Nicolás Gravel, Ph.D. *Curriculum vitae*

Contact Information

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

Research Interests

Neuro-imaging, bio-instrumentation, vision: I am interested in vision, computational and theoretical neuroscience, functional neuroanatomy, basic and applied biomedical research, 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 **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 behavioral 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.).
- Analog and digital electronics, printed circuit board design.

Peer-reviewed Journal Publications

[1] **Gravel N.**, Psarou, E., Grothe, I., Fries, P., Cichy, RM. (2024) Laminar differences in naturalistic image V1 responses in Macaque. Manuscript in preparation.

[2] **Gravel N.**, Psarou, E., Grothe, I., Fries, P., Cichy, RM. (2024) Layer-Specific Rhythm Interaction in Macaque Primary Visual Cortex Revealed by Multivariate Pattern Analysis. Manuscript in preparation

[3] **Gravel N.**, Cichy, RM,. Cornelissen, FW. Gilson, M. (2024) Network Dynamic Flow Analysis of Early Visual Cluster Interactions. Manuscript submitted for publication.

[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., Curcic-Blake, B. , Cornelissen, FW. (2014). Cortical connective field estimates from resting state fMRI activity. Frontiers in neuroscience 8, 339.

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.

Invited Seminars and Lectures

[1] **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.

[2] **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.

[3] **Gravel, N.** (2018). Directed influences across human visual cortex revealed by fMRI. Primera Jornada Chilena de Neurociencia Computacional, Valparaíso, Chile.

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).