March 2021

CV for Alla Borisyuk

Professional Preparation

Moscow State University	Mathematics, Applied Mathematics	Diploma (M.S.), 1997
New York University	Mathematics	M.S., 1999
New York University	Mathematics	Ph. D., 2002

Postdoctoral Institution

Ohio State University	Mathematical Biology	2002 – 2005

Appointments

2020-current	Professor, Department of Mathematics, University of Utah
2019-current	Associate Chair, Department of Mathematics, University of Utah
2013-2020	Associate Professor, Department of Mathematics, University of Utah
2005-2013	Assistant Professor, Department of Mathematics, University of Utah
2002 – 2005	Postdoctoral Researcher, Mathematical Biosciences Institute, Ohio State University
1997 – 2002	Teaching and Research Assistant, Dept. of Mathematics, New York University
June - July 2000	Visiting researcher, National Institutes of Health (NIDDK)
June - July 1999	Visiting researcher, National Institutes of Health (NINDS)
June - July 1998	Research Assistant, Institute for Systems Research, University of Maryland
June - July, 1996	Summer student research, Center for Applied Mathematics, Cornell University

Publications: Peer-reviewed

Zavitz D., Amematsro E., Borisyuk A., Caron S. Connectivity patterns shape sensory representation in a cerebellum-like network. *Submitted.*

Zavitz D., Youngstrom I.A., Wachowiak M, Borisyuk A. Biologically-based Packet Networks. *In preparation*

G. Handy, A. Borisyuk. How astrocytes change what we think we know about neuronal networks. *In preparation.*

Zavitz D., Youngstrom I.A., Borisyuk A., Wachowiak M. (2020) Effect of interglomerular inhibitory networks on olfactory bulb odor representations. *J. Neuroscience*, 40 (31) 5954-5969; https://doi.org/10.1523/JNEUROSCI.0233-20.2020

R. Viertel, A. Borisyuk (2019) A Computational Model of the Mammalian External Tufted Cells. *J Theor Biol.*; 462: 109-121. doi: 10.1016/j.jtbi.2018.10.003

G. Handy, S.D. Lawley, A. Borisyuk (2019) Role of trap recharge time on the statistics of captured particles. *Physical Review E*, 99(2)

G. Handy, S.D. Lawley, A. Borisyuk (2018) Receptor recharge time drastically reduces the number of captured particles. *PLOS Computational Biology*, https://doi.org/10.1371/journal.pcbi.1006015

M. Taheri, G. Handy, A. Borisyuk, J.A. White (2017) Diversity of Evoked Astrocyte Ca2+ Dynamics Quantified through Experimental Measurements and Mathematical Modeling. *Front. Syst. Neurosci.* https://doi.org/10.3389/fnsys.2017.00079

G. Handy, M. Taheri, J.A. White, A. Borisyuk (2017) Mathematical investigation of IP3-dependent calcium dynamics in astrocytes. *J Comput Neurosci*. 42(3): 257-273

R. Carey, W.E. Sherwood, M. Shipley, A. Borisyuk, M. Wachowiak (2015) Role of intraglomerular circuits in shaping temporally structured responses to naturalistic inhalation-driven sensory input to the olfactory bulb. *Journal of Neurophysiology.* 113(9), 3112- 3129. doi: 10.1152/jn.00394.2014

A. Borisyuk, F. Rassoul-Agha (2014) Quasiperiodicity and Phase Locking in Stochastic Circle Maps: a Spectral Approach, *Physica D: Nonlinear Phenomena*. DOI: 10.1016/j.physd.2014.07.006

A. Borisyuk (2014) Modulation of neuronal entrainability by epilepsy-associated currents and noise: a spectral approach. *BMC Neuroscience*, **15**(Suppl 1):P202

A. Borisyuk, J. Best, D. Terman (2013) Frequency separation by an excitatory-inhibitory network. *J. Comp. Neurosci.* 34(2): 231-243

T. Broicher, P. Malerba, A. Dorval, A. Borisyuk, F. Fernandez, and J. White (2012) Spike Phase Locking in CA1 Pyramidal Neurons depends on Background Conductance and Firing Rate. *J Neurosci*, 32(41): 14374-14388

S.E.Odom, A.Borisyuk (2012) Estimating three synaptic conductances in a stochastic neural model. *J. Comp. Neurosci.* 33: 191-205

S.Ahn, B.H. Smith, A. Borisyuk, D. Terman (2010) Analyzing Neuronal Networks Using Discrete-Time Dynamics, *Physica D: Nonlinear phenomena* 239(9): 515-528 (In Physica D Top 25 Hottest Articles list)

W.H. Nesse, A. Borisyuk, P.C. Bressloff (2008) Fluctuation-Driven rhythmogenesis in an excitatory network with slowadaptation, *J. Comp. Neurosci.* 25(2): 317-33

J. Best, A. Borisyuk, J. Rubin, D. Terman, M. Wechselberger (2005) The dynamic range of bursting in a network of synaptically coupled square-wave bursting respiratory pacemaker cells, *SIAM J. of Appl. Dyn. Syst.* 4: 1107-1139

A. Borisyuk, B. H. Smith (2004) Odor interactions and learning in a model of the insect antennal lobe. *Neurocomputing* 58-60: 1041-1047

A. Borisyuk, M. N. Semple, J. Rinzel (2002) Adaptation and inhibition underlie responses to time-varying interaural phase cues in a model of inferior colliculus neurons. *J. Neurophysiol.* 88: 2134-2146

A. Borisyuk, M. N. Semple, J. Rinzel (2001) Computational model for the dynamic aspects of sound processing in the auditory midbrain. *Neurocomputing* 38: 1127-1134

Publications: Book Chapters, etc.

A. Borisyuk. Dynamical Systems: Overview. *Encyclopedia of Comp. Neuroscience.* Spinger-Verlag NewYork, 2015

A. Borisyuk. Morris-Lecar Model. *Encyclopedia of Computational Neuroscience.* Springer-Verlag New York, 2015

A. Borisyuk. Physiology and mathematical modeling of the auditory system. *In:* Tutorials in Mathematical Biosciences I. Mathematical Neurosciences, Lecture Notes in Mathematics, Vol. 1860, Springer, Berlin Heidelberg NewYork, 2005

A. Borisyuk, J. Rinzel. Understanding neuronal dynamics by geometrical dissection of minimal models. *In:* Methods and Models in Neurophysics, Les Houches Summer School, Session LXXX, C. Chow, B. Gutkin, D. Hansel and C. Meunier (eds). Elsevier, 2005

Grants:

- Granted (2019-2022) NSF-DMS-1853673. PI: Borisyuk. Incorporating the Effects of Synaptic Ensheathment in Neuronal Networks: A Multi-scale Investigation.

- Granted (2018-2023) NIH. 1R01NS109979-01 (PI: Wachowiak, Role: Co-Investigator). Using functionally-defined glomeruli to probe circuit function in the mammalian olfactory bulb

- Granted (2012-2018) RTG, Mathematical biology (PI: Keener. Role: co-PI), $2,496,299.00

- Granted (Oct. 2010-Sept. 2015) NSF-DMS-1022945. PI: Borisyuk. Coding of Timing Information in the Auditory System, $150,000

- Granted (July 2005 - June 2009) NIH/NIDCD R01-DC-7997 Importance of temporal information for olfactory codes (co-PI with D. Terman (OSU), B.H. Smith (ASU)), $618,180 (d+i)

AWARDS

2003 Kurt O. Friedrichs Prize for an outstanding dissertation in mathematics. Courant Institute, New York University

2001 Bella Manel Prize for outstanding achievement in mathematics on the graduate level by a woman. Courant Institute, New York University

2000 Sandra Bleistein Prize for notable achievement by a woman in applied mathematics or computer science. Courant Institute, New York University

1997 - 2001 Teaching and Research Assistantship. Courant Institute, New York University

1996, 1997 Soros Foundation Scholarship for high academic and scientific performance

SELECTED INVITED TALKS (since 2013)

Sept. 2021	The Cold Place Mathematical Biology Seminar
April 2021	Dynamics seminar, University of Exeter, UK
June 2020	Minisymposium talk at the SIAM LS conference
May 2020	Mathematical Biosciences Institute, OSU
November 2019	Northwestern Applied Mathematics Colloquium
May 2019	Minisymposium talk at the SIAM DS conference
May 2018	Workshop for Women in Mathematical Biology, IMA
February 2017	U of Arizona, Applied Math colloquium
February 2017	COSYNE workshop
October 2016	Mathematical Biosciences Institute, OSU
October 2016	BYU Dynamical Systems seminar
October 2016	Mathematical Biosciences Institute, OSU
May 2016	Minisymposium talk at the SIAM LS conference
August 2015	Kavli Institute, UCSB

April 2015	Centre de Recerca Matematica, Barcelona, Spain
April 2015	Warwick University, UK
January 2015	Biomath and Dyn.Systems seminars, Courant Institute, NYU
July 2014	CNS-2014 Workshop, Quebec
February 2013	Math Colloquium, IUPUI

COURSE DEVELOPMENT

Spring 2009 Mathematics in Medicine and Physiology. Oriented to pre-med physics and math majors. Required course in physics department pre-med program. Course number as of Spring 2010: Math 4600

OUTREACH AND OTHER EDUCATIONAL ACTIVITIES

2018-2020	High School Math Circle Faculty coordinator
2014-2019	Elementary Math Circle
Summer 2016	ACCESS program instructor
Fall 2012	Science Day presentation
2011-2012	AWM student section helper
2007-2011	Presentations at West High School Math Club, East High Math, Granite summer program
Summer 2010	ACCESS summer program lecturer. University of Utah
Summer 2009	ACCESS summer program lecturer. University of Utah
August 2004	Project leader in the MBI Summer Program on Cell Processes

TEACHING EXPERIENCE: REGULAR COURSES

Spring 2021	Reading course in Computational Neuroscience (1st &2nd year PhD students)
Spring 2021	Math 4600: Math in Medicine and Physiology
Fall 2020	Introduction to Mathematical Biology I (5110)
Spring 2020	Math 3010: Topics in the History of Mathematics
Fall 2019	Computational Neuroscience (graduate)
Spring 2019	Math 3010: Topics in the History of Mathematics
Fall 2018	Math 1170: Calculus for Life Sciences
Spring 2018	Math 4800: Data Analysis in Neuroscience
Fall 2017	Math 6770: Computational Neuroscience
Spring 2017	Math 4600: Math in Medicine and Physiology; Math 5470: Chaos
Fall 2016	Math 5740: Module 1 – Applications of Discrete Dynamics
Spring 2016	Mathematics in Medicine and Physiology (4600)
Fall 2015	Computational Neuroscience (graduate)
Spring 2014	Mathematics in Medicine and Physiology (4600). University of Utah
Spring 2014	Math for Life Sciences II (1180). University of Utah
Fall 2013	Math for Life Sciences I (1170). University of Utah
Spring 2013	Math for Life Sciences II (1180). University of Utah
Fall 2012	Topics in Mathematical Biology: Computational Neuroscience (6770).
Fall 2012	Math for Life Sciences I (1170). University of Utah

Spring 2012 Mathematics in Medicine and Physiology (4600). University of Utah
Fall 2011 Introduction to Mathematical Biology I (5110). University of Utah
Spring 2011 Mathematics in Medicine and Physiology (4600). University of Utah
Spring 2011 Math for Life Sciences II (1180). University of Utah
Fall 2010 Math for Life Sciences I (1170). University of Utah
Spring 2010 Mathematics in Medicine and Physiology (4600). University of Utah
Spring 2010 Introduction to Mathematical Biology II (5120). University of Utah
Fall 2009 Introduction to Mathematical Biology (5110). University of Utah
Spring 2009 Medical mathematics (3900). University of Utah
Spring 2008 Computational Neuroscience (6780). University of Utah
Fall 2007 Math for Life Sciences I (1180). University of Utah
Fall 2007 Dynamical sytems and chaos (5470/6440). University of Utah
Spring 2007 Math for Life Sciences I (1170). University of Utah
Spring 2007 Introductory Statistics (1040). University of Utah
Fall 2006 Introduction to Mathematical Biology (5110). University of Utah
Fall 2005, Spring 2006 Elementary Statistics (1070). University of Utah
Fall 2000 PreCalculus. New York University
Spring 2000 Elementary Statistics. New York University

BOARDS, EDITORIAL, EXECUTIVE COMMITTEES, ETC

2016 - Journal of Theoretical Biology, Editorial Board Member

2017-2020 Program Director (Officer board member. Co-chair of society conference on Life Sciences), Society for Industrial and Applied Mathematics (SIAM) SIAG Activity Group on Life Sciences (Elected by Society Members)

2015 Encyclopedia of Computational Neuroscience, Section Editor, Springer-Verlag NewYork

2012-2015 Board Member, Society/Organization for Computational Neuroscience (OCNS). (Elected by Society Members)

2009-2011 Secretary (Officer board member), Society for Industrial and Applied Mathematics (SIAM) SIAG Activity Group on Life Sciences (Elected by Society Members)

CONFERENCES, WORKSHOPS AND MINISYMPOSIA ORGANIZED

Co-chair and organizer of SIAM Life Sciences Biannual Conference 2018, 2020
Minisymposium organizer at SIAM Dynamical Systems 2003, 2007, 2009, 2017
May 2007 Co-organizer of JPK60: a conference in honor of Kim Keener's 60th birthday
July 2006 Minisymposium at SMB - SIAM Life Sciences meeting
March 2005 Co-organizer of First Young Researchers Workshop in Mathematical Biology, MBI, OSU
May 2003 Minisymposium at SIAM Dynamical systems 2003 meeting

REVIEWER

Brain Sciences, Frontiers of Neuroscience, NSF Review panel, Journal of Neural Engineering, Journal of Theoretical Biology, Chaos, Biological Cybernetics, Scholarpedia, Encyclopedia of Computational

Neuroscience, Bulletin of Mathematical Biology, PLoS Computational Biology, Mathematical Medicine and Biology, NRC-CNRC, Canada, SIAM Jouranl of Applied Dynamical Systems, Society for Computational Neuroscience, Physica D, Journal of Computational Neuroscience, Neural Networks

DEPARTMENT AND UNIVERSITY COMMITTEE WORK

2020-2021	Dept of Math.: Scholarship committee; Faculty, Grads and Postdocs awards committees Awards Program committee
2020-2021	Chair of College of Science Scholarship committee
2020-2021	University Undergraduate Council member
2019-2021	Associate Chair, Department of Mathematics
2015-2019	Director of Undergraduate Studies, chair of the Undergraduate Curriculum committee
2017-2018	University Undergraduate Council member
2017-2018	Integrated Science Core planning committee
2013-2014	Chair of Graduate recruitment
2013-2014	Dean search committee
2013-2014	University Undergraduate Council member
2012-2013	Graduate committee (recruitment)
2010-2011	Graduate committee (recruitment)
2009-2010	Undergraduate curriculum committee
2007-2008	Dean's task force on diversity
2007-2008	VIGRE committee
2007-2008	Undergraduate curriculum committee
2006-2007	Instructorship committee

TRAINEES

Graduate students: Samantha Linn (reading), Patrick Talley (reading), Anil Cengiz (reading), Andy Liu (current), Daniel Zavitz (PhD 2021), Gregory Handy (PhD 2019), Marsa Taheri (John White's lab; PhD bioeng 2019), Ryan Viertel (PhD 2018), Vera Babenko (MS 2015), Steve Odom (MS 2012), Alex Heitman (M.S. 2011), Chad Hokama (M.S. CS)
Postdoctoral: Erik Sherwood (2012-13), Carter Johnson (current)
Undergraduates: Darshan Shimpi (current). Previous: Jacob Jones, Elom Amematsro (Caron lab), Yousef Alamri, Audrey Brown, Adam Lee, Emma Fine, Daniel Griffin (USU), Alexandria Cervantes (CSUMB), Heather Brooks, Marsa Taheri, Nathan Rickett