

Guillaume Lajoie, PhD

CONTACT INFORMATION	Department of Nonlinear Dynamics Max Planck Institute for Dynamics and Self-Organization Am Fassberg 17 Goettingen, Germany, D-37077	<i>Phone:</i> +49-551-5176-401 <i>Fax:</i> +49-551-5176-402 <i>E-mail:</i> glajoie@nld.ds.mpg.de http://www.nld.ds.mpg.de/~glajoie/
NATIONALITY	Canadian	
LANGUAGES	French and English	
PROFESSIONAL EXPERIENCE	Bernstein Fellow (independent researcher in nonlinear dynamics and theoretical neuroscience) Max Planck Institute for Dynamics and Self-Organization Goettingen, Germany 01/2014 – present	
	Visiting Scholar <i>Instituto de Matemática Pura e Aplicada</i> (IMPA) Rio de Janeiro, Brazil 01/2010 – 05/2010	
RESEARCH INTERESTS	Dynamical systems, Theoretical neuroscience, Stochastic dynamics, Information theory, Neural networks, Mathematical Modelling	
TECHNICAL SKILLS	Mathematical modeling, Large scale scientific computing, Programming (Matlab, Python, Cython, PBS submission script)	
EDUCATION	Ph.D., Applied Mathematics , 11/2013 University of Washington, Seattle, Washington, USA <ul style="list-style-type: none">• Advisor: Eric Shea-Brown• Dissertation: <i>On driven neural assemblies: synchrony, chaos and entropy.</i> M.Sc., Applied Mathematics , 06/2010 University of Washington, Seattle, Washington, USA	
	M.Sc., Mathematics , 05/2007 University of Ottawa, Ottawa, Ontario, Canada <ul style="list-style-type: none">• Advisor: Victor LeBlanc• Thesis: <i>Wave blocking phenomenon: a dynamical systems approach.</i> B.Sc., Mathematics , 12/2004 University of Ottawa, Ottawa, Ontario, Canada <ul style="list-style-type: none">• <i>magna cum laude</i> International Baccalaureate , 05/2001 Petit Séminaire de Québec, Gatineau, Québec, Canada	

Methods in computational neuroscience, 08/2010

Marine Biological Laboratory, Woods Hole, MA, USA

- Specialized summer school

PUBLICATIONS

Structured chaos shapes spike-response noise entropy in balanced neural networks, Guillaume Lajoie, Jean-Philippe Thivierge and Eric Shea-Brown, Under review. Preprint available on the arXiv and available at <http://arxiv.org/abs/1311.7128>.

On driven neural assemblies: synchrony, chaos and entropy., Guillaume Lajoie, PhD thesis, Dept. of Applied Mathematics, University of Washington, December 2013

Chaos and reliability in balanced spiking networks with temporal drive, Guillaume Lajoie, Kevin K. Lin and Eric Shea-Brown, Phys. Rev. E, 2103, vol. 87 (5), p. 052901

Shared Inputs, Entrainment, and Desynchrony in Elliptic Bursters: From Slow Passage to Discontinuous Circle Maps, Guillaume Lajoie and Eric Shea-Brown, SIADS, 2011, vol. 10, p. 1232

Wave blocking phenomenon: a dynamical systems approach, Guillaume Lajoie, Masters thesis, Dept. of Mathematics, University of Ottawa, June 2007

PAPERS IN PREPARATION

Single cell spiking mechanisms influence chaos-driven stochasticity in large balanced nets, Guillaume Lajoie, Kevin Lin, Eric Shea-Brown, to be submitted 2014.

Induced desynchrony in a network of bursting cells, Megan Lacy, Guillaume Lajoie and Eric Shea-Brown, to be submitted 2014

PRESENTATIONS

Poster - *Structured chaos shapes neuronal spike-response noise entropy of driven balanced networks*, Computational and Systems Neuroscience 14 (COSYNE), Saly-Lake City, UT, Feb. 2014

Invited Talk - *Chaos and reliability in fluctuation-driven, balanced spiking networks*, Interdisciplinary Conference in Applied Mathematics, Modeling, and Computational Science (AMMCS-2013), Waterloo, Ontario, Canada, Aug. 2013

Poster - *Chaos and reliability in fluctuation-driven, balanced spiking networks*, SIAM Applied Dynamical Systems Conference, SnowBird resort, Utah, May 2013

Invited Talk - *Chaos and reliability in fluctuation-driven, balanced spiking networks*, IMACS international conference on nonlinear evolution equations and wave phenomena: computation and theory, UGA, Athens, GA, March 2013

Talk - *Structured chaos and spike responses in stimulus-driven networks*, Computational and Systems Neuroscience 13 (COSYNE), Saly-Lake City, UT, Feb. 2013

Poster - *Chaos and reliability in fluctuation-driven, balanced spiking networks*, Mathematical Challenges in Neural Network Dynamics, MBI, Columbus, OH, Oct. 2012

Invited Talk - *Reliability of Spike Times in Sparsely Connected Networks*, SIAM Life Sciences 12, San Diego, CA, Aug. 2012

Poster - *Synchrony control in a population of bursting neurons using a common input a mathematical study*, Workshop on Mathematical Modeling of Neurological Disease from Cellular Perspectives,

Fields Institute, Toronto, Canada, May 2012

Invited Talk - *Spike time reliability of temporally driven neural networks in balanced regimes*, Frontiers in Applied and Computational Mathematics, Newark, NJ, May 2012

Poster - *Reliable and Unreliable spike times in sparsely connected networks*, COSYNE12, Salt-Lake City, UT, Feb. 2012

Poster - *Reliability in small networks of excitable cells*, Workshop for Young Researchers in Mathematical Biology, Mathematical Bioscience Institute (MBI), Columbus, OH, Aug. 2011

Poster - *Reliability in small networks of excitable cells*, International Congress on Industrial and Applied Mathematics (ICIAM), Vancouver, Canada, Jul. 2011.

Talk - *Synchrony control in a population of bursting neurons using a common input*, Control Symposium, University of Washington, Seattle, Sept. 2011.

Invited Talk - *Desynchronizing a neural population with shared input*, 2nd Northwest Computational Neuroscience Connection, University of Washington, Seattle, Oct. 2010.

Invited Talk - *Dynamics of commonly driven elliptic bursters*, SIAM Life Sciences conference, Pittsburgh, Jul. 2010. (Part of a symposium on coherent behavior in neural networks and populations)

Talk - *From slow/fast bursting to discontinuous circle maps*, Dynamical systems seminar, Instituto de mathematica pura e applicada (IMPA), Rio de Janeiro, Brazil, Jan. 2010.

Talk - *Driven bursters: asymptotics and discrete dynamics*, Applied mathematics seminar, University of Ottawa, Ottawa, Canada, Dec. 2009.

Talk - *Contour Definition and Applications to Medical Modeling*, 4th Pacific-coast variational conference, University of Washington, Seattle, Feb. 2009.

Invited Talk - *Wave Blocking Phenomena for Traveling Waves*, Joint AARMS CRM Workshop on Recent Advances in Functional and Delay Differential Equations, Dalhousie University, Halifax, Canada, Nov. 2007.

Talk - *Wave Blocking Phenomena for Traveling Waves*, Colloquium of the Québec's Institute of Mathematical Sciences (ISM), Laval University, Québec, Canada, May 2006.

TEACHING
EXPERIENCE

Instructor: *Introduction to Computational Neuroscience* (graduate level) - University Georg-August Goettingen / Max Planck Institute for Dynamics and Self-Organization, Spring 2014

Teaching Assistant: *Methods in Computational Neuroscience summer school* - Marine Biological Laboratory (Woods Hole, MA), Aug. 2012

Instructor: *Mathematical Models of Biological Systems* (graduate level) - University of Washington, Winter 2012

Instructor: *ODEs, Laplace Transforms and numerical methods* (undergraduate level) - University of Ottawa, Fall 2006

Teaching Assistant: Various appointments (Calculus, Linear Algebra, Discrete Mathematics, ODEs and Dynamical Systems) - University of Ottawa and University of Washington, 2006-2009

OTHER LECTURES *Special Topics Seminar on computation of Lyapunov Exponents*, University of Washington, Dept. of Applied Math, fall 2011.

Computational neuroscience: what is this?, University of Washington, Seattle, Aug. 2011. - Presented to incoming UW freshmen from the Bridge undergraduate program

Computational neuroscience: an introduction, University of Washington, Seattle, Nov.2009. Presented to the members of the Control Theory Group of the University of Washington

HONORS AND AWARDS

Bernstein Research Fellowship in Computational Neuroscience - Awarded by the Bernstein Center for Computational Neuroscience (BCCN) - January 2014 to December 2015

FQRNT Postdoctoral Research Scholarship - Awarded by the *Fonds Quebecois de Recherche Nature et Technologies* (FQRNT) - January 2014 to December 2015

UW-NIH Computational Neuroscience Training Grant - Awarded by the UW computational neuroscience training program and funded by the National Institute of Health (NIH) - September 2011 to June 2013

NSERC Graduate Scholarship D (ES D) - Awarded by the Natural Sciences and Engineering Research Council of Canada (NSERC) - September 2009 to August 2011

Graduate School Top Scholar Award - University of Washington - September 2008

NSERC Graduate Scholarship D (ES D) - Awarded by the Natural Sciences and Engineering Research Council of Canada (NSERC) - September 2007 to August 2008

Prize of excellence for a scientific presentation at the Colloquium of the Québec Institute of Mathematical Sciences (ISM), Laval University - Awarded by the Center for Research and Development for Canadian Defense of Valcartier - May 25th 2006

National Excellence Scholarship of the University of Ottawa - University of Ottawa - May 2006 to April 2007

Canada Graduate Scholarship M (ES M) - Awarded by the Natural Sciences and Engineering Research Council of Canada (NSERC) - May 2006 to April 2007

Excellence Scholarship from the University of Ottawa - University of Ottawa - May 2005 to April 2006

Ontario Graduate Scholarship (OGS) - Province of Ontario - May 2005 to April 2006

ACADEMIC EXPERIENCE

Research Co-Supervision, with Eric Shea-Brown - Supervision of Megan Lacy on an undergraduate research project supported by AMGEN and Mary Gates programs for undergraduate research, 2011-2013

President, SIAM UW Student Chapter, Organizing weekly and special seminars as well as research oriented activities. 2011-2012

Vice President, SIAM UW Student Chapter, Organizing weekly and special seminars as well as research oriented activities. 2010-2011

OTHER EXPERIENCE

Intern

Demographics department, Canada Revenue Agency
Ottawa, Canada
01/2003 - 05/2003