Michael A. Schwemmer
Curriculum Vitae

The Program in Applied and
Computational Mathematics
Princeton University
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Education

University of California, Davis Davis, CA
Ph.D. in Applied Mathematics, August 2010.
Thesis: The Influence of Dendritic Properties on the Dynamics of Oscillatory Neurons
Advisor: Dr. Timothy J. Lewis

Queens College, CUNY Flushing, NY
B.A. in Mathematics, May 2005.

Research Experience

Postdoctoral Research Fellow 09/2010–2011
The Program in Applied and Computational Mathematics
Princeton Neuroscience Institute
Princeton University

NSF VIGRE Research Fellow 09/2005–2010
Department of Mathematics, UC Davis.
Performed original research in mathematical neuroscience relating to the effects of dendritic properties on the dynamics of neuronal oscillators under Dr. Timothy J. Lewis.

Teaching Experience

Instructor 02/2011–5/2011
Department of Mathematics, Princeton University.
Topics in Mathematical Modeling: Mathematical Neuroscience (MAT 351/APC 351)

Teaching Assistant 09/2009–12/2009
Department of Neurobiology, Physiology, and Behavior, UC Davis.
Computational Neuroscience (NPB 267/167)

Teaching Assistant 09/2008–9/2009
CLIMB Program
(Collaborative Learning at the Interface of Mathematics and Biology)
Department of Evolution and Ecology, UC Davis.
Assisted several scholarship undergraduate students in learning the concepts behind mathematical biology research in different biological fields and helped them to formulate their own research project. Aided them in their pursuit of their research project during the summer which involved modeling the effects of age structure and voluntary vaccination on outbreaks of measles epidemics.

Associate Instructor 08/2008–9/2008
Department of Mathematics, UC Davis.
Lectured, administered and graded exams, and held office hours for the undergraduate course Differential Equations (Math 22B).

Teaching Assistant 09/2006–6/2008
Department of Mathematics, UC Davis.
Led discussion sections, held office hours, and graded exams for undergraduate class Calculus for Biology and Medicine (Math 17A and 17C) and the upper division undergraduate courses Ordinary Differential Equations (Math 119A) and Mathematical Biology (Math 124).

Service to the University

Co-Organizer Dynamical Systems and Nonlinear Science Seminar 9/2010–5/2011
Princeton University.

SIAM Club Executive Chairman 6/2008–6/2009
University of California Davis.
Chaired the five member executive committee for the Society of Industrial and Applied Mathematics (SIAM) club at UC Davis which promotes applied mathematics throughout the UC Davis campus and provides a forum for students interested in applied mathematics. Organized the second annual Davis SIAM Student Research Conference which highlights the cutting edge applied mathematics research being performed by students at UC Davis and included two keynote addresses. Successfully orchestrated SIAM funding grant and NSF VIGRE grant proposals to fund projects.

Research Experience for Undergraduates (REU) Aide 7/2006, 7/2008
University of California Davis.
Assisted undergraduate students that were doing research projects with my advisor during the summer.

Synergistic Activities

SIAM LS10 Minisymposium 7/2010
Pittsburgh, PA.
Understanding the Link Between Neuronal Dynamics and Neuronal Computation
Co-organized minisymposium bringing together researchers in neuronal dynamics and neuronal statistics to discuss the relationship between a neuron's intrinsic biophysical properties and its computational properties, a problem of significant interest for neuroscience.

Research Interests

My interests lie in dynamical systems, asymptotic analysis, and stochastic differential equations and their applications to mathematical biology, particularly neuroscience.

Journal Articles

Schwemmer, M.A. and Lewis, T.J. Effects of Dendritic Load on the Firing Frequency of Oscillating Neurons. *Physical Review E.* **83** 031906 2011.

Schwemmer, M.A. and Lewis, T.J. Bistability in a Leaky Integrate-and-Fire Neuron with a Passive Dendrite. *In Prep.* 2011.

Invited Book Chapters

Netoff, T., Schwemmer, M.A. and Lewis, T.J. Measuring Phase Response Curves from Neurons. To appear in: *Phase Response Curves in Neuroscience: Theory, Experiment, and Analysis.* (N. Schultheiss, A. Prinz, and R. Butera eds.), Springer.

Schwemmer, M.A. and Lewis, T.J. The Theory of Weakly Coupled Oscillators. To appear in: *Phase Response Curves in Neuroscience: Theory, Experiment, and Analysis.* (N. Schultheiss, A. Prinz, and R. Butera eds.), Springer.

Conference Publications

Schwemmer, M.A. and Lewis, T.J. Effects of Passive Dendritic Properties on the Dynamics of an Oscillating Neuron. *BMC Neuroscience*, 9:P120 2008. CNS 2008, July, 2008. Poster abstract.

Invited Talks

Dynamical Systems and Nonlinear Science Seminar 2/19/2010
Princeton University
The Effects of Dendritic Properties on the Dynamics of Oscillatory Neurons

Colloquium 2/15/2010
Rice University
The Effects of Dendritic Properties on the Dynamics of Oscillatory Neurons

Poster Sessions

Bistability in a Leaky-Integrate-and-Fire Neuron with a Passive Dendrite
SIAM Conference on the Life Sciences (LS10) Pittsburgh, PA. 07/2010

Effects of Dendritic Load on the Firing Frequency of Oscillating Neurons
Conference in Honor of John Rinzel's 60^{th} Birthday, NYU, New York, NY. 06/2009

Effects of passive dendritic properties on the dynamics of an oscillating neuron
Seventeenth Annual Computational Neuroscience Conference CNS 2008, Portland, OR. 7/2008

Effects of passive dendritic properties on the dynamics of an oscillating neuron
Davis SIAM Student Research Conference, University of California, Davis, CA. 5/2008

Action potential dynamics in simulated and real axons, Einsteins in the City, City College of New York, CUNY, New York, NY. 2005

Action potential dynamics in simulated and real axons, Society for Neuroscience, 34th Annual Meeting, San Diego, CA. 10/2004

Workshops Attended

Methods in Computational Neuroscience
Marine Biological Laboratory, Woods Hole, MA
Invited participant, 08/2009

Math Biology Workshop on Building an Interdisciplinary Career
University of Utah, Salt Lake City, UT
Invited Participant, 05/2009

Computational Cell Biology
Cold Springs Harbor Laboratory, Cold Springs Harbor, NY
Invited participant, 06/2008

Awards and Honors

Best Graduate Student Poster Award 07/2010
SIAM Conference on the Life Sciences (LS10)
Pittsburgh, PA.

Alice Leung 06/2010
Scholarship in Mathematics
University of California, Davis, CA.

Floyd and Mary Schwall 09/2009–06/2010
Dissertation Year Fellowship in Medical Research
University of California, Davis, CA.

Claire and Samuel Jacobs 05/2005
Award for Excellence in Mathematics
Queens College, CUNY, Flushing, NY.

Member, Phi Beta Kappa 05/2005
Queens College, CUNY, Flushing, NY.

CUNY Honors College Scholar 08/2001–05/2005
Queens College, CUNY, Flushing, NY.

Professional Memberships

American Mathematical Society
Society for Industrial and Applied Mathematics
Society for Neuroscience

Conferences Attended

SIAM Conference on the Life Sciences (LS10) (7/2010) Pittsburgh, PA.
Computational and Systems Neuroscience (COSYNE) 2010 (2/2010) Salt Lake City, UT.
Conference on Neural Dynamics in Honor of John Rinzel's 60^{th} Birthday (6/2009) NYU, New York, NY
Davis SIAM Student Research Conference (5/2008, 5/2009) Davis, CA.
17^{th} Annual Computational Neuroscience Meeting (7/2008) Portland, OR.
16^{th} Annual Computational Neuroscience Meeting (7/2007) Toronto, Canda.
Society for Neuroscience 34^{th} Annual Meeting (10/2004) San Diego, CA

Skills

Programming Languages: LaTeX, Mathematica, MATLab, FORTRAN.

Software: XPP AUTO