Gecia Bravo-Hermsdorff

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Education

Princeton University *Princeton, NJ, USA*

PhD in Quantitative & Computational Neuroscience *(link)* *November 2019*

- *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 Kurtosis of your Social Network? *arXiv, 2020*
- **G Bravo-Hermsdorff**. Quantifying Human Priors over Abstract Relational Structures. *Ph.D. dissertation, Princeton University, 2020*
- **G Bravo-Hermsdorff*** & LM Gunderson*. A Unifying Framework for Spectrum-Preserving Graph Sparsification and Coarsening. *Neural Information Processing Systems (NeurIPS), 2019 (link)*
- **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)*
- **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

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

BioMath 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, EGG, 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

- **Computer:** Python & MATLAB *(fluent)*, Mathematica & R *(functional)*, Javascript & HTML *(conversant)*
- **Human:** Portuguese *(native)*, English & French *(fluent)*, Spanish *(conversant)*