

Victoria Booth
Associate Professor
University of Michigan
Department of Mathematics and Department of Anesthesiology
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Education and Training

Smith College, Northampton, MA
B.A. cum laude with Highest Honors in Mathematics 1986
Honors Thesis: "The Density of Symmetric Graph Color-Families"
Advisor: Michael O. Albertson

Northwestern University, Evanston, IL
M.S., Applied Mathematics 1990
Ph.D., Applied Mathematics 1993
Dissertation: "Propagation Failure in Discrete Reaction-Diffusion Systems"
Advisor: Thomas Erneux (currently at Universite Libre de Bruxelles)

National Institutes of Health, Bethesda, MD
Post-doctoral Fellow, Mathematical Research Branch 1993-1996
Advisor: John Rinzel (currently at New York University)

Research Appointments

The Center for Naval Analyses, Alexandria, VA
Research Associate 1987-1989

The RAND Corporation, Santa Monica, CA
Research Intern Summer 1990

Academic Appointments

New Jersey Institute of Technology, Newark, NJ
Assistant Professor, Department of Mathematical Sciences 1996-2002
Associate Research Professor, Center for Applied Mathematics & Statistics 2002-current

University of Michigan, Ann Arbor, MI
Assistant Professor (3-year term), Department of Mathematics 3/2004-9/2007
Assistant Research Professor, Department of Anesthesiology 6/2004-9/2007
Assistant Professor (tenure-track), Department of Mathematics 9/2007-9/2013
Assistant Professor (tenure-track), Department of Anesthesiology 9/2007-9/2013
Associate Professor, Department of Mathematics 9/2013-current
Associate Professor, Department of Anesthesiology 9/2013-current

Research Interests

- Mathematical and biophysical modeling of neurons and neuronal networks.

- Development of models based on electrophysiological data.
- Analysis of models providing quantitative support of experimental hypotheses and yielding quantitative predictions of experimentally-testable behaviors.
- Mathematical analysis of neuronal models using methods of nonlinear dynamics, singular perturbation techniques and bifurcation theory.

Grants

a) Present and Active

- 1) NSF, Division of Mathematical Sciences, “Dynamics of Sleep-Wake Regulation”, Role: PI, 10/2011-10/2014, \$299,998.

b) Previous Awards

- 1) Air Force Office of Scientific Research, “Mathematical Modeling of Circadian and Homeostatic Interaction”, Role: PI, Co-PIs Daniel Forger and Cecilia Diniz Behn, 2/2008 – 8/2011, \$408,253.
- 2) University of Michigan Center for Computational Medicine and Biology: Cellular Pathologies and their Effect on Brain Dynamics in Temporal Lobe Epilepsy, Role: PI, Co-PIs Michal Zochowski, Geoffrey Murphy and Gina Poe, 11/2006-11/2007, \$67,443.
- 3) NIH (NIMH), “Collaborative Research in Computational Neuroscience - Neuromodulation of Hippocampal Synaptic Plasticity in Waking & REM Sleep”, Role: Co-PI, PI: Gina R. Poe, 9/2005 - 9/2009, \$706,155.
- 4) NIH (NINDS), “Collaborative Research in Computational Neuroscience-Modeling Neuromusculoskeletal Alterations after Spinal Cord Injury”, Role: Investigator, PI: Ranu Jung (Arizona State University), 8/2005-5/2008, \$1,314,799.
- 5) NSF, Biology ADVANCE Program, “ADVANCE Fellows Grant: Theta Phases of Hippocampal Place Cell Firing in REM Sleep and Waking”, Role: PI, 4/2004-4/2008, \$312,001.
- 6) NSF, Division of Mathematical Sciences, “Functional Roles for Short-Term Synaptic Plasticity in Neuronal Networks”, Role: Co-PI, PI: Amitabha Bose (New Jersey Institute of Technology), 7/2003-6/2006, \$355,340.
- 7) NSF Mathematical Sciences Computing and Research Environments, Computing Equipment Grant, Role: Investigator, PI: Jonathan Luke (New Jersey Institute of Technology), 7/2001-6/2004, \$233,905.
- 8) NSF, Division of Mathematical Sciences, “Neural mechanisms for generating temporal coding, Role: Co-PI, PI: Amitabha Bose (New Jersey Institute of Technology), 8/1999-7/2002, \$303,700.
- 9) NJIT Separately Budgeted Research, “Neural Models to Generate Temporal Codes of Hippocampal Place Cells, Role: PI, 7/1999-6/2000, \$14,000.
- 10) NJIT Separately Budgeted Research, “Using genetic algorithms to investigate dendritic-dependent behaviors in neural models”, Role: PI, 7/1998-6/1999, \$16,000.
- 11) NSF, Division of Integrative Biology and Neuroscience, “A Dendritic Origin of Bistability of Motoneuron Firing Patterns”, Role: PI, 9/1997-8/2000, \$75,000.

- 12) NJIT Separately Budgeted Research, “Using genetic algorithms to investigate bistable behaviors in motoneuron models”, Role: PI, 7/1997-6/1998, \$17,500.

Honors and Awards

- Association for Women in Mathematics Travel Grant, 1997.
- National Science Foundation Graduate Research Fellowship, 1990-1993.
- Royal E. Cabell Fellowship, Northwestern University, 1989-1990.
- Phi Beta Kappa, National Honor Society, elected 1986.
- Dean's List, Smith College, 1984-1986.
- Suzan Rose Benedict Prize for excellence in mathematics, Smith College, 1984.

Memberships in Professional Societies

- Society for Neuroscience, 1995-2002, 2004-current
- Society for Industrial and Applied Mathematics, 1993-2002, 2011-current
- Organization for Computational Neurosciences, 2011-current

Peer-Review Service

- Review panel member for National Science Foundation, 2004, 2007, 2012.
- Proposals reviewed ad hoc for National Science Foundation (2004-2009), National Institutes of Health (NINDS, 2006), Air Force Office of Scientific Research (2008).
- Reviewer for PNAS, Journal of Neuroscience, Journal of Neurophysiology, Journal of Computational Neuroscience, Physica D, Journal of Mathematical Biology, Journal of Theoretical Biology, Bulletin of Mathematical Biology, SLEEP, Journal of Biological Physics, Mathematical Medicine and Biology, Neuroscience, PLoS Computational Biology, PLoS One.

Teaching

Undergraduate Courses Taught

University of Michigan: MATH 450: Advanced Engineering Mathematics (Fall semesters 2004-2006), MATH 463: Mathematical Modeling in Biology (Fall 2011), Math 417: Matrix Algebra I (Winter 2013).

New Jersey Institute of Technology: Calculus I and II, Honors Calculus II, Differential Equations, Applied Numerical Methods, Intermediate Differential Equations, Introduction to Partial Differential Equations, Methods in Applied Mathematics, Analytical and Computational Neuroscience.

Graduate Courses Taught

University of Michigan: MATH 557: Methods of Applied Mathematics II – Asymptotic Analysis (Winter 2008), MATH 559: Computational and Mathematical Neuroscience (Fall semesters 2008-2010, 2012), NEUROSCI 612 (Fall 2013).

New Jersey Institute of Technology: Linear Algebra, Numerical Methods I, Analytical and Computational Neuroscience.

Courses Developed

University of Michigan: MATH 559: Computational and Mathematical Neuroscience; NEUROSCI 612: Networks and Computational Neuroscience.

New Jersey Institute of Technology: Undergraduate Honors Capstone in Computational Neuroscience; Analytical and Computational Neuroscience.

Contributed Lectures

University of Michigan: NEUROSCI 520/PSYCH 533: Sleep: Neurobiology, Medicine and Society (Fall semesters 2006-2007, 2010-2012)

Post-Doctoral Fellow Advising

University of Michigan:

- Justin Dunmyre, Department of Mathematics, 2011-2013 (currently tenure-track faculty at Frostburg State University).
- Cecilia Diniz Behn, Department of Mathematics, 2007-2011 (currently tenure-track faculty at Colorado School of Mines)
- Dinesh Pal, Department of Anesthesiology (in collaboration with Gina Poe), 2007-2010 (currently research investigator, UM Dept of Anesthesiology)

Ph.D. Thesis Advising

- Scott Rich, Applied and Interdisciplinary Mathematics Program, University of Michigan, co-advisor with M. Zochowski, 2013-current.
- Jae Kyoung Kim, Applied and Interdisciplinary Mathematics Program, University of Michigan, co-advisor with D. Forger, 2010-2013 (currently postdoctoral fellow at the Mathematical Biosciences Institute, Ohio State University).
- Christian Fink, Department of Physics, University of Michigan, co-advisor with M. Zochowski, 2009-2012 (currently tenure-track faculty at Ohio Wesleyan University).

M.S. Thesis Advising

Anne Lippert, University of Chicago, Committee on Computational Neuroscience, 2008.

Undergraduate Research Advising

University of Michigan:

- Scott Knudstrup, Department of Mathematics, 2012-current
- William Hockeimer, Neuroscience program, 2012-2013
- Theresa Regan, Department of Mathematics, summer REU project, 2012
- Rebecca Gleit, Department of Mathematics, 2011-current
- Aparna Ananthasubramaniam, Department of Mathematics, summer REU project, 2010
- Michelle Fleshner, Department of Mathematics, 2009-2010
- Khalid Kunji, Department of Mathematics, summer REU project, 2009
- Joshua Emrick, Neuroscience program, honors thesis (co-advised with Gina Poe), 2008-2009
- Alex Jacobsen and Scott Mariouw, Department of Biology, SUBMERGE program project, 2008-2009
- Andrew Bogaard, Department of Physics, honors thesis (co-advised with Michal Zochowski), 2006-2008
- Stephen Gao, Department of Mathematics, summer REU project, 2007
- Aalok Dave, Department of Mathematics, independent research project, 2006

New Jersey Institute of Technology:

Matthew Detlet, Michele Kung, John Demonteverde and Shirley-Eva Sanchez; Department of Mathematical Sciences.

Ph.D. Dissertation Committees

University of Michigan:

- Olivia Walch, Applied and Interdisciplinary Mathematics, Advisor: Daniel Forger.
- Courtney Peckens, Civil and Environmental Engineering, Advisor: Jerry Lynch, defended 11/13.
- Christopher Best, Industrial and Operations Engineering, Advisor: Yili Liu, defended 10/13.
- Sarah Mayes, Department of Mathematics, Advisor: Karen Smith, defended 2/13
- Kohinoor Dasgupta, Department of Statistics, Advisor: Vijay Nair, defended 4/12
- Conner Sandefur, Bioinformatics Graduate Program, Advisor: Santiago Schnell, defended 5/12
- Troy Lau, Department of Physics, Advisor: Michal Zochowski, defended 12/10
- Jane Wang, Department of Physics, Advisor: Michal Zochowski, defended 7/10.
- Casey Diekmann, Industrial and Operations Engineering, and Bioinformatics, Advisors: Daniel Forger, Vijay Nair and K.P. Unnikrishnan, defended 6/10.
- Marshall Williams, Department of Mathematics, Advisor: Mario Bonk, defended 2/10.
- Christine Walsh, Neuroscience Graduate Program, Advisor: Gina Poe, defended 12/09.
- Sarah Feldt, Department of Physics, Advisor: Michal Zochowski, defended 6/09.
- Jason Kutch, Department of Mathematics, Advisor: Anthony Bloch, defended 4/07.

New Jersey Institute of Technology:

Jerry Chen, Urmi Ghosh-Dastidar, Adrienne James, Steven Kunec and Michele Picarelli;
Department of Mathematical Sciences.

Ph.D. Preliminary Exam Committees

University of Michigan:

- Julia Kline, School of Kinesiology, Advisor: Daniel Ferris, April 2013
- Sima Mofakham, Biophysics, Advisor: Michal Zochowski, September 2012
- Daniel Dewoskin, Applied and Interdisciplinary Math, Advisor: Daniel Forger, August 2012
- Chang Gong, PIBS (Bioinformatics), Advisor: Denise Kirschner, May 2012
- Fred Feng, Industrial and Operations Engineering, Advisor: Yili Liu, December 2011.

Graduate Student Rotations

University of Michigan

- Chang Gong, Program in Biomedical Sciences (Bioinformatics), Spring 2011
- Bo Li, Graduate program in Bioinformatics, Fall 2009

Scientific Mentoring

University of Michigan, Department of Anesthesiology:

- Post-Doctoral Fellows: Brooks Gross, Jorge Lopez, Jonathan Reasor
- Graduate Students: Theresa Bjorness, Michelle Kron, Howard Gritton
- Undergraduate Students: Meghan Carroll, Alain Watts

Committee and Organizational Service

Institutional

University of Michigan:

- Organizer, Quantitative Biology Seminar, 2011-current
- Faculty advisor of the 2013 Spring Symposium of the Neuroscience Graduate Program
- Elected LSA representative to University Senate Assembly, 2010-2013
- Undergraduate Advisor, Department of Mathematics, 2010-current
- Organizer, Mathematical Biology Forum, 2010-2011
- Executive Committee, Department of Mathematics, 2009-2010
- Organizer, Mathematical Biology Seminar, Department of Mathematics, 2009-2010
- Review panel member for pilot grant proposals, Center for Computational Medicine and Bioinformatics, Fall 2008
- Organizer, Minisymposium on Mathematics and Neuroscience for Mathematics Department theme semester on Mathematical Biology, November 2005

New Jersey Institute of Technology:

- Committee on Student Appeals 1999-2002
- College of Science and Liberal Arts Dean Search Committee 2000-01
- Middle States Accreditation Library Technology and Learning Resources Committee 1999-2001
- Faculty Library Committee 1999-2000
- Applied Math Major Advisor 2000-2002
- Scholarship Award Committee 2000-2002
- Applied Math Minor Advisor 1998-2000
- Chair of the Applied Math weekly colloquium committee 1998-99
- Chair of the Math Department Publications Committee 1996-1998

National/International Committee Service

- Advisory board member for journal *Chaos: An Interdisciplinary Journal of Nonlinear Science*, 2013-2016.
- Treasurer, Organization for Computational Neurosciences, 2011-2014
- Society for Industrial and Applied Mathematics, Program Committee, 2011-2014
- Society for Industrial and Applied Mathematics, Advisory Committee for the Activity Group on Dynamical Systems, 2012-2013
- Program committee member of the Annual Computational Neuroscience Meeting, 2001-2003 and 2008-2010
- Program reviewer for the Mathematics Department curriculum at Passaic County Community College, Paterson, NJ, 2001.

National/International Organizational Service

- Co-organizer, Featured Minisymposium on “Dynamics and Control of Neurons and Networks”, SIAM Conference on Applications of Dynamical Systems, Snowbird, UT, May 2013
- Co-organizer, special session on “Mathematics for Human Physiology and Disease” at the Association for Women in Mathematics Research Symposium, Santa Clara, CA, March 2013

- Co-organizer, Neurological Disease Workshop, Mathematical Biosciences Institute, Columbus, OH, February 2013
- Co-organizer, 12th Experimental Chaos and Complexity Conference, Ann Arbor, MI, May 2012
- Co-organizer, Workshop on “Stochastic Dynamics of Small Networks of Neurons”, American Institute of Mathematics, Palo Alto, CA, February 2012
- Co-organizer, Minisymposium on “Modeling Dynamics of Sleep-Wake Regulation” at the 2011 SIAM Conference on Dynamical Systems, Snowbird, UT, May 2011
- Organizer, Minisymposium on “Mathematical and Computational Neuroscience” at the Society for Mathematical Biology Annual Meeting, Ann Arbor, MI, July 2004

University Affiliations

- Neuroscience Graduate Program, University of Michigan, 2007-current
- Center for Computational Medicine and Bioinformatics, University of Michigan, 2007-current
- Center for Sleep Science, University of Michigan, 2008-current

Consulting

- Pfizer Inc., Global Research & Development, Ann Arbor, MI. “Modeling of renal secretory and reabsorptive transport processes”, 6/2004 - 3/2006.
- Advisory committee member for the Mathematics Department of Passaic County Community College, Paterson, NJ, 1999-2002.

Extramural Seminars since 2004

- Department of Engineering Sciences and Applied Mathematics colloquium, Northwestern University, January 2005.
- Center for Adaptive Neural Systems, Arizona State University, February 2006.
- Department of Mathematics seminar, Arizona State University, April 2006.
- Center for Neural Computation and Neural Engineering Research Seminar, University of Chicago, November 2006.
- Mathematical Biology seminar, New Jersey Institute of Technology, April 2008.
- Mathematics Department REU seminar, Grand Valley State University, July 2010.
- Physics Department Seminar, Illinois State University, March 2012.
- Applied and Computational Math Seminar, George Mason University, May 2012.
- Center for Theoretical Neuroscience seminar, University of Waterloo, January 2014.
- Department of Mathematics, Wayne State University, Visiting Scholar, January 2014.
- Mathematical Biology seminar, Duke University, March 2014.
- Department of Engineering Sciences and Applied Mathematics colloquium, Northwestern University, April 2014.
- Department of Mathematics seminar, Washington State University, April 2014.

Invited Conference Presentations since 2004

- FACM 2005, 2nd Annual Conference on Frontiers in Applied and Computational Mathematics, New Jersey Institute of Technology, May 2005.
- Dynamical Systems in Biology conference, held in honor of Frank Hoppensteadt, New York University, April 2008.
- FACM 2009, 6th Annual Conference on Frontiers in Applied and Computational Mathematics Conference, New Jersey Institute of Technology, June 2009.
- Conference on Neural Dynamics and Computation, held in honor of John Rinzel, New York University, June 2009.
- Workshop on “Anaesthesia and sleep: recent experimental and theoretical aspects” at CNS*09, 18th Annual Computational Neuroscience Meeting, Berlin, July 2009.
- Minisymposium on "The role of adaptation and depression in neuronal network dynamics", SIAM Conference on the Life Sciences, Pittsburgh, July 2010.
- Dynamics Days 2012 conference, Baltimore, January 2012.
- Anesthesia/Sleep Disorders Workshop as part of Focus Program on "Towards Mathematical Modeling of Neurological Disease from Cellular Perspectives", Fields Institute, Toronto, June 2012.
- Minisymposium on “Hysteresis in neuroscience: Bursting and beyond”, SIAM Conference on the Life Sciences, San Diego, August 2012.
- Michigan Undergraduate Mathematics Conference (Featured Speaker), Eastern Michigan University, March 2014.
- Signaling Across Scales: Life Sciences to Social Systems, University of Michigan Center for the Study of Complex Systems and Center for Systems Biology conference, March 2014.
- FACM 2014, 11th Annual Conference on Frontiers in Applied and Computational Mathematics, New Jersey Institute of Technology, May 2014.
- Minisymposium on “Mathematical modeling of sleep patterns in humans”, SIAM Conference on the Life Sciences, Charlotte, August 2014.

University of Michigan seminars since 2004

- Department of Physiology seminar, University of Michigan, February 2006.
- Applied and Interdisciplinary Mathematics Seminar, University of Michigan, March 2007.
- Biological Physics Seminar, University of Michigan, Ann Arbor, November 2008.
- Mathematical Biology seminar, University of Michigan, Ann Arbor, October 2009.
- Biological Rhythms and Sleep seminar, University of Michigan, Ann Arbor, March 2010.
- Biopsychology seminar, University of Michigan, Ann Arbor, October 2010.

- Applied and Interdisciplinary Mathematics seminar, University of Michigan, Ann Arbor, November 2012.
- Molecular, Cellular and Developmental Biology seminar, University of Michigan, Ann Arbor, November 2012.
- Sleep Medicine Grand Rounds, University of Michigan, Ann Arbor, January 2014.
- Cognition and Cognitive Neuroscience Forum, University of Michigan, Ann Arbor, February 2014.

Conference Presentations (with unpublished abstracts) since 2004

- Nadim, F., Booth, V., Bose, A. and Manor, Y. Short-term synaptic depression promotes phase maintenance in rhythmic neuronal networks, Joint Mathematics Meetings, Phoenix, January 2004.
- Booth, V. and Bose, A. Multistability in inhibitory networks with depressing synapses, Thirteenth Annual Computational Neuroscience Meeting CNS*2004, Baltimore, July 2004.
- Graham, J., Booth, V. and Jung, R. Modeling motoneurons after spinal cord injury: persistent inward currents and plateau potentials, Thirteenth Annual Computational Neuroscience Meeting CNS*2004, Baltimore, July 2004.
- Booth, V. and Bose, A. Multistability in inhibitory networks with depressing synapses, Society for Mathematical Biology Annual meeting, Ann Arbor, July 2004.
- Booth, V., Tsukada, H. and Domino, E.F. Application of a mathematical model for quantifying brain dopamine dependence on substances of abuse, poster presentation, 11th Annual Meeting of the Society for Research on Nicotine and Tobacco, Prague, March 2005.
- Booth, V. and Poe, G.R. Neuromodulation of hippocampal synaptic plasticity in waking and REM sleep, poster presentation, NSF/NIH Collaborative Research in Computational Neuroscience 2006 Annual PI Meeting, Washington, DC, June 2006.
- Booth, V. and Poe, G.R. Modeling Learning and Forgetting in REM Sleep, SIAM Conference on the Life Sciences and Society for Mathematical Biology Annual Meeting, Raleigh, June 2006.
- Gritton, H., Reasor, J., Pal, D., Booth, V. and Poe, G.R. Effects of sleep-relevant neurotransmitters on hippocampal synaptic efficacy, poster presentation, NSF/NIH Collaborative Research in Computational Neuroscience 2007 Annual PI Meeting, University of Maryland, June 2007.
- Gritton, H., Lopez, J., Pal, D., Booth, V. and Poe, G.R. REM-relevant serotonergic effects on synaptic transmission and plasticity in hippocampal input pathways, poster presentation, NSF/NIH Collaborative Research in Computational Neuroscience 2008 Annual PI Meeting, University of Southern California, June 2008.
- Diniz Behn, C. Forger, D. and Booth, V. A population network model of neuronal and neurotransmitter interactions regulating rat sleep-wake behavior, Annual University of Michigan – Michigan State University Circadian Clocks Meeting, August 2009.

- M. Fleshner, C. Diniz Behn and V. Booth. Modeling the interaction between circadian and sleep-wake regulatory systems, Systems Biology Symposium, University of Michigan, Ann Arbor, December 2009.
- C. Fink, V. Booth and M. Zochowski. Network effects of frequency-dependent phase response curves, poster presentation, Systems Biology Symposium, University of Michigan, Ann Arbor, December 2009.
- Fleshner, M., Booth, V., Forger, D. and Diniz Behn, C. Modeling the neuronal interactions between circadian and sleep-wake regulatory systems, Annual University of Michigan – Michigan State University Circadian Clocks Meeting, August 2010.
- Booth, V. Overview of sleep-wake regulation and dynamics, opening speaker and organizer of minisymposium on Modeling Dynamics of Sleep-Wake Regulation at the SIAM Conference on Applications of Dynamical Systems, Snowbird, Utah, May 2011.
- Booth, V. and Diniz Behn, C. Modeling the temporal architecture of rat sleep-wake behavior, International Conference of the IEEE Engineering in Medicine and Biology Society, Boston, September 2011.
- Booth, V. From neuron dynamics to network plasticity, opening speaker and co-organizer of featured minisymposium on *Dynamics and Control of Neurons and Networks* at the SIAM Conference on Applications of Dynamical Systems, Snowbird, Utah, May 2013.

Bibliography

Peer-Reviewed Journal Publications

1. Albertson, M. O. and Booth, V. Homomorphisms of symmetric graphs, *Congressus Numerantium*, 53:79-86, 1986.
2. Booth, V. and Erneux, T. Mechanisms for propagation failure in discrete reaction-diffusion systems, *Physica A*, 188:206-209, 1992.
3. Booth, V., Erneux, T. and Laplante, J.-P. Experimental and numerical study of weakly coupled bistable chemical reactors, *J Phys Chem*, 98:6537-6540, 1994.
4. Booth, V. and Erneux, T. Understanding propagation failure as a slow capture near a limit point, *SIAM J Appl Math*, 55:1372-1389, 1995.
5. Booth, V. and Rinzel, J. A minimal, compartmental model for a dendritic origin of bistability of motoneuron firing patterns, *J Comput Neurosci*, 2:299-312, 1995.
6. Booth, V. and Rinzel, J. Plateau potentials in bistable motoneurons, *Computational Neuroscience: Trends in Research 1995*, Bower, J. M., editor, Academic Press, 1996, pp. 47-52.
7. Booth, V., Carr, T. W. and Erneux, T. Near-threshold bursting is delayed by a slow passage near a limit point, *SIAM J Appl Math*, 57:1406-1420, 1997.

8. Booth, V., Rinzel, J. and Kiehn, O. Compartmental model of vertebrate motoneurons for Ca^{2+} -dependent spiking and plateau potentials under pharmacological treatment, *J Neurophysiol*, 78:3371-3385, 1997.
9. Booth, V. A genetic algorithm study on the influence of dendritic plateau potentials on bistable spiking in motoneurons, *Neurocomputing*, 26-27:69-78, 1999.
10. Recce, M., Bose, A. and Booth, V. Hippocampal place cells and the generation of a temporal code, *Neurocomputing*, 32-33:225-234, 2000.
11. Bose, A., Booth, V. and Recce, M. A mechanism for temporal control of the phase precession of hippocampal place cells, *J Comput Neurosci*, 9:5-30, 2000.
12. Booth, V. and Bose, A. Regulating firing rate of networks of pyramidal cells, *Neurocomputing*, 38-40:497-504, 2001.
13. Booth, V. and Bose, A. Neural mechanisms for generating rate and temporal codes in model CA3 pyramidal cells, *J Neurophysiol*, 85:2432-2445, 2001.
14. Booth, V. and Bose, A. Transitions between different synchronous firing modes using synaptic depression, *Neurocomputing*, 44-46C:61-67, 2002.
15. Booth, V. and Bose, A. Burst synchrony patterns in model hippocampal pyramidal cell networks, *Network: Computation in Neural Systems*, 13:157-177, 2002.
16. Nadim, F., Booth, V., Bose, A. and Manor, Y. Short-term synaptic dynamics promote phase maintenance in multi-phasic rhythms, *Neurocomputing*, 52-54:79-87, 2003.
17. Manor, Y., Bose, A., Booth, V. and Nadim, F. The contribution of synaptic depression to phase maintenance in a model rhythmic network, *J Neurophysiol*, 90:3513-3529, 2003.
18. Graham, J., Booth, V., and Jung, R. Modeling motoneurons after spinal cord injury: persistent inward currents and plateau potentials, *Neurocomputing*, 65:719-726, 2005.
19. Booth, V. and Poe, G. R. Input source and strength influences overall firing phase of model hippocampal CA1 pyramidal cells during theta: relevance to REM sleep reactivation and memory consolidation, *Hippocampus*, 16:161-175, 2006.
20. Waddell, J., Dzakpasu, R., Booth, V., Riley, B.T., Reasor, J., Poe, G. R. and Zochowski, M. Causal entropies - a measure for determining changes in the temporal organization of neural systems, *J Neurosci Methods*, 162:320-332, 2007.
21. Best, J., Diniz Behn, C., Poe, G.R. and Booth, V. Neuronal models for sleep-wake regulation and synaptic reorganization in the sleeping hippocampus, *J Biol Rhythms*, 22:220-232, 2007.

22. Bogaard, A., Parent, J., Zochowski, M. and Booth, V. Interaction of cellular and network mechanisms in spatiotemporal pattern formation in neuronal networks. *J Neurosci* 29:1677-1687, 2009.
23. Gross, B.A., Walsh, C.M., Booth, V., Mashour, G. and Poe, G.R. Open-source logic-based automated sleep scoring software using electrophysiological recordings in rats. *J Neurosci Methods* 184:10-18, 2009.
24. Lippert, A. and Booth, V. Understanding effects on excitability of simulated Ih modulation in simple neuronal models. *Biol Cybernetics* 101:297-306, 2009.
25. Diniz Behn, C. and Booth, V. Simulating microinjection experiments in a novel model of the rat sleep-wake regulatory network. *J Neurophysiol*, 103: 1937-1953, 2010.
26. Bose, A. and Booth, V. Co-existent activity patterns in inhibitory neuronal networks. *J Theor Biol*, 272: 42-54, 2011.
27. Fink, C., Booth, V., and Zochowski, M. Cellularly-driven differences in network synchronization capacity are differentially modulated by firing frequency. *PLOS Comput Biol*, 7(5):e1002062, 2011.
28. Fleshner, M., Booth, V., Forger, D. and Diniz Behn, C. Multiple signals from the suprachiasmatic nucleus required for circadian regulation of sleep-wake behavior in the nocturnal rat. *Phil Trans R Soc A* 369:3855-3883, 2011.
29. Walsh, C.M., Booth, V. and Poe, G.R. Spatial and reversal learning in the Morris water maze are largely resistant to 6 hrs of REM sleep deprivation following training. *Learn & Mem*, 18(7):422-34, 2011.
30. Diniz Behn, C. and Booth, V. Modeling the temporal architecture of rat sleep-wake behavior (peer-reviewed conference paper). *Conf Proc IEEE Eng Med Biol Soc* 2011:4713-4716, 2011.
31. Diniz Behn, C. and Booth, V. Fast-slow analysis of REM sleep dynamics. *SIAM J Appl Dyn Sys* 11:212-242, 2012.
32. Diniz Behn, C., Anathasubramaniam, A. and Booth, V. Contrasting existence and robustness of REM/non-REM cycling in physiologically-based models of REM sleep regulatory networks. *SIAM J Appl Dyn Sys*, 12:279-314, 2013.
33. Fink, C.G., Murphy, G.G., Booth, V. and Zochowski, M. A dynamical role for acetylcholine in synaptic renormalization. *PLOS Comput Biol*, 9(3): e1002939, 2013.
34. Gleit, R.D., Diniz Behn, C.G. and Booth, V. Modeling interindividual differences in spontaneous internal desynchronization. *J Biol Rhythms*, 28(5):339-355, 2013.

35. Fink, C.G., Zochowski, M., Booth, V. Neural network modulation, dynamics and plasticity. IEEE Global Conference on Signal and Information Processing (GlobalSIP), pp. 843-846 (doi: 10.1109/GlobalSIP.2013.6737023), 2013.
36. Booth, V. and Diniz Behn, C. G. Physiologically-based modeling of sleep-wake regulatory networks, *Math Biosciences*, 250:54-68, 2014.
37. Dunmyre, J. Mashour, G.A., Booth, V. Coupled flip-flop model for REM sleep regulation in the rat, PLoS One, in revision, 2014.

Book Chapters

1. Bose, A. and Booth, V., Bursting in 2-compartment neurons: a case study of the Pinsky-Rinzel model. In: *Bursting: The Genesis of Rhythm in the Nervous System*, S. Coombes and P.C. Bressloff, eds. World Scientific Publishing, 2005.
2. Poe, G.R., Booth, V., Bjorness, T.E., Riley, B.T. and Watts, A.C. Sleep is for unfinished business: Growing evidence that sleep is important for learning and memory. In: *Current Advances in Sleep Biology*, M.G. Frank, ed. Nova Publishers, 2009.
3. Diniz Behn, C. and Booth, V. A population network model of neuronal and neurotransmitter interactions regulating sleep-wake behavior in rodent species. In: *Sleep and Anesthesia: Neural Correlates in Theory and Experiment*, A. Hutt, ed. Springer, 2011.
4. Pal, D., Booth, V. and Poe, G.R. Sleep-related hippocampal activation: Implications for spatial memory consolidation. In: *Rapid Eye Movement Sleep: Regulation and Function*, B.N. Mallick, S.R. Pandi-Perumal, R. McCarley and A. Morrison, eds. Cambridge University Press, 2011.
5. Fink, C., Booth, V. and Zochowski, M. Effects of the frequency dependence of phase response curves on network synchronization. In: *Phase Response Curves in Neuroscience*, N. Schulteiss, R. Butera and A. Prinz, eds. Springer, 2012.

Published Abstracts since 2004

1. V. Booth and G.R. Poe. Mean theta phase of model CA1 pyramidal cell firing changes with location of synaptic stimuli, 34th Annual Meeting of the Society for Neuroscience, 2004.
2. V. Booth, B.T. Riley and G.R. Poe. REM sleep hippocampal place cell activity prevents reset of backward expansion in novel place fields, 35th Annual Meeting of the Society for Neuroscience, 2005.
3. J.N. Waddell, R. Dzakpasu, V. Booth, B. Riley, J. Reasor, G. Poe and M. Zochowski. Detection of asymmetries in temporal patterning in simulated and experimental systems, 35th Annual Meeting of the Society for Neuroscience, 2005.

4. J.N. Waddell, R. Dzakpasu, V. Booth, B. Riley, J. Reasor, G. Poe and M. Zochowski. Network structure, neural synchrony and plasticity. 36th Annual Meeting of the Society for Neuroscience, 2006.
5. V. Booth, B.T. Riley and G.R. Poe. Evidence that REM sleep theta trough activity depotentiates synapses: Hippocampal place field backward skewness during subsequent waking, 21st Annual Meeting of the Associated Professional Sleep Societies. SLEEP, 30(Abstract Supp):1115, 2007.
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