Gabrielle J. Gutierrez, PhD

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EDUCATION

Brandeis University
***PhD** in Neuroscience (Defense date 30th August 2012, degree awarded February 2013)*
Advisor: Eve Marder; Thesis: Dynamics of multi-functional, pattern-generating, neuronal networks

Barnard College, Columbia University
***BA**, Physics major, Applied Mathematics minor, 2006*

GRANTS, HONORS, AND AWARDS

Research Exchange fellow, California alliance, 2019
BRAINS fellow, 2019
NIH Career Transition K Award, 2018
Semifinalist, Burroughs-Wellcome Fund, Career Award at Scientific Interface, 2017
Perfect Pitch Competition, 1st place UWIN division, 2016
CMU Modeling Neural Activity conference, travel award, 2016
WRF Innovation Postdoctoral Fellowship in Neuroengineering, UWIN, 2016
Allison Doupe Fellowship to attend McKnight Endowment Fund Conference, 2016
Barnard Alumnae Association Fellowship for Graduate Studies, 2010
Bernstein Conference on Computational Neuroscience Travel Fellowship, 2009 and 2011
BOLLI Teaching Fellowship, Brandeis University, 2008
IGERT Training Fellowship, 2006
SURP Research Experience for Undergraduates, 2005
Barnard College Leadership Award, 2005
GE Fellowship for minority students in science, 2005
Irene Diamond Scholarship, 2004
Charles Dana Undergraduate Scholarship, 2004
Dulcida Romero Chicón Scholarship, 2003

PRIMARY PUBLICATIONS

Gutierrez GJ, Rieke FR, Shea-Brown ET (2019). Nonlinear convergence preserves information. **in preparation*

Gutierrez GJ, Deneve S (2019). Population adaptation in efficient balanced networks. *eLife, 8:e46926*.

Gutierrez GJ, Marder E (2014). Modulation of a single neuron has state-dependent actions on circuit dynamics. *eNeuro, 1*(1).

Gutierrez GJ, Marder E (2013). Rectifying electrical synapses can affect the influence of synaptic modulation on output pattern robustness. *J Neurosci. 33*(32).

Gutierrez GJ, O'Leary T, Marder E (2013). Multiple mechanisms switch an electrically coupled, synaptically inhibited neuron between competing rhythmic oscillators. *Neuron*, 77(5).

Gerhard F, Kispersky T, Gutierrez GJ, Marder E, Kramer M, Eden U (2012). Successful prediction of a physiological circuit with known connectivity from spiking activity alone. *PLoS Comput Biol. 9*(7).

Kispersky T, Gutierrez GJ, Marder E (2011). Functional connectivity in a rhythmic inhibitory circuit using Granger causality. *Neural Systems & Circuits,* **1**(9).

Gutierrez GJ, Grashow RG (2009). Cancer borealis stomatogastric nervous system dissection. *J Vis Exp. Mar 23*(25). pii: 1207.

REVIEW ARTICLES

Marder E, Gutierrez GJ, Nusbaum MP (2017). Complicating Connectomes: Electrical Coupling Creates Parallel Pathways and Degenerate Circuit Mechanisms. *Devel Neurobio. 77(5).*

CONFERENCE ABSTRACTS

Gutierrez GJ, Rieke FM, Shea-Brown ET. Info in a bottleneck: The compression of information in neural circuits. San Diego, CA: Society for Neuroscience 2018.

Gutierrez GJ, Shea-Brown E, Rieke F. Info in a bottleneck: exploring the compression of visual information in the retina. Seattle, WA: Organization for Computational Neuroscience 2018. **talk*

Gutierrez GJ and Deneve S. Spike-frequency adaptation optimizes the tradeoff between efficiency and accuracy in a predictive coding model. Waikoloa, HI: Modeling of Neural Activity conference hosted by Carnegie Mellon 2016.

Gutierrez GJ and Deneve S. Spike-frequency adaptation optimizes the tradeoff between efficiency and accuracy in a predictive coding model. Chicago, IL: Society for Neuroscience 2015. **talk*

Gutierrez GJ and Deneve S. Spike-frequency adaptation optimizes the tradeoff between efficiency and accuracy in a predictive coding model. Bilbao, Spain: Neural coding, computation, and dynamics conference 2015.

Gutierrez GJ and Deneve S. Adaptation and homeostasis in a spiking predictive coding network. Salt Lake City, UT: Cosyne 2015.

Gutierrez G and Marder E. The rectification of an electrical synapse can change the functional output of a pattern-generating circuit. Paris, France: Organization for Computational Neuroscience 2013.

Gutierrez G and Marder E. An electrically coupled and synaptically inhibited neuron switches between competing oscillator sub-networks via multiple mechanisms. New Orleans, LA: Society for Neuroscience 2012.

Gutierrez G, Goeritz M, Marder E. Signal propagation in a small neural network: the contribution of inhibitory synapses and electrical gap junctions to signal propagation properties of a central pattern generator. San Diego, CA: Society for Neuroscience 2011.

Gutierrez G and Marder E. Signal propagation in a small neural network. Freiburg, Germany: Bernstein Conference for Computational Neuroscience 2011.

Gutierrez G, Abbott LF, Marder E. Are biological neural networks capable of acting as computing reservoirs? Frankfurt, Germany: Bernstein Conference for Computational Neuroscience 2009.

Gutierrez GJ, Abbott LF, Marder E. Can a biological neural network act as a dynamic reservoir? Chicago, IL: Society for Neuroscience 2009.

INVITED TALKS

UW Applied Math 50th Conference 2019, Seattle, WA. Neural and Neuronal Networks mini-symposium.
Nonlinear convergence preserves information in the retina.

Neural Computation and Engineering Connection 2018, Seattle, WA.
Info in a bottleneck: how the retina is optimally set up to process natural images.

Cosyne 2015, Salt Lake City, UT. "Cortical Circuits in Action" Workshop.
Understanding state-dependent neuromodulation in small circuits.

RESEARCH & TEACHING EXPERIENCE

University of Washington, Seattle, WA **April 2016 – present**
Postdoctoral researcher and UWIN fellow in the Applied Mathematics dept. Advisors: Eric Shea-Brown and Fred Rieke. Topic: Contribution of local neuron properties to global network computation.

Janelia Research Campus, Ashburn, VA **October 2015 – March 2016**
Visiting postdoctoral researcher. Advisor: Shaul Druckmann. Topic: Interplay between recurrent connectivity and intrinsic neuron properties in a predictive coding model.

École Normale Supérieure, Paris, France **April 2013 – September 2015**
Postdoctoral researcher in the Group for Neural Theory, Cognitive Studies dept. Advisor: Sophie Denève. Topic: Adaptation and population coding in a predictive coding model.

Brandeis University, Waltham, MA **September 2012 – March 2013**
Postdoctoral researcher in Eve Marder's lab. Continued work on computational modeling of neural circuits and neuromodulation.

Brandeis University, Waltham, MA **September 2006 – August 2012**
Research trainee and IGERT fellow, Advisor: Eve Marder. Electrophysiology and computational modeling of crustacean stomatogastric nervous system. Studies focused on neuromodulation of neural circuits.

Brandeis University, Waltham, MA **Fall 2007 & Spring 2008**
Teaching Assistant for BioLab and Neuropharmacology courses: Graded homework and exams and held regular study sessions and office hours.

Barnard College, New York, NY **Spring 2006**
Teaching Assistant for Physics Department: Taught Electricity and Magnetism Laboratory section for Dr. Janna Levin's course. Responsibilities included lab set-up, lecturing, and grading.

New York University, New York, NY **Summer 2005**
SURP Research Experience for Undergraduates, IGERT research fellow: Studied visual preference in Nava Rubin's psychophysics lab.

City College of New York, New York, NY **Summer 2004**
Summer Research with Professor Jay Edelman: Studied vision in human subjects. Designed and coded programs using MATLAB and EYEtracker. Analyzed data and presented findings to fellow student researchers and professors.

ADDITIONAL TRAINING and STUDY

Methods in Computational Neuroscience, Woods Hole, MA July 30, 2014 – August 27, 2014
Computational and Cognitive Neuroscience course, Shanghai, China July 5, 2014 – July 23, 2014

WORK EXPERIENCE

American Museum of Natural History, New York, NY **November 2003 – August 2006**
Astrophysics Education Coordinator (part-time): Developed and taught astrophysics programs aimed at children and teachers. Managed the Saltz High School Internship Program, including training, supervision, and design of activities. Oversaw the maintenance of the Saltz Carts: moveable exhibitions with interactive, educational activities.

American Museum of Natural History, New York, NY **November 2002 – November 2003**
Space Show Presenter and Educator (part-time): Operated the space show in the Hayden Planetarium. Programmed space shows and performed live sky presentations using the Zeiss star projector. Presented and performed in the "Kid's show": an interactive, live, educational show in the Hayden Planetarium. Assisted in teaching and developing astronomy programs for children.

PUBLIC OUTREACH and SERVICE

Guest speaker for YSP-REACH program, University of Washington. Summer 2019.
Computational neuroscience journal club leader, University of Washington. Academic year 2018-2019.
Guest speaker at Girls Who Code, Seattle, WA. Multiple sessions every summer since 2016.
Panelist at Emerald City Comic Con's "Science doesn't work that way, goodnight!" event. March 2019.
Abstract reviewer of submissions for 2019 and 2018 Cosyne conference.
Skype a Scientist participant. Summer 2018.
Guest speaker, Darwin Day at the Burke Museum, Seattle, WA. 18 February 2018.
Chair, Computational Neuroscience Social, Society for Neuroscience conference, 2017.
Co-chair, Computational Neuroscience Social, Society for Neuroscience conference, 2016.
Volunteer, UW Bioscience experience program for underrepresented minority students. 21 July, 2016.
Guest science speaker at Heritage High School, Leesburg, VA. 11 February, 2016.
Women in Science club co-organizer at Brandeis University, 2012.
Barnard Alumnae Admissions Representative (BAAR) since 2010.

EXTRACURRICULAR

Member of the board of directors of the Young Patrons Circle of Pacific Northwest Ballet, 2017-2019; Data Analytics committee and Executive committee (Secretary).

"Grow with Google" Udacity scholarship, Android Basics Nanodegree program, 2018.

Art Neureau contributor, 2018.