

Gecia Bravo-Hermsdorff

(+1)404.630.8102 | geciah@princeton.edu | gecia.github.io

Education

Princeton University

Princeton, NJ, USA

PHD IN QUANTITATIVE & COMPUTATIONAL NEUROSCIENCE ([link](#))

2020

- *Dissertation*: “Quantifying human priors over abstract relational structures”
- *Selected courses (hyperlinked)*: Random graphs and networks, Mathematical physics, Theory of deep learning, Statistical learning and nonparametric estimation, Complex analysis, Machine learning & pattern recognition, Natural algorithms, Interacting with data, Optimal learning, Abstract algebra, Computational complexity, Statistical optimization and reinforcement learning, High-dimensional probability, Stochastic processes on graphs

École Normale Supérieure (ENS Ulm)

Paris, France

RESEARCH MASTER IN COGNITIVE SCIENCES AND NEUROSCIENCE ([link](#))

2011

- *Dissertation*: “Neural basis of self-contingency detection in 5-month-old babies”

École Normale Supérieure (ENS Ulm)

Paris, France

DIPLÔME DE L'ENS ([link](#))

2011

- Three-year multidisciplinary program. Admitted via the “International Selection in Science” ([link](#))
- *Selected courses*: Computational neuroscience, Mathematics, Developmental biology, Modeling, Biophysics, Logics, Ecology and evolution, Cognitive science, Philosophy of science, Theoretical chemistry, Decision sciences, Statistics

École Normale Supérieure (ENS Ulm)

Paris, France

BACHELOR OF SCIENCE ([link](#))

2009

Publications

- LM Gunderson* & G Bravo-Hermsdorff*. INTRODUCING GRAPH CUMULANTS: WHAT IS THE VARIANCE OF YOUR SOCIAL NETWORK? *arXiv*, 2020 ([link](#)) ([video](#)) ([code](#))
- G Bravo-Hermsdorff. QUANTIFYING HUMAN PRIORS OVER ABSTRACT RELATIONAL STRUCTURES. *Ph.D. dissertation, Princeton University*, 2020 ([link](#)) ([slides](#)) ([demos](#))
- G Bravo-Hermsdorff* & LM Gunderson*. A UNIFYING FRAMEWORK FOR SPECTRUM-PRESERVING GRAPH SPARSIFICATION AND COARSENING. *Neural Information Processing Systems (NeurIPS)*, 2019 ([link](#)) ([video](#)) ([demos](#)) ([code](#)) ([poster](#))
- G Bravo-Hermsdorff, V Felso, E Ray, LM Gunderson, ME Helander, J Maria & Y Niv. GENDER AND COLLABORATION PATTERNS IN A TEMPORAL SCIENTIFIC AUTHORSHIP NETWORK. *Applied Network Science*, 4(1), 2019 ([link](#)) ([dataset](#))
- G Bravo-Hermsdorff & Y Niv. MODELING THE HEMODYNAMIC RESPONSE FUNCTION FOR PREDICTION ERRORS IN THE VENTRAL STRIATUM. *bioRxiv, Cold Spring Harbor Laboratory*, 2019 ([link](#))
- G Bravo-Hermsdorff, TD Pereira & Y Niv. QUANTIFYING HUMANS' PRIORS OVER GRAPHICAL REPRESENTATIONS OF TASKS. In *Unifying Themes in Complex Systems IX. ICCS, Springer Proceedings in Complexity*, 281–290, 2018 ([link](#))

*denotes equal contribution

Talks

- GRAPH REDUCTION BY EDGE DELETION AND EDGE CONTRACTION. *International Conference on Complex Systems (ICCS)*, 2018
- QUANTIFYING PEOPLE'S PRIORS OVER GRAPHICAL REPRESENTATIONS OF TASKS. *International Conference on Complex Systems (ICCS)*, 2018
- GRAPH REDUCTION BY EDGE DELETION AND EDGE CONTRACTION. *SIAM workshop on network science (SIAMNS18)*, 2018
- CHARACTERIZING PEOPLE'S PRIORS OVER NAVIGATION TASK STRUCTURE. *Princeton Cognitive Science Lunchtime Talk*, 2017
- ASSESSING DECISION-MAKING DEFICITS IN PATIENTS WITH INSULA LESION USING VARIOUS NEUROECONOMIC TASKS. *Regional conference in neuroeconomics at the Duke center for interdisciplinary decision sciences*, 2016

Research

PHD CANDIDATE AT THE NIV LAB ([link](#))

Princeton, NJ, US, 2014 – 2019

PHD RESEARCH ROTATION AT THE BOTVINICK LAB (*now at Google DeepMind*)

Princeton, NJ, US, 2013 – 2014

- Learning structure in task-sets. Started work leading to my PhD project. *Advisor*: Matthew Botvinick

RESEARCH SCHOLAR IN NEUROECONOMICS AT THE MONTAGUE LAB ([link](#))

VTCRI, Roanoke, VA, US, 2011–2013

- Worked in several projects modeling human behavior in games, such as the ultimatum game and gambles. *Advisors*: Terry Lohrenz and Read Montague

MASTER'S STUDENT AT THE COGNITIVE SCIENCE AND PSYCHOLINGUISTIC LAB ([link](#))

ENS Ulm, Paris, France, 2011

- Master's project studying the neural substrates of self-contingency detection in babies using functional near-infrared spectroscopy (fNIRS). Designed, coded and built the experimental apparatus, recorded and analyzed the data from 61 babies. *Advisor*: Emmanuel Dupoux

RESEARCH INTERNSHIP AT THE EMOTION AND SOCIAL COGNITION LAB [\(link\)](#)

Caltech, CA, US, Spring, 2010

- Designed, performed, and analyzed behavioral experiments in humans for a project investigating whether values learned during a Pavlovian conditioning task could be expressed in an unrelated task without the subjects' conscious awareness. *Advisors:* Naotsugu Tsuchiya and Ralph Adolphs

RESEARCH INTERNSHIP AT THE DEVELOPMENT AND NEUROPHARMACOLOGY LAB [\(link\)](#)

Collège de France, Paris, France, 2009

- Worked on an experimental project studying the molecular mechanisms involved in the emergence of cellular territories during the morphogenesis of chicken embryo neural tubes. *Advisors:* Elizabeth Di Lullo and Alain Prochiantz

Awards

- INDEPENDENT RESEARCH GRANT:** Graduate student research funding (\$5,000), Princeton Cognitive Science Department 2019
- SCHOLARSHIP FOR LAKE COMO SCHOOL OF ADVANCED STUDIES IN COMPLEX NETWORKS** May, 2016
- COGNITIVE SCIENCE GRADUATE FELLOWSHIP** 2016–2017
- SCHOLARSHIP FOR BRAINS, MINDS AND MACHINES SUMMER SCHOOL** August, 2015
- SCHOLARSHIP FOR SAMSI BAYESIAN NONPARAMETRICS WORKSHOP** July, 2015
- PRINCETON PHD FELLOWSHIP** 2013–2019
- ÉCOLE NORMALE SUPÉRIEURE (ENS ULM) “INTERNATIONAL SELECTION IN SCIENCE”** 2008
- BRAZILIAN CNPQ “SCIENTIFIC INITIATION” SCHOLARSHIP** 2006–2008
- ENTRANCE EXAM FOR THE BIOMEDICAL SCIENCES PROGRAM AT THE UNIVERSIDADE FEDERAL DO RIO DE JANEIRO (UFRJ):** Top Brazilian undergraduate program in biomedical sciences, completed two of four years before moving to France 2006–2008
- 99TH PERCENTILE AT THE EXAME NACIONAL DE ENSINO MÉDIO (ENEM):** Nationwide exam for Brazilian students after high school 2005
- TRAVEL AWARDS FOR PRESENTING AT CONFERENCES:** Neural Information Processing Systems (NeurIPS), 2019; NIPS Women in Machine Learning, 2018; International Conference on Complex Systems (ICCS), 2018; Society for Industrial and Applied Mathematics (SIAM) Annual Meeting, 2018; NIPS Women in Machine Learning, 2017; Multidisciplinary Conference in Reinforcement Learning and Decision Making (RLDM), 2017; International Conference on Mathematical Neuroscience (ICMNS), 2017; Multidisciplinary Conference in Reinforcement Learning and Decision Making (RLDM), 2015; Austin Memory & Learning Conference, 2015

Summer schools

MACHINE LEARNING SUMMER SCHOOL (MLSS) [\(link\)](#) [\(video of my poster presentation\)](#)

Tübingen (virtual event), Germany, Summer 2020

COMPLEX NETWORKS: THEORY, METHODS, AND APPLICATIONS [\(link\)](#)

Lake Como School of Advanced Studies, Italy, May 2016

BAYESIAN NONPARAMETRICS: SYNERGIES IN STATISTICS, PROBABILITY AND MATH [\(link\)](#)

SAMSI, NC, US, June 2015

BRAINS, MINDS AND MACHINES SUMMER SCHOOL [\(link\)](#)

Woods Hole, MA, US, August 2015

COMPUTATIONAL AND COGNITIVE NEUROSCIENCE SUMMER SCHOOL [\(link\)](#)

Suzhou, China, August 2010

Teaching

BIO MATH BOOTCAMP (PRINCETON UNIVERSITY) [\(link\)](#)

Summer 2016

- Month-long training in mathematical and computational tools for incoming PhD students in neuroscience and biology, organized by Carlos Brody
- LECTURER:** Lectured for the probability module.
- TEACHER ASSISTANT:** Held afternoon sessions for exercises in Python, linear algebra, dynamical systems, probability, and signal processing

INTRODUCTION TO COGNITIVE NEUROSCIENCE (PRINCETON UNIVERSITY) [\(link\)](#)

Spring 2015

- TEACHER ASSISTANT:** Held weekly sessions discussing relevant journal publications, constructed and graded the exams

LAB COURSE FOR INTRODUCTION TO PSYCHOLOGY (PRINCETON UNIVERSITY) [\(link\)](#)

Fall 2014

- TEACHER ASSISTANT:** Held weekly lab sessions and lectured on topics such as statistical analysis, MRI, EEG, psychophysics, experimental design, computational modeling, and game theory

MENTORING (PRINCETON UNIVERSITY)

- Daniel J Wilson (intern during 2015, now a PhD student at the University of Toronto)
- Caitlyn Cap and Olamilekan Sule (interns during 2014 summer)

Languages

- Human:** PORTUGUESE (*native*), ENGLISH & FRENCH (*fluent*), SPANISH (*conversant*)
- Computer:** PYTHON & MATLAB (*fluent*), MATHEMATICA & R (*functional*), JAVASCRIPT & HTML (*conversant*)