Changes in the periodicity of BOLD co-fluctuations underlie the variability of cortico-cortical population receptive field maps derived from resting state data. Society for Neuroscience, Chicago, United States of America.
- [5] **Gravel, N.**, Harvey, B., Dumoulin, SO., Renken, R., Cornelissen, FW. (2014). Retinotopic organization of resting state fluctuations in the early visual cortex. Organization for Human Brain Mapping, Hamburg, Germany.
- [6] **Gravel, N.**, Harvey, B., Dumoulin, SO., Renken, R., Cornelissen, FW. (2014). Cortical Connective Field Estimates from Resting State fMRI Activity. 37th European Conference on Visual Perception, Belgrade, Serbia.
- [7] Nordhjem, B., Petrozzelli, CK., **Gravel, N.** Renken, R., Cornelissen, FW.(2014). Systematic eye movements during recognition of emerging images. Vision Sciences Society Annual Meeting, Florida, United States of America.
- [8] van Dijk, M., **Gravel, N.**, Haak, KV., Cornelissen, FW. (2013). Cortical connective fields in a hemispherectomized patient. Applied Vision Association, Leuven, Belgium.
- [9] Nordhjem, B., Petrozzelli, CK., **Gravel, N.** Renken, R., Cornelissen, FW. (2013). Eye movements while viewing coarse and fine image information. 36th European Conference on Visual Perception, Bremen, Germany.

**AWARDS AND  
FELLOWSHIPS**

- [1] **Alexander von Humboldt fellowship for post-doctoral research** (Germany).
- [2] **Advanced Human Capital post-doctoral research scholarship** (Chile).
- [3] **Professor Mulder Stitching doctoral research scholarship** (The Netherlands).
- [4] **Advanced Human Capital PhD scholarship** (Chile).
- [5] **Abel-Tasman pre-doctoral internship scholarship for young talents in the biomedical sciences** (The Netherlands).