

Gabrielle J. Gutierrez, PhD

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EDUCATION & TRAINING

Barnard College, Columbia University, graduated in 2006
Bachelor of Arts, Physics major, Applied Mathematics minor

Brandeis University, Neuroscience PhD program, September 2006 – August 2012
PhD in Neuroscience

Advisor: Eve Marder; Thesis: Dynamics of multi-functional, pattern-generating, neuronal networks

Ecole Normale Supérieure, Group for Neural Theory, April 2013 – September 2015
Postdoctoral researcher; Advisor: Sophie Deneve

Janelia Research Campus, Shaul Druckmann, October 2015 – March 2016
Visiting researcher

University of Washington, Applied Math department, April 2016 – present
Postdoctoral research associate; Advisors: Eric Shea-Brown and Fred Rieke

PRIMARY PUBLICATIONS

Gutierrez GJ, Deneve S (2015) Balanced recurrent connectivity rescues the decoded representation that is corrupted by adapting neural responses. *In preparation*.

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 (2016) Complicating Connectomes: Electrical Coupling Creates Parallel Pathways and Degenerate Circuit Mechanisms. *Devel Neurobio* (ePub ahead of print).

CONFERENCE ABSTRACTS

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

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

Gutierrez G and Marder E (2012) 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 (2011) 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 (2011) Signal propagation in a small neural network. Freiburg, Germany: Bernstein Conference for Computational Neuroscience 2011.

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

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

INVITED TALKS

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

HONORS AND AWARDS

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 Romerco Chicon Scholarship, 2003

RESEARCH & TEACHING EXPERIENCE

University of Washington, Seattle, WA

April 2016 – present

Postdoctoral researcher and UWIN fellow in the Applied Math 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 Group for Neural Theory, Advisor: Sophie Denève. Topic: Adaptation and population coding in a predictive coding model.

Brandeis University, Waltham, MA**August 2012 – April 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. Performed electrophysiology experiments and did computational modeling work. Studies focused on neural circuits and neuromodulation.

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. 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 EYTracker. Analyzed data and presented findings to fellow student researchers and professors.

ADDITIONAL TRAINING

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

PUBLIC OUTREACH

Guest speaker at Girls Who Code, Seattle, WA. 3 sessions, summer of 2016.

Volunteer for the Bioscience experience program for underrepresented minority students, UW, Seattle, WA. 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

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.

Henry Street Settlement, New York, NY**September 2002 – January 2003**

After school teacher (part-time): Developed and provided fun and enriching after-school activities for a group of 25 third and fourth graders. Assisted this group with homework for 1 hour every day.