

PERSONAL DATA

Name: **Yixin Guo**
Current Position: Assistant Professor
Office Address: Department of Mathematics, Drexel University, Philadelphia, PA 19104
Telephone: (215)-895-2581 (office)
Fax: (215)-895-1582
Electronic Mail: yixin@math.drexel.edu

ACADEMIC BACKGROUND

Ph.D., Mathematics, August 2003

University of Pittsburgh, Pittsburgh, Pennsylvania, USA.

Dissertation Title: Existence and Stability of Standing Pulses in Neural Networks.

Ph. D. advisor: Carson Chow

M.A., Mathematics, April 2000

University of Pittsburgh, Pittsburgh, Pennsylvania, USA.

B.S., Mathematics, July 1990

Heilongjiang University, Harbin, Heilongjiang Province, P. R. China.

Summer Program on Methods in Computational Neuroscience

Marine Biological Laboratory (MBL), Woods Hole, MA, July 31 – August 27, 2005.

Directors of summer program: Prof. G. Bard Ermentrout and Prof. John White.

PROFESSIONAL EXPERIENCES

- Associate Professor, Department of Mathematics, Drexel University, Philadelphia, PA, *September 2013 – Present.*
- Assistant Professor, Department of Mathematics, Drexel University, Philadelphia, PA, *April 2006 – August 2013.* Maternity leave (tenure clock stopped from September 2009 to August 2010).
- Visiting Assistant Professor, Department of Mathematics, Harvey Mudd College, CA, *July 2005 – March 2006.*
- Postdoctoral Researcher at Mathematical Biosciences Institute (MBI), and the Laboratory of Research on Attention and Rhythmicity at the Department of Psychology, The Ohio State University, OH, USA. *September 2004 – June 2005.*
Construct mathematical models on Parkinson's Disease and Deep Brain Stimulation.
Construct mathematical models on timing and rhythm in attention and memory.
Postdoctoral advisor: David Terman. MBI director: Professor Avner Friedman.
- Visiting Assistant Professor, Department of Mathematics, The Ohio State University, OH, USA. Postdoctoral researcher at Mathematical Biosciences Institute (MBI), The Ohio State University, OH, USA. *September 2003-August 2004.*
Teaching: designed and instructed Differential Equations. Fall 2003 and Spring 2004.
Research: constructed mathematical models on Parkinson's Disease and Deep Brain Stimulation.
Postdoctoral advisor: David Terman. MBI director: Professor Avner Friedman.
- Department of Mathematics, University of Pittsburgh, Pittsburgh, PA, USA, *August 1997-August 2003.*
Research Fellow, Department of Mathematics, University of Pittsburgh, *May 2000-August 2003.*
Teaching Assistant and Instructor *August 1997-May 2000*
Designed and instructed undergraduate course on Business Calculus, summer 1999. Led recitation for undergraduate level algebra, Business Calculus, Calculus. Tutored various undergraduate courses, calculus, differential equations, and real analysis.
- Department of Mathematics, Heilongjiang University, P.R. China, *July 1990-August 1997*
Lecturer, *June 1995-August 1997*, Instructor, undergraduates advisor, *July 1990-May 1995.*

RESEARCH GRANTS

- Yixin Guo, National Science Foundation, DMS-1226180, Closed-loop Deep Brain Stimulation, Synchrony breaking and Chimera State. Funded by NSF, DMS at \$164,996 from September 2012 to August 2015.

RESEARCH INTERESTS

- Computational Neuroscience, Mathematical Biology. Dynamical Systems. Ordinary and Partial Differential Equations.

PUBLICATIONS (REFREED JOURNALS)

- Yixin Guo, Choongseok Park, Min Rong, Robert M. Worth, Leonid L. Rubchinsky, *Basal ganglia modulation of thalamocortical relay in Parkinson's disease and dystonia*. *Frontiers in Computational Neuroscience*, Vol. 7 No. 124, September 2013.
- Yixin Guo, *Existence and Stability of Traveling Fronts in a Lateral Inhibition Neural Network*, *SIAM Journal on Applied Dynamical Systems*, Vol. 11, No. 4, pp. 1543–1582, 2012.
- Dennis Y. Guang and Yixin Guo. *Localized states in 1-D homogeneous neural field models with general coupling and firing rate functions*. Submitted, 2012.
- Yixin Guo and Jonathan Rubin, *Multi-site Stimulation of Subthalamic Nucleus Diminishes Thalamocortical Relay Error in a Biophysical Network Model*. *Neural Networks*, Elsevier. [Volume 24, Issue 6](#), August 2011, Pages 602–616. Special Issue: Neurocomputational Models of Brain Disorders.
- Yixin Guo, Jonathan Rubin, Cameron McIntyre and David Terman. *Thalamocortical relay fidelity varies across subthalamic nucleus deep brain stimulation protocols in a data-driven computational model*, *Journal of Neurophysiology*, 99, 1477–1492, January 2, 2008.
- Yixin Guo and Carson C. Chow. *Existence and Stability of Standing Pulses in Neural Networks: I Existence*, *SIAM Journal on Applied Dynamical Systems* Vol 4, 217–248, 2005.
- Yixin Guo and Carson C. Chow. *Existence and Stability of Standing Pulses in Neural Networks: II Stability*, *SIAM Journal on Applied Dynamical Systems* Vol 4, 249–281, 2005.
- Yixin Guo, Wenbo Qu and Shuyan Sun. *Convergence Sequences in Local Convex Spaces* (in Chinese), *Daqing Petroleum Institute Journal* Vol. 20, No. 2, June 1996.
- Yixin Guo. *Existence and Stability of Traveling pulses in Neural Networks*, in preparation, 2012.
- Yixin Guo and Dennis Guang Yang, *Entrainment of a thalamocortical neuron to periodic sensorimotor signals*. Manuscript, 2012.
- Dennis Guang Yang and Yixin Guo. *A horseshoe structure of multi-bump standing pulses in a firing rate model*. In preparation, 2012.

PUBLICATIONS (CONFERENCE PAPERS)

- Guo Y, Park C, Rong M, Worth RM, Rubchinsky LL. Modulation of thalamocortical relay by basal ganglia in Parkinson's disease and dystonia. *BMC Neuroscience* 2011, 12(Suppl 1):P275.
- Yang D G, Guo Y. Entrainment of a thalamocortical neuron to periodic sensorimotor signals. *BMC Neuroscience* 2011, 12(Suppl 1):P135.

AWARDS AND HONORS

- Financial Support from CIRM (Centre International de Rencontres Mathématiques) for accommodation to give a talk at the Workshop on Spatio-temporal evolution equations and neural fields. October 2011.
- Drexel University Faculty International Travel Award of \$700 to attend the Twentieth Annual Computational Neuroscience Meeting, Stockholm, Sweden, July 23–28, 2011.

- Financial support of \$1800 from the International Center of Mathematical Sciences (ICMS) at University of Edinburgh for giving an invited talk at the Mathematical Neuroscience Workshop, *April 11-13, 2011*, Edinburgh, UK.
- Antelo Devereux award for Young Faculty for the proposal acceptance-modeling Parkinson's disease and deep brain stimulation, \$10,000, Drexel University, 2008.
- Scholarship for summer program on Methods in Computational Neuroscience at the Marine Biological Laboratory, Woods Hole, MA, *July 31 – August 27, 2005*.
- Research Fellowship, Department of Mathematics, University of Pittsburgh, *May 2000- August 2003*.
- Teaching Assistantship, Department of Mathematics, University of Pittsburgh, *August 1999 -April 2000*.
- Undergraduate Advisor Award, Heilongjiang University, P.R. China, *December 1990*.
- Undergraduate Scholarship, Department of Mathematics, Heilongjiang University, P. R. China, 1988.

INVITED TALKS AT CONFERENCES AND SYMPOSIA

- Invited talk at the AMS sectional meeting in Mathematical Biology, Oct. 12-13, 2013, Temple University, Philadelphia.
- Invited talk at MBI Workshop 3 on Disease organized by [Victoria Booth](#), [Liam Paninski](#), [Jonathan Rubin](#), [Steven J. Schiff](#), and [Charles Wilson](#). Mathematical Biosciences Institute (MBI). February 4-8, 2013.
- Invited talk at The 9th AIMS Conference on Dynamical Systems, Differential Equations and applications, Orlando, FL, July 1-5, 2012. Invited by Prof. Jianzhong Su.
- Invited talk at the Workshop on Spatio-temporal evolution equations and neural fields. Funded by CIRM (Centre International de Rencontres Mathématiques) for accommodation. October 24-28, 2011, Marseille, France.
http://icn.epfl.ch/Workshops/Marseille2011/SpatioTemporalEvolution/STE_Marseille2011.htm.
(Invited by Prof. Paul Bressloff. <http://www.math.utah.edu/~bressloff/>)
- Invited talk at the Mathematical Neuroscience Workshop at ICMS, April 11-13, 2011, Edinburgh, UK. Fully funded by ICMS (The International Center for Mathematical Sciences). Workshop website: <http://www.icms.org.uk/workshops/neuro2011>
(Invited by Prof. Stephen Coombes. <http://www.maths.nott.ac.uk/personal/sc/>)
- Invited talk at the 2nd International Conference on Cognitive Neurodynamics, November 16-18, 2009. Hangzhou, China.
(Invited by Prof. Jianzhong Su. <http://www.uta.edu/math/pages/faculty/su.htm>)
- Frontiers in Applied and Computational Mathematics, NJ, June 5-7, 2009.
(Invited by Prof. Amitabha Bose. <http://m.njit.edu/~bose/>)
- Invited talk, AIMS international Conference on Dynamical Systems, Differential Equations and Applications, May 18-21, 2008, University of Texas at Arlington, TX.
(Invited by Prof. Jianzhong Su. <http://www.uta.edu/math/pages/faculty/su.htm>)
- Invited talk, International Conference on Cognitive Neurodynamics, November 17-21, 2007, Shanghai, P. R. China.
- Invited Talk, SIAM Conference on Applications of Dynamical Systems (DS07) May 28-June 1, 2007, Snowbird, Utah.
(Invited by Prof. Jonathan Rubin and Prof. Jeff Moehlis)
- Invited talk, The Annual Computational Neuroscience Meeting, Neuronal Patterns of Parkinson's Disease and Deep Brain Stimulation, Madison, WI, *July 21, 2005*.
- Invited talk, AMS 2004 Fall Eastern Section Meeting, Pittsburgh, PA, *November 6-8, 2004*.

INVITED COLLOQUIA AND SEMINAR TALKS AT UNIVERSITIES

- Invited colloquium talk at the Department of Physics, Georgetown University, April 23, 2013. Invited by Prof. Rhonda Dzakpasu.
- Invited seminar talk at the School of Biomedical Engineering, Drexel University, April 12, 2013.
- Invited colloquium talk at the Department of Mathematics, New Jersey Institute of Technology. February 22, 2013. Invited by Prof. Amitabha Bose.
- Colloquium talk on Standing Patterns of firing rate models and Working Memory, Lehigh University, Department of Mathematics, October 29, 2008.
(Invited by Prof. Linghai Zhang. <http://www.lehigh.edu/~liz5/>)
- Multi-site Local Field Potential stimulation to Restore Thalamocortical Relay fidelity, Mathematical Neuroscience Seminar, Center for Mathematical Biosciences, Indiana University Purdue University Indianapolis, September 12, 2008.
(Invited by Prof. Leonid L. Rubchinsky. <http://www.math.iupui.edu/~leo/>)
- Modeling Parkinson's Disease and Brain Stimulations, HRL lab, Malibu, CA, September 4, 2008.
- Dean's seminar, Drexel University, October 3, 2007, Philadelphia, PA.
- Invited talk, New Jersey Institute of Technology, April 17, 2007, Newark, NJ.
- Center for Neurodegenerative Disease Research, University of Pennsylvania, Invited talk, Modeling Parkinson's Disease and Deep Brain Stimulation, Philadelphia, PA, *August 3, 2006*.
- The Department of Neurobiology and Anatomy, Drexel University, invited talk, Modeling Parkinson's Disease and Deep Brain Stimulation, Philadelphia, PA, *June 9, 2006*.
- Invited talk, SIAM chapter at the Department of Mathematics, Drexel University, Modeling Neural Circuits, Philadelphia, PA, *April 18, 2006*.
- Colloquium talk on Modeling Parkinson's Disease and Deep Brain Stimulation, Department of Mathematics, Drexel University, *April 19, 2005*.
- Colloquium talk on Modeling Parkinson's Disease and Deep Brain Stimulation, Harvey Mudd College, Department of Mathematics, *February 15, 2005*.
- Research lectures for undergraduate students: I. Working Memory and Standing Pulses; II. Parkinson's Disease and Deep Brain Stimulation, Harvey Mudd College, *February 16, 2005*.
- Mathematical Biosciences Institute (MBI) Postdoctoral Seminar, research talk, *April 15, 2004*. Abstract available on <http://mbi.osu.edu/sciprograms/seminars.html#pseminars>.
- University of Wisconsin, Green Bay, invited talk, *April 12, 2004*.
- Tufts University, Department of Mathematics, invited talk, *March 22, 2004*.
- Applied Analysis seminar, University of Pittsburgh, Department of Mathematics, research talk, *September 2001*.

CONTRIBUTED TALKS AND POSTERS AT CONFERENCES AND SYMPOSIA

- Twenty-first Annual Computational Neuroscience Meeting, Paris, France, July 13-18, 2013.
- Twentieth Annual Computational Neuroscience Meeting, Stockholm, Sweden, July 23-28, 2011.
- SIAM Conference on Applications of Dynamical Systems, Snow Bird, UT, May 22-26, 2011.
- The 40th Annual Meeting of Society of Neuroscience, San Diego, CA, November 12-16, 2010.
- The Annual Computational Neuroscience Meeting, poster, Madison, WI, *July 20, 2005*.
- The Annual Meeting of Society of Mathematical Biology, contributed talk, Ann Arbor, MI, *July 25-28, 2004*.
- SIAM Conference on Life Science. Portland, OR, poster. *July 11-14, 2004*.
- SIAM Conference on Application of Dynamical Systems. Snowbird, UT, poster, *May 27-31, 2003*.
- Gordon Research Conference: Theoretical Biology and Biomathematics. Tilton, NH, poster, *June 9-14, 2002*.
- The First SIAM Conference on Life Science. Boston, MA. Poster, *March 6-8 2002*.
- Science 2001: A Research Odyssey. Pittsburgh, PA. Poster, *September 12-14, 2001*.

COURSES TAUGHT

- *Drexel University*: Graduate Level: Mathematical Neuroscience, and Ordinary Differential equations. Undergraduate Level: Partial Differential Equations, Ordinary Differential Equations, Calculus I, Calculus II, Calculus III, Linear Algebra, Fundamental of mathematics, Precalculus, Probability and Statistics I, and Numerical Analysis II.
- *Harvy Mudd College*: Mathematical Biology.
- *The Ohio State University*: Ordinary Differential Equations.

SERVICES

- *Drexel University*: Serve as a judge for student posters on the Research Day of CoAs. April 2, 2012. Serve as a judge to evaluate student posters at the Biomed Talent and Technology Showcase, November 2, 2010;
Departmental committee: Tenure-track Hiring Committee (2012-2013). Graduate Committee (2011-2012). Teaching Faculty Evaluation Committee (2010-2011 academic year); Graduate Committee (2008-2009 academic year); Departmental Computer Committee (2007-2008 academic year); Graduate Committee (2006-2007 fall quarter), Hiring Committee (2006-2007 academic year), Departmental Computer Committee (2007-2008 academic year), Graduate Committee (2008-2009 academic year), Meet and Greet (College of Art and Sciences), University Open House (2006 and 2008), Convocation .
- *NSF Panel Review*: Cyber-enabled discovery and innovation (CDI), June 2-3, 2008.
(Invited by then program director Weiqing Gu who is a professor at Harvey Mudd College.
<http://www.math.hmc.edu/~gu/>

STUDENT THESIS COMMITTEES

- Kelly Toppin. Supervise his Ph. D. dissertation. 2013-2016.
- Amrit Misra, Patrick Ganzer, Marissa Powers, (from Karen Moxon Lab in the School of Biomedical Engineering); Walter Hinds, Honghui Zhang (from Joshua Jacobs Lab in the School of Biomedical Engineering).
- Svitlana Zhuravytska, defended on May 26th 2011 at department of Mathematics, Drexel University,.
- Amal Aafif, defended on June 27, 2007 department of Mathematics, Drexel University,.

REFEREE FOR JOURNALS

- SIAM Journal on Applied Mathematics, SIAM Journal on Applied Dynamical Systems. Journal of Mathematical Biology. Journal of Computational Neuroscience. Physica D. Journal of Dynamics and Differential Equations. Dynamics of Partial Differential Equations.

PROPOSAL SUBMITTED

- Simons Collaboration Grants for Mathematicians
PI: Yixin Guo
Agency: Simons Foundation
Requested amount: \$7,000 yearly; Submission date: Jan 31, 2012
- Title: Closed-loop Deep Brain Stimulation, Synchrony Breaking and Chimera State
Agency: NSF
Requested amount: \$220,973; Period: 3 years; Submission date: Jan 13, 2012.
- Proposal for Drexel Career Development Award submitted March 31, 2011
PI: Yixin Guo
Requested amount: \$5300; Cost Sharing from Department of Mathematics: \$2000.
- Title: Multisite feedback deep brain stimulation: synchrony breaking and chimera state
PI: Yixin Guo

Agency: NSF

Requested amount: \$213,706; Period: 3 years; Submission date: Jan 13, 2011.

- Simons Collaboration Grants for Mathematicians

PI: Yixin Guo

Agency: Simons Foundation

Requested amount: \$7,000 yearly; Submission date: Jan 31, 2011

- Title: Persistent activity, standing and propagating patterns of firing rate models

PI: Yixin Guo

Agency: NSF

Requested amount: \$90,000; Period: 3 years; Submission date: Jan 13 2008.

- Title: Persistent activity, standing and propagating patterns of firing rate models

PI: Yixin Guo

Agency: NSF

Requested amount: 202,098; Period: 3 years; Submission date: Jan 15 2007.

WORKSHOPS ATTENDED

- MBI workshop-the Math Biology: Looking at the Future (MBI's 10th Anniversary Meeting), September 19-21, 2012.
- Real Time Brain Interfacing Applications, MBI, The Ohio State University, *May 12-15, 2008*.
- Workshops at Mathematical Biosciences Institute, The Ohio State University as a researcher. *September 2003-June 2005*.
- *Nonlocal Integro-Differential Equations in Mathematics and Biology*, Mathematical Bioscience Institute, The Ohio State University. *March 6-8, 2003*.
- *System Level Modeling*, Organized by John Rinzel and Barry Horwitz, Mathematical Bioscience Institute, The Ohio State University. *November 18-22, 2002*.
- *Neuronal Dynamics*, Organized by Bard Ermentrout and David Terman. Mathematical Bioscience Institute, The Ohio State University. *October 7-18, 2002*.
- *Epidemiology for Mathematical Scientists Part I: Introduction to Epidemiological Studies. Part II: The Foundations of Molecular Genetics for Non-Biologists*. DIMACS center, Rutgers University. *August 26-30, 2002*.

PROFESSIONAL SOCIETY MEMBERSHIPS

- Organization of Computational Neuroscience, *2013-present*.

REFERENCES

Professor Carson C. Chow
National Institute of Health, NIDDK,
Laboratory of Biological Modeling
University of Pittsburgh, Department of Mathematics
Voice: 301-402-8250
E-mail: carsonc@nidk.nih.gov

Professor David Terman
The Ohio State University
Department of Mathematics
Mathematical Biosciences Institute (MBI)
Voice: 614-688-3064
Email: terman@math.ohio-state.edu

Professor Avner Friedman
The Ohio State University
Mathematical Biosciences Institute
Department of Mathematics
Voice: 614-292-5296
E-mail: afriedman@mbi.osu.edu

Professor G. Bard Ermentrout
University of Pittsburgh
Department of Mathematics
Voice: 412-624-8324
Email: bard@pitt.edu