

## **CURRICULUM VITAE**

**Richard Bertram**

Professor of Mathematics

Department of Mathematics and

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Florida State University

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### **Education**

**Postdoctoral Fellowship**, 1993-1996

Mathematical Research Branch

National Institutes of Health, Bethesda, MD.

**Doctor of Philosophy in Applied Mathematics**, 1993

Florida State University, Tallahassee, FL.

**Bachelor of Science in Applied Mathematics** (Summa Cum Laude), 1985

Florida State University, Tallahassee, FL.

### **Academic Appointments**

8/09–present: **Professor of Mathematics**, Florida State University, Tallahassee, FL.

6/05–present: **Member of the Program in Neuroscience**, Florida State University, Tallahassee, FL.

8/01–present: **Member of the Molecular Biophysics Program**, Florida State University, Tallahassee, FL.

8/04–6/09: **Associate Professor of Mathematics**, Florida State University, Tallahassee, FL.

8/01–7/04: **Assistant Professor of Mathematics**, Florida State University, Tallahassee, FL.

8/99–7/01: **Assistant Scientist**, Institute of Molecular Biophysics, Florida State University, Tallahassee, FL.

6/96–7/99: **Assistant Professor of Mathematics**, Pennsylvania State University, Erie, PA.

### **Honors and Awards**

**Graduate Faculty Mentor Award**, Florida State University, 2017. Honors faculty mentors for dedication to graduate students and commitment to excellence in graduate education.

**2017 SIAM Outstanding Paper Prize**, one of three awards made by the Society for Industrial and Applied Mathematics (SIAM) for outstanding papers published in one of 18 SIAM journals from 2014 through 2016. Co-authors are Theodore Vo and Martin Weschelberger.

**Marion Bradley Brennan Professor of Mathematics**, an endowed 3-year award from Florida State University, 2015–2018.

**Developing Scholar Award**, Florida State University, 2006. Awarded to mid-career (Associate Professor) faculty to help identify FSU’s future academic leaders.

**Penn State Collaborative and Curricular Innovations Award** for “Seminar Course on Mathematical Biology”, 1997.

### Leadership Positions

8/2010–present: **Director** of Biomathematics Graduate Program, Florida State University, Tallahassee, FL.

2014–present: **Associate Editor** of *Mathematical Biosciences*.

2017: **Guest Editor** of *50th Anniversary Issue of Mathematical Biosciences*.

1/2015–12/2016: **Chair** of the SIAM Activity Group on Life Sciences. I oversaw all functions of this activities group, including organization of the SIAM Conference on the Life Sciences, held in Boston in the summer of 2016.

7/2014–6/2015: **Chair** of the Modeling and Analysis of Biological Systems (MABS) Study Section of the NIH. I was responsible for running the meetings of this grant review panel three times during the year.

2011–2012: **Co-organizer** of *Mathematical Neuroendocrinology*, a week-long workshop held in Tours, France, 2012.

2011–2012: **Co-organizer** of *Dynamics in Neural, Endocrine and Metabolic Systems: A Symposium in Honor of Arthur Sherman*, Bethesda, MD, 2012. This two-day symposium was held at the National Institutes of Health.

2011–2012: **Co-organizer** of *Modelling Electrical Activity in Physiological Systems*, week-long workshop held in Agra, India, 2012. This workshop was funded by the US

and Indian governments.

2009–2010: **Co-organizer** of *Mathematical Neuroendocrinology*, a week-long workshop held at the Mathematical Biosciences Institute, Ohio State University, 2010.

2007–2008: **Co-organizer** of *Rhythms in the Hypothalamus and Pituitary*, a week-long workshop held at the American Institute of Mathematics, Palo Alto, CA, 2008.

2007–2011: **Chair** of the Landahl Travel Grant committee, Society for Mathematical Biology. I was solely responsible for evaluating applications for travel grants and making travel awards.

2006–2007: **Co-organizer** of *Insulin Secretion, Insulin Action, and Type 2 Diabetes*, at week-long workshop held at the Mathematical Biosciences Institute, Ohio State University.

## Research Support

### A. Current

1. Agency: National Institutes of Health  
Award number: NIH R01 DK080714-10  
Title: *Microfluidic Devices for Determining Dynamics of Islets of Langerhans*  
Investigators: Mike Roper (PI), Richard Bertram (Co-PI)  
Funding level: \$1,000,000 (direct), \$1,416,664 (total)  
Funding period: 4/1/17–3/31/21.  
This is a renewal from a prior NIH grant, which is listed in Section B.
2. Agency: National Science Foundation  
Award number: NSF IOS 1656360  
Title: *Developmental Learning Involves Nonsynaptic Plasticity*  
Investigators: Richard Hyson (PI), Richard Bertram, Frank Johnson, Wei Wu (Co-PIs)  
Funding level: \$560,333 (direct), \$800,000 (total)  
Funding period: 4/15/17–3/31/21.
3. Agency: National Science Foundation  
Award number: NSF DMS 1612193  
Title: *Analysis and Extension of a Model for Islet Oscillatory Activity*  
Investigators: Richard Bertram (PI)  
Funding level: \$208,785 (direct), \$294,235 (total)  
Funding period: 8/15/16–7/31/19.
4. Agency: National Science Foundation  
Award number: NSF IOS 1456965

Title: *Parallel Encoding of Sequence and Structure in a Motor Memory Trace*  
Investigators: Frank Johnson (PI), Richard Bertram, Richard Hyson, Wei Wu (Co-PIs)  
Funding level: \$392,435 (direct), \$560,621 (total)  
Funding period: 8/1/15–7/31/18. In no-cost extension until 7/31/19.

5. Agency: National Institutes of Health  
Award number: R21 DA 04442-01A1  
Title: *Microfluidic System for Monitoring Gliotransmitter Release*  
Multi-PI Investigators: Richard Bertram (PI), Mike Roper (PI), Paul Trombley (PI)  
Funding level: \$247,635 (direct), \$351,513 (total)  
Funding period: 9/30/18–8/31/20.

## **B. Completed**

1. Agency: National Institutes of Health  
Award number: NIH R01 DK080714-06  
Title: *Microfluidic Devices for Determining Dynamics of Islets of Langerhans*  
Investigators: Mike Roper (PI), Richard Bertram (Co-PI)  
Funding level: \$870,000 (direct), \$1,320,497 (total)  
Funding period: 4/1/13–3/31/17.
2. Agency: National Science Foundation  
Award number: NSF DMS 1220063  
Title: *Mathematical Analysis of Electrical Oscillations in Anterior Pituitary Cells*  
Investigators: Richard Bertram (PI), Joel Tabak, Arturo Gonzalez-Iglesias (Co-PIs)  
Funding level: \$199,631 (direct), \$275,000 (total)  
Funding period: 9/1/12–8/31/15.
3. Agency: National Institutes of Health  
Award number: NIH R01 DK043200  
Title: *Regulation of Prolactin Secretion at the Lactotroph*  
Investigators: Richard Bertram, Arturo Gonzalez-Iglesias, Joel Tabak (PIs)  
Funding level: \$1,623,538 (direct), \$2,386,601 (total)  
Funding period: 2/1/10–1/31/15.
4. Agency: National Science Foundation  
Award number: NSF IOS 1146607  
Title: *Spatial Organization of a Neural Network for Serial-Order Behavior*  
Investigators: Frank Johnson (PI), Richard Bertram, Richard Hyson, Wei Wu (Co-PIs)  
Funding level: \$258,994 (direct), \$350,000 (total)  
Funding period: 3/1/12–2/28/15 (no-cost extension).

5. Agency: National Science Foundation  
Award number: NSF DMS 0917664  
Title: *A Mathematical Study of the Biochemical and Electrical Dynamics of Pancreatic Islets*  
Investigators: Richard Bertram (PI)  
Funding level: \$168,702 (direct), \$237,549 (total)  
Funding period: 9/1/09–8/31/12.
6. Agency: National Institutes of Health  
Award number: NIH R01 DC002035  
Title: *Cell Survival in a Neural Circuit for Learning*  
Investigators: Richard Bertram, Frank Johnson, Wei Wu (PIs)  
Funding level: \$400,000 (direct), \$574,001 (total)  
Funding period: 7/1/09–6/30/11.
7. Agency: National Institutes of Health  
Award number: NIH R01 DA193356  
Title: *A Joint Computational/Experimental Study of Hypothalamic-Pituitary Interactions*  
Investigators: Richard Bertram (PI), Marc E. Freeman, Marcel Egli (Co-PIs)  
Funding level: \$1,250,000 (direct), \$1,754,832 (total)  
Funding period: 7/1/04–6/30/09.
8. Agency: National Science Foundation  
Award number: NSF DMS 0613179  
Title: *Oscillation and Synchronization of Pancreatic Islets*  
Investigators: Richard Bertram (PI)  
Funding level: \$ 138,603 (direct), \$190,524 (total)  
Funding period: 9/1/06–8/31/09.
9. Agency: National Science Foundation  
Award number: NSF DMS 0311856  
Title: *Phantom Bursting Models and Complex Bursting Patterns in Pancreatic Islets*  
Investigators: Richard Bertram (PI)  
Funding level: \$92,928 (direct), \$127,298 (total)  
Funding period: 9/1/03–8/31/07.
10. Agency: National Science Foundation  
Award number: NSF DMS 9981822  
Title: *Modeling and Analysis of Multimodal Bursting in Pancreatic  $\beta$ -Cells*  
Investigators: Richard Bertram (PI)  
Funding level: \$57,087 (direct), \$78,202 (total)  
Funding period: 9/1/1999–8/31/03

### **C. Educational Grants and Traineeships Sponsored**

1. Agency: Indo-U.S. Science and Technology Forum (through the U.S. State Department)  
 Title: *Modeling Electrical Activity in Physiological Systems*  
 Investigators: Richard Bertram, Samdatta Sinha (PIs)  
 Funding level: Expenses provided for a small workshop in Agra, India with 7 U.S. scientists, 10 Indian scientists, and 15 Indian graduate students  
 Funding period: March 4-9, 2012.
2. Agency: American Heart Association  
 Title: *Entrainment and Synchronization of the Pancreatic Islet*  
 Investigators: Predoctoral fellowship awarded to Bernard Fendler  
 Funding level: \$43,540 (direct and total)  
 Funding period: 7/1/07–6/31/09.
3. Agency: American Heart Association  
 Title: *Computational Methods for the Determination of the Atomic Structure of Membrane Proteins*  
 Investigators: Predoctoral fellowship awarded to Tom Asbury  
 Funding level: \$40,000 (direct and total)  
 Funding period: 7/1/04–6/31/06.

## Publications

All are peer reviewed, unless indicated otherwise. \* denotes student

### A. Published

Total number of published chapters and articles: 136

Total number of citations (Google Scholar): 4,682

H-index (Google Scholar): 37

1993

1. **R. Bertram**, *A Computational Study of the Effects of Serotonin on a Molluscan Burster Neuron*, Biological Cybernetics, 69:257-267, 1993.

1994

1. **R. Bertram**, *Reduced-System Analysis of the Effects of Serotonin on a Molluscan Burster Neuron*, Biological Cybernetics, 70:359-368, 1994.

1995

1. **R. Bertram**, M. J. Butte, T. Kiemel, A. Sherman, *Topological and Phenomenological Classification of Bursting Oscillations*, Bulletin of Mathematical Biology, 57:413-440, 1995.

2. **R. Bertram**, P. Smolen, A. Sherman, D. Mears, I. Atwater, F. Martin, B. Soria, *A Role for Calcium Release Activated Current (CRAC) in Cholinergic Modulation of Electrical Activity in Pancreatic  $\beta$ -Cells*, *Biophysical Journal*, 68:2323-2332, 1995. (Selected for New and Notable, *Biophysical Journal* 68:2216-2217, 1995.)

1996

1. Y.-X. Li, **R. Bertram**, J. Rinzel, *Modeling N-Methyl-D-Aspartate-Induced Bursting in Dopamine Neurons*, *Neuroscience*, 71:397-410, 1996.
2. **R. Bertram**, A. Sherman, E. F. Stanley, *The Single Domain/Bound Calcium Hypothesis of Transmitter Release and Facilitation*, *Journal of Neurophysiology*, 75:1919-1931, 1996.

1997

1. D. Mears, N. F. Sheppard Jr., I. Atwater, E. Rojas, **R. Bertram**, A. Sherman, *Evidence That Calcium Release-Activated Current Mediates the Biphasic Electrical Activity of Mouse Pancreatic  $\beta$ -Cells*, *Journal of Membrane Biology*, 155:47-60, 1997.
2. **R. Bertram**, *A Simple Model of Transmitter Release and Facilitation*, *Neural Computation*, 9:515-523, 1997.

1998

1. **R. Bertram** and A. Sherman, *Population Dynamics of Synaptic Release Sites*, *SIAM Journal on Applied Mathematics*, 58:142-169, 1998.
2. **R. Bertram**, M. Pernarowski, *Glucose Diffusion in Pancreatic Islets of Langerhans*, *Biophysical Journal*, 74:1722-1731, 1998.

1999

1. **R. Bertram**, G. D. Smith, A. Sherman, *Modeling Study of the Effects of Overlapping  $Ca^{2+}$  Microdomains on Neurotransmitter Release*, *Biophysical Journal*, 76:735-750, 1999.
2. H. Tabakovic, J. Paultet, **R. Bertram**, *Measuring the Curl of Paper*, *The College Mathematics Journal*, 30:315-317, 1999.
3. **R. Bertram** and M. Behan, *Implications of G-Protein-Mediated  $Ca^{2+}$  Channel Inhibition for Neurotransmitter Release and Facilitation*, *Journal of Computational Neuroscience*, 7:197-211, 1999.

2000

1. **R. Bertram**, J. R. Quine, M. S. Chapman, T. A. Cross, *Atomic Refinement Using Orientational Restraints from Solid-State NMR*, Journal of Magnetic Resonance, 147:9-16, 2000.
2. **R. Bertram**, J. Previte, A. Sherman, T. A. Kinard, L. S. Satin, *The Phantom Bursting Model for Pancreatic  $\beta$ -Cells*, Biophysical Journal, 79:2880-2892, 2000.
3. **R. Bertram** and A. Sherman, *Dynamical Complexity and Temporal Plasticity in Pancreatic  $\beta$ -Cells*, Journal of Biosciences, 25:197-209, 2000. [Review article, not peer reviewed]

2001

1. **R. Bertram**, *Differential Filtering of Two Presynaptic Depression Mechanisms*, Neural Computation, 13:69-85, 2001.

2002

1. A. Korostelev\*, **R. Bertram**, M. S. Chapman, *Simulated Annealing Real-Space Refinement as a Tool in Model Building*, Acta Crystallographica, D58:761-767, 2002.
2. **R. Bertram**, M. I. Arnot, G. W. Zamponi, *A Role for G Protein  $G\beta\gamma$  Isoform Specificity in Synaptic Signal Processing: A Computational Study*, Journal of Neurophysiology, 87:2612-2623, 2002.
3. F. Fabiola, **R. Bertram**, A. Korostelev\*, M. S. Chapman, *An Improved Hydrogen Bond Potential for Crystallographic Refinement*, Protein Science, 11:1415-1423, 2002.
4. P. B. Goforth, **R. Bertram**, F. A. Khan, M. Zhang, A. Sherman, L. S. Satin, *Calcium-Activated  $K^+$  Channels of Mouse  $\beta$ -Cells are Controlled by Both Store and Cytoplasmic  $Ca^{2+}$ : Experimental and Theoretical Studies*, Journal of General Physiology, 120:307-322, 2002.
5. **R. Bertram**, K. Wierschem\*, M. Zhang, P. Goforth, A. Sherman, L. S. Satin, *Phantom Bursting in Pancreatic Islets: A Potential Role for Insulin Feedback*, in Recent Research Developments in Biophysics, ed. S. G. Pandalai, Transworld Research Network Publishers, 1:31-51, 2002. [Book chapter, not peer reviewed]

2003

1. M. Zhang, P. Goforth, **R. Bertram**, A. Sherman, L. Satin, *The  $Ca^{2+}$  Dynamics of Isolated Mouse  $\beta$ -Cells and Islets: Implications for Mathematical Models*, Biophysical Journal, 84:2852-2870, 2003.



2. **R. Bertram**, T. Asbury\*, F. Fabiola, J. R. Quine, T. A. Cross, M. S. Chapman, *Atomic Refinement with Correlated Solid-State NMR Restraints*, Journal of Magnetic Resonance, 163:300-309, 2003.
3. **R. Bertram**, J. Swanson\*, M. Yousef\*, Z.-P. Feng, G. Zamponi, *A Minimal Model for G Protein-Mediated Synaptic Facilitation and Depression*, Journal of Neurophysiology, 90:1643-1653, 2003.

2004

1. K. Wierschem\* and **R. Bertram**, *Complex Bursting in Pancreatic Islets: A Potential Glycolytic Mechanism*, Journal of Theoretical Biology, 228:513-521, 2004.
2. M. Egli, **R. Bertram**, M. T. Sellix\*, M. E. Freeman, *Rhythmic Secretion of Prolactin in Rats: Action of Oxytocin Coordinated by Vasoactive Intestinal Polypeptide of Suprachiasmatic Nucleus Origin*, Endocrinology, 145:3386-3394, 2004.
3. **R. Bertram** and A. Sherman, *A Calcium-Based Phantom Bursting Model for Pancreatic Islets*, Bulletin of Mathematical Biology, 66:1313-1344, 2004.
4. **R. Bertram**, L. Satin, M. Zhang, P. Smolen, A. Sherman, *Calcium and Glycolysis Mediate Multiple Bursting Modes in Pancreatic Islets*, Biophysical Journal, 87:3074-3087, 2004.
5. J. R. Quine, T. A. Cross, M. S. Chapman, and **R. Bertram**, *Mathematical Aspects of Protein Structure Determination with NMR Orientational Restraints*, Bulletin of Mathematical Biology, 66:1705-1730, 2004.
6. **R. Bertram** and A. Sherman, *Filtering of Calcium Transients by the Endoplasmic Reticulum in Pancreatic  $\beta$ -Cells*, Biophysical Journal, 87:3775-3785, 2004.

2005

1. M. G. Pedersen, **R. Bertram**, and A. Sherman, *Intra- and Inter-Islet Synchronization of Metabolically Driven Insulin Secretion*, Biophysical Journal, 89:107-119, 2005.
2. C. S. Nunemaker, M. Zhang, D. H. Wasserman, O. P. McGuinness, A. C. Powers, **R. Bertram**, A. Sherman, and L. S. Satin, *Individual Mice can be Distinguished by the Period of Their Islet Calcium Oscillations: Is there an Intrinsic Islet Period That is Imprinted In Vivo?*, Diabetes, 54:3517-3522, 2005.
3. **R. Bertram**, *Mathematical Models of Synaptic Transmission and Short-Term Plasticity*, in *Tutorials in Mathematical Biosciences II: Mathematical Modeling of Calcium Dynamics and Signal Transduction*, ed. J. Sneyd, Springer, Lecture Notes in Mathematics, 1867:173-202, 2005. [Book chapter, not peer reviewed]

4. A. Sherman and **R. Bertram**, *Integrative Modeling of the Pancreatic  $\beta$ -Cell*, in Encyclopedia of Genetics, Genomics, Proteomics and Bioinformatics, Part 3: Proteomics, (ed.) Raimond Winslow, Wiley Publishers, ISBN: 0-470-84974-6, (21 pages), 2005. [Book chapter, not peer reviewed]
5. **R. Bertram** and A. Sherman, *Negative Calcium Feedback: The Road from Chay-Keizer*, in Bursting: The Genesis of Rhythm in the Nervous System, (ed.) S. Coombes and P. Bressloff, World Scientific Press, pp. 19-48, 2005. [Book chapter, not peer reviewed]

2006

1. M. Egli, **R. Bertram**, N. Toporikova\*, M. T. Sellix\*, W. Blanco\*, and M. E. Freeman, *Prolactin Secretory Rhythm of Mated Rats Induced by a Single Injection of Oxytocin*, American Journal of Physiology, 290:E566-E572, 2006.
2. **R. Bertram**, M. Egli, N. Toporikova\*, and M. E. Freeman, *A Mathematical Model for the Mating-Induced Prolactin Rhythm of Female Rats*, American Journal of Physiology, 290:E573-E582, 2006.
3. K. Tsaneva-Atanasova, C. L. Zimlik, **R. Bertram**, A. Sherman, *Diffusion of Calcium and Metabolites in Pancreatic Islets: Killing Oscillations with a Pitchfork*, Biophysical Journal, 90:3434-3446, 2006.
4. J. R. Quine, S. Achuthan\*, T. Asbury\*, **R. Bertram**, M. S. Chapman, J. Hu\*, and T. A. Cross, *Intensity and Mosaic Spread Analysis from PISEMA Tensors in Solid-State NMR*, Journal of Magnetic Resonance, 179:190-198, 2006.
5. C. S. Nunemaker, **R. Bertram**, A. Sherman, K. Tsaneva-Atanasova, C. R. Daniel, L. S. Satin, *Glucose Modulates  $[Ca^{2+}]_i$  Oscillations in Pancreatic Islets via Ionic and Glycolytic Mechanisms*, Biophysical Journal, 91:2082-2096, 2006.
6. T. Asbury\*, J.R. Quine, S. Achuthan\*, J. Hu\*, M. S. Chapman, T. A. Cross, **R. Bertram**, *PIPATH: An Optimized Algorithm for Generating  $\alpha$ -Helical Structures from PISEMA data*, Journal of Magnetic Resonance, 183:87-95, 2006.
7. **R. Bertram**, M. G. Pedersen, D. S. Luciani, A. Sherman, *A Simplified Model for Mitochondrial ATP Production*, Journal of Theoretical Biology, 243:575-586, 2006.
8. V. Matveev, **R. Bertram**, A. Sherman, *Residual Bound  $Ca^{2+}$  Can Account for the Effects of  $Ca^{2+}$  Buffers on Synaptic Facilitation*, Journal of Neurophysiology, 96:3389-3397, 2006.
9. **R. Bertram**, J. Tabak, N. Toporikova\*, and M. E. Freeman, *Endothelin Action on Pituitary Lactotrophs: One Receptor, Many GTP-Binding Proteins*, Science STKE, 2006(319):pe4, (4 pages), 2006. [Review article, not peer reviewed]

10. **R. Bertram**, J. Tabak, N. Toporikova\*, *Models of Hypothalamus*, Scholarpedia, 1(12):1330, 2006. [Online encyclopedia chapter, peer reviewed]

2007

1. **R. Bertram**, L. S. Satin, M. G. Pedersen, D. S. Luciani, A. Sherman, *Interaction of Glycolysis and Mitochondrial Respiration in Metabolic Oscillations of Pancreatic Islets*, Biophysical Journal, 92:1544-1555, 2007.
2. J. Tabak, N. Toporikova\*, M. E. Freeman, **R. Bertram**, *Low Dose of Dopamine may Stimulate Prolactin Secretion by Increasing Fast Potassium Currents*, Journal of Computational Neuroscience, 22:211-222, 2007.
3. J. Hu\*, T. Asbury\*, S. Achuthan\*, C. Li\*, **R. Bertram**, J. R. Quine, R. Fu\*, T. A. Cross, *Backbone Structure of the Amantadine-Blocked Trans-Membrane Domain M2 Proton Channel from Influenza A Virus*, Biophysical Journal, 92:4335-4343, 2007.
4. D. T. McKee\*, M. O. Poletini, **R. Bertram**, M. E. Freeman, *Oxytocin Action at the Lactotroph is Required for Prolactin Surges in Cervically Stimulated Ovariectomized Rats*, Endocrinology, 148:4649-4657, 2007.
5. J. A. Thompson\*, W. Wu, **R. Bertram**, F. Johnson, *Auditory-Dependent Vocal Recovery in Adult Male Zebra Finches is Facilitated by Lesion of a Forebrain Pathway that Includes the Basal Ganglia*, Journal of Neuroscience, 27:12308-12320, 2007.
6. **R. Bertram**, A. Sherman, L. S. Satin, *Metabolic and Electrical Oscillations: Partners in Controlling Pulsatile Insulin Secretion*, American Journal of Physiology, 293:E890-E900, 2007. [Review article, peer reviewed]

2008

1. N. Toporikova\*, J. Tabak, M. E. Freeman, **R. Bertram**, *A-type  $K^+$  Current Can Act as a Trigger for Bursting in the Absence of a Slow Variable*, Neural Computation, 20:436-451, 2008.
2. S. Achuthan\*, T. Asbury\*, J. Hu\*, **R. Bertram**, T. A. Cross, J. R. Quine, *Continuity Conditions and Torsion Angles from ssNMR Orientational Restraints*, Journal of Magnetic Resonance, 191:24-30, 2008.
3. **R. Bertram**, R. C. Arceo II\*, *A Mathematical Study of the Differential Effects of Two SERCA Isoforms on Calcium Oscillations in Pancreatic Islets*, Bulletin of Mathematical Biology, 70:1251-1271, 2008.
4. W. Wu, J. A. Thompson\*, **R. Bertram**, F. Johnson, *A Statistical Method for Quantifying Songbird Phonology and Syntax*, Journal of Neuroscience Methods, 174:147-154, 2008.

5. **R. Bertram**, J. Rhoads\*, W. P. Cimbora\*, *A Phantom Bursting Mechanism for Episodic Bursting*, Bulletin of Mathematical Biology, 70:1979-1993, 2008.
6. **R. Bertram**, Y.-X. Li, *A Mathematical Model for the Actions of Activin, Inhibin, and Follistatin on Pituitary Gonadotrophs*, Bulletin of Mathematical Biology, 70:2211-2228, 2008.
7. M. Zhang, B. Fendler\*, B. Peercy, P. Goel, **R. Bertram**, A. Sherman, L. Satin, *Long Lasting Synchronization of Isolated Pancreatic Islet Calcium Oscillations by Cholinergic Stimulation*, Biophysical Journal, 95:4676-4688, 2008.
8. M. Tomaiuolo\*, **R. Bertram**, D. Houle, *Enzyme Isoforms May Increase Phenotypic Robustness*, Evolution, 62:2884-2893, 2008.
9. M. E. Freeman, D. T. McKee\*, M. Egli, **R. Bertram**, *Biological and Mathematical Modeling Approaches to Defining the Role of Oxytocin and Dopamine in the Control of Mating-Induced PRL Secretion*, in Neurobiology of the Parental Brain, (ed.) R. Bridges, Elsevier, pp. 233-245, 2008. [Book chapter, not peer reviewed]
10. **R. Bertram**, *Bursting in Pituitary Cells*, in Frontiers of Applied and Computational Mathematics, (ed.) D. Blackmore, A. Bose, P. Petropoulos, World Scientific, pp. 47-55, 2008. [Book chapter, not peer reviewed]

2009

1. C. V. Helena, D. T. McKee\*, **R. Bertram**, A. M. Walker, M. E. Freeman, *The Rhythmic Secretion of Mating-Induced Prolactin Secretion is Controlled by Prolactin Acting Centrally*, Endocrinology, 150:3245-3251, 2009.
2. B. Fendler\*, M. Zhang, L. S. Satin, **R. Bertram**, *Synchronization of Pancreatic Islet Oscillations by Intrapancreatic Ganglia: A Modeling Study*, Biophysical Journal, 97:722-729, 2009.
3. V. Matveev, **R. Bertram**, A. Sherman, *Ca<sup>2+</sup> Current vs. Ca<sup>2+</sup> Channel Cooperativity of Exocytosis*, Journal of Neuroscience, 29:12196-12209, 2009.
4. **R. Bertram**, P. Budu-Grajdeanu, M. S. Jafri, *Using Phase Relations to Identify Potential Mechanisms for Metabolic Oscillations in Isolated Beta-Cell Mitochondria*, Islets, 2:87-94, 2009.
5. M. Tomaiuolo, J. Tabak, **R. Bertram**, *Correlation Analysis: A Tool for Comparing Relaxation-Type Models to Experimental Data*, In Michael L. Johnson and Ludwig Brand, editors: Methods in Enzymology, vol. 467, Burlington: Academic Press, 2009, pp. 1-22. [Book chapter, not peer reviewed]

2010

1. J. Tabak, A. E. Gonzalez-Iglesias, N. Toporikova\*, **R. Bertram**, M. E. Freeman, *Variations in the Response of Pituitary Lactotrophs to Oxytocin During the Rat Estrous Cycle*, *Endocrinology*, 151:1806-1813, 2010.
2. J. Tabak, M. Mascagni, **R. Bertram**, *Mechanism for the Universal Pattern of Activity in Developing Neuronal Networks*, *Journal of Neurophysiology*, 103:2208-2221, 2010.
3. **R. Bertram**, A. Sherman, L. S. Satin, *Electrical Bursting, Calcium Oscillations, and Synchronization of Pancreatic Islets*, In *The Islets of Langerhans*, editor: Md. Shahidul Islam, *Advances in Experimental Medicine and Biology*, vol. 654, Springer, pp. 271-279, 2010. [Book chapter, peer reviewed]
4. **R. Bertram**, C. Helena, A. E. Gonzalez-Iglesias, J. Tabak, M. E. Freeman, *A Tale of Two Rhythms: Roles of Oxytocin in Rhythmic Prolactin Release*, *Journal of Neuroendocrinology*, 22:778-784, 2010. [Review article, peer reviewed]
5. M.J. Merrins, B. Fendler\*, M. Zhang, A. Sherman, **R. Bertram**, L.S. Satin, *Metabolic Oscillations in Pancreatic Islets Depend on the Intracellular Calcium Level but not Calcium Oscillations*, *Biophysical Journal*, 99:76-84, 2010.
6. T. Vo, **R. Bertram**, J. Tabak, M. Wechselberger, *Mixed Mode Oscillations as a Mechanism for Pseudo-Plateau Bursting*, *Journal of Computational Neuroscience*, 28:443-458, 2010.
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2. M. Watts\*, J. Tabak, C. Zimlik, A. Sherman, **R. Bertram**, *Slow Variable Dominance and Phase Resetting in Phantom Bursting*, *Journal of Theoretical Biology*, 276:218-228, 2011.

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4. W. Teka\*, K. Tsaneva-Atanasova, **R. Bertram**, J. Tabak, *From Plateau to Pseudo-Plateau Bursting: Making the Transition*, Bulletin of Mathematical Biology, 73:1292-1311, 2011.
5. V. Matveev, **R. Bertram**, A. Sherman, *Calcium Cooperativity of Exocytosis as a Measure of  $Ca^{2+}$  Channel Domain Overlap*, Brain Research, 1398:126-138, 2011. [Review article, peer reviewed]
6. C. V. Helena, R. Cristancho-Gordo, A. E. Gonzalez-Iglesias, J. Tabak, **R. Bertram**, M. E. Freeman, *Systemic Oxytocin Induces a Prolactin Secretory Rhythm via the Pelvic Nerve in Ovariectomized Rats*, American Journal of Physiology, 301:R676-R681, 2011. [Chosen as an Editorial Focus article, AJP, 301:R674-675, 2011.]
7. X. Zhang\*, A. Daou\*, T. M. Truong, **R. Bertram**, M. G. Roper, *Synchronization of Mouse Islets of Langerhans by Glucose Waveforms*, American Journal of Physiology, 301:E742-E747, 2011.
8. M. Watts\*, J. Tabak, **R. Bertram**, *Mathematical Modeling Demonstrates How Multiple Slow Processes Can Provide Adjustable Control of Islet Bursting*, Islets, 3:320-326, 2011.
9. A. Sirzen-Zelenskaya, A. E. Gonzalez-Iglesias, J. Boutet de Monvel, **R. Bertram**, M. E. Freeman, U. Gerber, M. Egli, *Prolactin Induces a Hyperpolarizing Current in Rat Paraventricular Oxytocinergic Neurones*, Journal of Neuroendocrinology, 23:883-893, 2011.
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11. W. Teka\*, J. Tabak, T. Vo\*, M. Wechselberger, **R. Bertram**, *The Dynamics Underlying Pseudo-Plateau Bursting in a Pituitary Cell Model*, Journal of Mathematical Neuroscience, volume 1, number 12, doi:10.1186/2190-8567-1-12, 2011.

2012

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2. M. J. Merrins, **R. Bertram**, A. Sherman, L. S. Satin, *Phosphofructo-2-Kinase/Fructose-2,6-Bisphosphatase Modulates Oscillations of Pancreatic Islet Metabolism*, PLoS One, 7(4):e34036, doi:10.1371/journal.pone.0034036, 2012.

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4. M. O. Poletini, D. T. McKee\*, R. E. Szawka, **R. Bertram**, C. V. V. Helena, M. E. Freeman, *Cervical Stimulation Activates A1 and Locus Coeruleus Neurons that Project to the Paraventricular Nucleus of the Hypothalamus*, *Brain Research Bulletin*, 88:566–573, 2012.
5. A. Daou\*, F. Johnson, W. Wu, **R. Bertram**, *A Computational Tool for Automated Large-Scale Analysis and Measurement of Bird-Song Syntax*, *Journal of Neuroscience Methods*, 210:147–160, 2012.
6. M. Tomaiuolo, **R. Bertram**, G. Leng, J. Tabak, *Models of Electrical Activity: Calibration and Prediction Testing on the Same Cell*, *Biophysical Journal*, 103:2021–2032, 2012.
7. W. Teka\*, J. Tabak, **R. Bertram**, *The Relationship Between Two Fast/Slow Analysis Techniques for Bursting Oscillations*, *Chaos*, 22:043117, 2012.

2013

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2. T. Vo\*, **R. Bertram**, M. Wechselberger, *Multiple Geometric Viewpoints of Mixed Mode Dynamics Associated with Pseudo-Plateau Bursting*, *SIAM Journal on Applied Dynamical Systems*, 12:789-830, 2013. **Winner of 2017 SIAM Outstanding Paper Prize.**
3. J. T. Corthell\*, A. M. Stathopoulos\*, C. C. Watson\*, **R. Bertram**, P. Q. Trombley, *Olfactory Bulb Monoamine Concentrations Vary with Time of Day*, *Neuroscience*, 247:234–241, 2013.
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2014

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2. T. Vo\*, J. Tabak, **R. Bertram**, M. Wechselberger, *A Geometric Understanding of How Fast Potassium Channels Promote Bursting in Pituitary Cells*, Journal of Computational Neuroscience, 36:259-278, 2014.
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10. M. Basista\*, K. Elliott\*, W. Wu, R. Hyson, **R. Bertram**, F. Johnson, *Independent Premotor Encoding of the Sequence and Structure of Birdsong in Avian Cortex*, Journal of Neuroscience, 34:16821-16834, 2014.



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2. **R. Bertram**, *Mathematical Modeling in Neuroendocrinology*, *Comprehensive Physiology*, 5:911-927, 2015.
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2016

1. J. P. McKenna\*, J. Ha, M. J. Merrins, L. S. Satin, A. Sherman, **R. Bertram**,  *$Ca^{2+}$  Effects on ATP Production and Consumption Have Regulatory Roles on Oscillatory Islet Activity*, *Biophysical Journal*, 110:733-742, 2016.
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3. A. Tagliavini\*, J. Tabak, **R. Bertram**, M. G. Pedersen, *Is Bursting More Effective than Spiking in Evoking Pituitary Hormone Secretion? A Spatiotemporal Simulation Study of Calcium and Granule Dynamics*, *American Journal of Physiology*, 310:E515-E525, 2016.

4. **R. Bertram**, J. Tabak, S. Stojilkovic, *Ion Channels and Electrical Activity in Pituitary Cells: A Modeling Perspective*, in Masterclasses in Neuroendocrinology: Computational Neuroendocrinology (vol. 2), editors: Duncan J. MacGregor and Gareth Leng, Wiley Pub., ISBN:9781119951698, pp. 80–110, 2016. [book chapter, peer reviewed]
5. P. Fletcher\*, J. Tabak, **R. Bertram**, *From Global to Local: Exploring the Relationship Between Parameters and Behaviors in Models of Electrical Excitability*, Journal of Computational Neuroscience, 40:331-345, 2016.
6. A. M. Stathopoulos\*, C. V. Helena, R. Cristancho-Gordo, A. E. Gonzalez-Iglesias, **R. Bertram**, *Influence of Dynorphin on Estradiol- and Cervical Stimulation-Induced Prolactin Surges in Ovariectomized Rats*, Endocrine, 53:585-594, 2016.
7. P. J. Duncan, J. Tabak, P. Ruth, **R. Bertram**, M. J. Shipston, *Glucocorticoids Inhibit CRH/AVP-Evoked Bursting Activity of Male Murine Anterior Pituitary Corticotrophs*, Endocrinology, 157:3108-3121, 2016.
8. J. P. McKenna\*, R. Dhumpa, N. Mukhitov\*, M. G. Roper, **R. Bertram**, *Glucose Oscillations Can Activate an Endogenous Oscillator in Pancreatic Islets*, PLoS Computational Biology, 12(10):e1005143, 2016.
9. L. Yi\*, B. Bandak\*, X. Wang\*, **R. Bertram**, M. G. Roper, *Dual Detection System for Simultaneous Measurement of Intracellular Fluorescent Markers and Cellular Secretion*, Analytical Chemistry, 88:10368-10373, 2016.

2017

1. K. C. Elliott\*, W. Wu, **R. Bertram**, R. Hyson, F. Johnson, *Orthogonal Topography in the Parallel Input Architecture of Songbird HVC*, Journal of Comparative Neurology, 525:2133-2151, 2017.
2. **R. Bertram** and J. E. Rubin, *Multi-timescale Systems and Fast-Slow Analysis*, Mathematical Biosciences, 287:105-121, 2017. [Review article, peer reviewed]
3. D. Weingard\*, W. Blanco, O. Steinbock, **R. Bertram**, *Stabilization of Collapsing Scroll Waves in Systems with Random Heterogeneities*, Chaos, 27(4):043108, doi:10.1063/1.4980076, 2017.
4. V. Yildirim\*, **R. Bertram**, *Calcium Oscillation Frequency Sensitive Gene Regulation and Homeostatic Compensation in Pancreatic  $\beta$ -Cells*, Bulletin of Mathematical Biology, 79:1295-1324, 2017.
5. V. Yildirim\*, S. Vadrevu, B. Thompson\*, L. S. Satin, **R. Bertram**, *Upregulation of an Inward Rectifying  $K^+$  Channel Can Rescue Slow  $Ca^{2+}$  Oscillations in  $K(ATP)$  Channel Deficient Pancreatic Islets*, PLoS Computational Biology, 13(7):e1005686, 2017.

6. D. Galvis\*, W. Wu, R. L. Hyson, F. Johnson, **R. Bertram**, *A Distributed Neural Network Model for the Distinct Roles of Medial and Lateral HVC in Zebra Finch Song Production*, *Journal of Neurophysiology*, 118:677-692, 2017.
7. W. Blanco, **R. Bertram**, J. Tabak, *The Effects of GABAergic Polarity Changes on Episodic Neural Network Activity in Developing Neural Systems*, *Frontiers in Computational Neuroscience*, 11:88, doi: 10.3389/fncom.2017.00088, 2017.
8. M. T. Ross\*, D. Flores\*, **R. Bertram**, F. Johnson, R. L. Hyson, *Neuronal Intrinsic Physiology Changes During Development of a Learned Behavior*, *eNeuro*, 4(5), e0297-17.2017, 2017.

2018

1. B. Carroll\*, **R. Bertram**, R. L. Hyson, *The Intrinsic Physiology of Inhibitory Neurons Changes Over Auditory Development*, *Journal of Neurophysiology*, 119:290–304, 2018.
2. **R. Bertram**, L. S. Satin, A. S. Sherman, *Closing in on the Mechanisms of Pulsatile Insulin Secretion*, *Diabetes*, 67:351–359, 2018. [Perspectives article, peer reviewed]
3. D. Weingard\*, O. Steinbock, **R. Bertram**, *Expansion of Scroll Wave Filaments Induced by Chiral Mismatch*, *Chaos*, 28(4):045106, doi: 10.1063/1.5008274, 2018.
4. I. Marinelli\*, T. Vo, L. Gerardo-Giorda, **R. Bertram**, *Transitions Between Bursting Modes in the Integrated Oscillator Model for Pancreatic  $\beta$ -Cells*, *Journal of Theoretical Biology*, 454:310–319, 2018.
5. D. Galvis\*, W. Wu, R. L. Hyson, F. Johnson, **R. Bertram**, *Interhemispheric Dominance Switching in a Neural Network Model for Birdsong*, *Journal of Neurophysiology*, 120:1186–1197, 2018.
6. J. P. McKenna\*, **R. Bertram**, *Fast-Slow Analysis of the Integrated Oscillator Model for Pancreatic  $\beta$ -Cells*, *Journal of Theoretical Biology*, 457:152–162, 2018.

### Book Reviews

- **R. Bertram**, *Exploring the Definition of Systems Biology*, SIAM News Online, August 23, 2016.

### B. Accepted for Publication

- D. W. Shaughnessy\*, R. L. Hyson, **R. Bertram**, W. Wu, F. Johnson, *Female Zebra Finches do not Sing Yet Share Neural Pathways Necessary for Singing in Males*, *Journal of Comparative Neurology*, in press, 2018.
- M. Ross\*, D. Flores\*, **R. Bertram**, F. Johnson, W. Wu, R. Hyson, *Experience-Dependent Intrinsic Plasticity During Auditory Learning*, *Journal of Neuroscience*, in press, 2018.

### C. Submitted for Publication

- J. E. Adablah\*, R. Vinson\*, M. G. Roper, **R. Bertram**, *Entrainment of Islets of Langerhans to Periodic and Non-Periodic Muscarinic Pulses*, submitted.

### Abstracts (during the last 5 Years)

1. R. Dhumpa, T. M. Troung, X. Wang, **R. Bertram**, M. G. Roper, *Synchronization of islets of Langerhans using a microfluidic feedback system*, Pittcon Conference & Expo, Chicago, IL, 2014.
2. M. J. Basista, K. C. Elliott, W. Wu, R. L. Hyson, **R. Bertram**, F. Johnson, *Independent Processing of the Sequence and Structure of Birdsong in Avian Premotor Cortex*, Annual Meeting of the Society for Neuroscience, Washington, DC, 2014.
3. M. T. Ross, D. Flores, **R. Bertram**, F. Johnson, R. L. Hyson, *Changes in Phenotypic Firing Patterns and Ion Channel Expression Across Developmental Learning Stages in the HVC of Juvenile Songbirds*, Annual Meeting of the Society for Neuroscience, Washington, DC, 2014.
4. K. C. Elliott, W. Wu, **R. Bertram**, R. L. Hyson, F. Johnson, *Basal Ganglia Disconnection Attenuates the Physiological Development of a Cortical Pre-Motor Region That Encodes Learned Birdsong*, Annual Meeting of the Society for Neuroscience, Washington, DC, 2014.
5. A. E. Gonzalez-Iglesias, J. A. Arias-Cristancho, P. Fletcher, R. Cristancho-Gordo, **R. Bertram**, J. Tabak, *Effect of Ovarian Steroids in the Response to Oxytocin of Anterior Pituitary Gonadotrophs from Intact and Ovariectomized Female Rats*, Annual Meeting of the Society for Neuroscience, Washington, DC, 2014.
6. C. V. Helena, N. T. Toporikova, B. Kalil, A. M. Stathopoulos, J. A. Anselmo-Franci, **R. Bertram**, *Involvement of KNDy Neurons in Luteinizing Hormone Surges Induced by Steroids*, International Congress of Neuroendocrinologists, Sydney, Australia, 2014.
7. C. V. Helena, N. Toporikova, A.M. Stathopoulos, R.O. Carolino, J.A. Anselmo-Franci, **R. Bertram**, *Involvement of KNDy Neurons in Luteinizing Hormone Surges*, Annual Meeting of the Society for Neuroscience, Washington, DC, 2014.
8. A. M. Stathopoulos, F. S. Nenninger, J. Arias-Cristancho, R. Cristancho-Gordo, C. V. Helena, A. E. Gonzalez-Iglesias, **R. Bertram**, *Dynorphin Modulation of Physiological Prolactin Surges*, Annual Meeting of the Society for Neuroscience, Washington, DC, 2014.
9. D. Galvis, D. Flores, M. Basista, W. Wu, R. L. Hyson, F. Johnson, **R. Bertram**, *A Computational Model that can Reproduce the Effects of Partial HVC Ablation on the Zebra Finch Song*, Annual Meeting of the Society for Neuroscience, Chicago, IL, 2015.

10. M. J. Basista, M. T. Ross, W. Wu, **R. Bertram**, R. L. Hyson, F. Johnson, *Encoding and Integration of Birdsong Syllable Repertoire and Sequencing*, Annual Meeting of the Society for Neuroscience, Chicago, IL, 2015.
11. M. T. Ross, D. Flores, **R. Bertram**, F. Johnson, R. L. Hyson, *A Role for the  $I_h$  Current in the Production of Song in Zebra Finches*, Annual Meeting of the Society for Neuroscience, Chicago, IL, 2015.
12. D. Flores, M. T. Ross, J. Tabak, F. Johnson, R. L. Hyson, **R. Bertram**, *Using Dynamic Clamp to Explore the Current Properties of the HVC Neurons in the Zebra Finch*, Annual Meeting of the Society for Neuroscience, Chicago, IL, 2015.
13. K. C. Elliott, W. Wu, **R. Bertram**, R. L. Hyson, F. Johnson, *The Basal Ganglia Influence Synaptic Organization in a Cortical Region that Encodes a Learned Motor Pattern*, Annual Meeting of the Society for Neuroscience, Chicago, IL, 2015.
14. S. N. Blythe, A. E. Gonzalez-Iglesias, **R. Bertram**, G. B. Whitworth, *The Effect of Diet-Induced Obesity on Estradiol-Induced Hormonal Surges in Female Rats*, Annual Meeting of the Society for Neuroscience, Chicago, IL, 2015.
15. A. Sherman, J. Ha, J. McKenna, M. Merrins, L. Satin, **R. Bertram**, *Rescuing the Dual Oscillator Model for  $\beta$ -Cells from Inconvenient Data*, Midwest Islet Club meeting, Chicago, IL, 2015.
16. B. Carroll, **R. Bertram**, R. L. Hyson, *The Intrinsic Physiology of Inhibitory Brainstem Neurons Changes During Auditory Development*, Annual Meeting of the Society for Neuroscience, San Diego, CA, 2016.
17. D. Shaughnessy, D. L. Flores, W. Wu, **R. Bertram**, R. L. Hyson, F. Johnson, *Brain Connectivity Not to Blame for a Sex Difference in Singing Behavior of Zebra Finches*, Annual Meeting of the Society for Neuroscience, San Diego, CA, 2016.
18. D. Galvis, R. Hyson, F. Johnson, **R. Bertram**, *A Brainstem Efference Copy Model for the Control of Singing in Zebra Finch*, Annual Meeting of the Society for Neuroscience, San Diego, CA, 2016.
19. M. T. Ross, D. Flores, **R. Bertram**, F. Johnson, R. L. Hyson, *Changes in the Intrinsic Physiology of HVC Neurons as a Result of Auditory Experience*, Annual Meeting of the Society for Neuroscience, San Diego, CA, 2016.
20. D. Shaughnessy, D. Flores, R. L. Hyson, **R. Bertram**, W. Wu, F. Johnson, *Sex Similarities and Differences in the Extrinsic Connectivity of Zebra Finch HVC*, Annual Meeting of the Society for Neuroscience, Washington, DC, 2017.
21. D. Galvis, W. Wu, R. L. Hyson, F. Johnson, **R. Bertram**, *A Distributed Network Model can Account for the Effects of Unilateral Cooling and Electrical Stimulation of HVC on Song Production*, Annual Meeting of the Society for Neuroscience, Washington, DC, 2017.

22. M. T. Ross, D. Flores, **R. Bertram**, F. Johnson, R. L. Hyson, *Auditory Experience Changes Neuronal Intrinsic Physiology*, Annual Meeting of the Society for Neuroscience, Washington, DC, 2017.

## Invited Talks

### Colloquia

1. *How Simple Concepts From Dynamics Can Drive Biological Experiments*, Dynamics Colloquium, **University of Northumbria**, Newcastle on Tyne, UK, 2017.
2. *Glycolytic Oscillations, Insulin Pulsatility, and Regime Change*, Dynamics Colloquium, **University of Exeter**, Exeter, UK, 2017.
3. *Marrying Mathematical and Experimental Biology*, Integrated Mathematical Oncology, **Moffitt Cancer Center**, Tampa, FL, 2016.
4. *Marrying Mathematical and Experimental Biology*, joint Mathematics/Statistics/Biology colloquium, **University of Maryland Baltimore County**, Baltimore, MD, 2016.
5. *An Investigation of Pulsatile Insulin Secretion Through Mathematical Modeling and Experiments*, Physiology, **University of Michigan**, Ann Arbor, MI, 2015.
6. *Why Do Insulin Levels Oscillate?*, Biomedical Engineering, **Georgia Institute of Technology**, Atlanta, GA, 2014.
7. *GPUfit: A Tool for Real-Time Model Calibration and Prediction Testing*, Biomathematics, **Duke University**, Durham, NC, 2014.
8. *Understanding the Neural Basis of Birdsong in the Zebra Finch with the Help of Mathematical Modeling*, Biology, **West Virginia University**, 2013.
9. *A Hybrid Approach to Understanding Cell Dynamics*, Mathematics, **West Virginia University**, 2013.
10. *A Mathematical Model for Pancreatic Islet Oscillations and Their Synchronization*, Computational Mathematics, **Tulane University**, New Orleans, LA, 2013.
11. *A Mathematical Model for Pancreatic Islet Oscillations and Their Synchronization*, Mathematics, **University of Exeter**, Exeter, England, 2013.
12. *The Dual Oscillator Model for Islet Oscillations*, Mathematics, **University of Waterloo**, Waterloo, Ontario, Canada, 2012.
13. *Mathematical Aspects of Bursting Oscillations in Nerve and Endocrine Cells*, Mathematics, **University of Louisville**, Louisville, KY, 2009.

14. *Using Mathematical Modeling and Experiments to Understand the Mechanism of Pulsatile Insulin Secretion*, Mathematics, **University of Utah**, Salt Lake City, UT, 2009.
15. *A Combined Modeling/Experimental Study of Pulsatile Insulin Secretion*, Computational Biology, **George Mason University**, Arlington, VA, 2009.
16. *The Neural Control of Hormone Secretion*, Physics, **University of South Florida**, Tampa, FL, 2007.
17. *Mathematical Analysis of the Neural Control of Hormone Secretion*, Mathematics, **University of British Columbia**, Vancouver, Canada, 2006.
18. *A Biophysical Phantom Bursting Model*, Mathematics, **New Jersey Institute of Technology**, Newark, NJ, 2003.
19. *Complex Bursting in Pancreatic Islets*, Mathematics, **New Jersey Institute of Technology**, Newark, NJ, 2003.
20. *The Role of G-Proteins in Presynaptic Inhibition, Facilitation, and Synaptic Filtering: A Computational Study*, Applied Mathematics, **Rice University**, Houston, TX, 2002.
21. *Bursting Models in Biology*, Engineering, **Georgia Institute of Technology**, Atlanta, GA, 2001.
22. *Topological and Phenomenological Classification of Bursting Oscillations*, **Naval Research Laboratory**, Washington, DC, 1994.

### Symposia

1. *Canard-Induced Early Afterdepolarizations: Ducks in the Heart*, **SIAM Conference on the Life Sciences**, Minneapolis, MN, 2018.
2. *Global Analysis of the Electrical Activity of Pituitary Cells*, **British Society for Neuroendocrinology**, Nottingham, UK, 2017.
3. *Rescuing Pulsatile Insulin Secretion by Wiggling Glucose*, at **SIAM Conference on the Applications of Dynamical Systems**, Snowbird, UT, 2017.
4. *A Neural Network Model for Song Production in the Zebra Finch*, at **SIAM Conference on the Life Sciences**, Boston, MA, 2016.
5. *Synergistic Oscillations in Islet Metabolism and Intracellular Signaling Molecules*, at **Society for Mathematical Biology Annual Meeting**, Atlanta, GA, 2015.
6. *Rhythms in Insulin Secretion: Origin and Synchronization*, **Biodynamics 2015**, Edinburgh, Scotland, 2015.

7. *Using Mathematical Models to Determine the Source of Heterogeneity in Cellular Calcium Dynamics*, at **SIAM Conference on the Life Sciences**, Charlotte, NC, 2014.
8. *Mathematical Models of Islet Synchronization*, at Workshop on Type 1 and Type 2 Diabetes, **Fields Institute**, Toronto, Canada, 2014.
9. *Synchronization of Pancreatic Islets*, at **Frontiers of Applied and Computational Mathematics**, Newark, NJ, 2014.
10. *A Hybrid Experimental/Modeling Approach to Studying Pituitary Cell Dynamics*, at **Biodynamics 2013**, Bristol, England, 2013.
11. *A Hybrid Approach for Understanding Cell Dynamics*, at **Workshop on Cellular and Subcellular Models**, Mathematical Biosciences Institute, Ohio State University, 2013.
12. *The Relationship Between Two Fast/Slow Analysis Techniques for Bursting Oscillations*, at **SIAM Conference on the Life Sciences**, San Diego, CA, 2012
13. *The Dual Oscillator Model for Pancreatic Islets*, at **9th AIMS International Conference on Dynamical Systems**, Differential Equations, and Applications, Orlando, FL, 2012.
14. *The Dual Oscillator Model for Islet Oscillations*, at **Dynamics in Neural, Endocrine and Metabolic Systems: A Symposium in Honor of Arthur Sherman**, Bethesda, MD, 2012.
15. *Fast Negative Feedback Facilitates Bursting in Pituitary Cells*, at **Workshop on Modelling Electrical Activity in Physiological Systems**, Agra, India, 2012.
16. *Mixed Mode Oscillations Underlie Bursting in Pituitary Cells*, at **SIAM Conference on Applications of Dynamical Systems**, Snowbird, Utah, 2011.
17. *The Emerging Roles of Oxytocin in Rhythmic Prolactin Secretion*, at **7th International Congress of Neuroendocrinology**, Rouen, France, 2010.
18. *Mixed Mode Oscillations as a Mechanism for Pseudo-Plateau Bursting*, at **Frontiers in Applied and Computational Mathematics**, Newark, NJ, 2010.
19. *A Mathematical Study of Electrical Bursting in Pituitary Cells*, at **Workshop on Dynamical Systems and Neuroendocrinology**, Paris, France, 2009.
20. *Bursting in Pituitary Cells: A Totally Different Animal*, at **Frontiers in Applied and Computational Mathematics**, Newark, NJ, 2008.
21. *Metabolic and Electrical Oscillations: Partners in Controlling Rhythmic Islet Activity*, at **Workshop on Insulin Secretion, Insulin Action, and Type II Diabetes**, Mathematical Biosciences Institute, Ohio State University, 2007.



22. *Modeling Network Interactions Between the Hypothalamus and Pituitary*, at **Frontiers in Applied and Computational Mathematics**, Newark, NJ, 2005.
23. *Complex Bursting Patterns in Pancreatic Islets*, at **SIAM Conference on the Life Sciences**, Portland, OR, 2004.
24. *A Mechanism for High-Pass Filtering of Neuronal Signals*, at **SIAM Conference on Applications of Dynamical Systems**, Snowbird, UT, 2003.
25. *The Role of G-Proteins in Synaptic Filtering*, at **Workshop on Neural Dynamics**, Mathematical Biosciences Institute, Ohio State University, 2002.
26. *Global Optimization Methods for Solving Protein Structures*, at **SIAM Conference on the Life Sciences**, Boston, MA, 2002.
27. *A Biophysical Phantom Bursting Model for Pancreatic  $\beta$ -Cells*, at **SIAM Conference on the Life Sciences**, Boston, MA, 2002.
28. *Intrinsic and Network Bursting in Pancreatic  $\beta$ -Cells*, at **Society for Mathematical Biology Annual Meeting**, Hilo, HW 2001.
29. *The Role of G-Proteins in Presynaptic Inhibition, Facilitation, and Synaptic Filtering*, at **SIAM Conference on Applications of Dynamical Systems**. Snowbird, UT, 2001.
30. *Physiology and Methods of Modeling in the Synapse*, at **PIMS Summer Workshop on Mathematical Physiology**, University of British Columbia, Vancouver, Canada, 1999.
31. *Phantom Bursting in Pancreatic  $\beta$ -Cells*, at **Workshop on Hormone Secretion and Control**, Institute for Mathematics and Its Applications, Minneapolis, MN, 1999.

### Copyrighted Computer Software

All software is available for free download from my web site.

1. **SONGSEQ**, a software package for automatic sequencing and analysis of bird song, Co-written with Arij Daou, 2012.
2. **K-L Distance**, a software package for comparing birdsong syllables and sequences. Co-written with Wei Wu, 2008.
3. **PIPATH**, a software package for assigning solid state NMR data and building helical atomic structures. Co-written with Tom Asbury, 2006.
4. **HBOND2002**, a software package for determining hydrogen bonds in proteins, and constructing an appropriate double-well potential energy function. Co-written with Felcy Fabiola, Andrei Korostelev, and Michael Chapman, 2002.

5. **ssNMR**, a software package for protein structure determination using uncorrelated solid-state NMR data. Co-written with Jack Quine, 2000.
6. **ssNMR-02**, an updated and improved version of ssNMR, incorporating correlated solid-state NMR data. 2002.
7. **RSREF2000**, a software package for making local improvements to models of proteins using electron density maps. Co-written with Michael Chapman and Andrei Korostelev, 2000.

## Other Professional Activities

### A. Grant Reviews and Review Panels

1. NHLBI/NIH intramural site review team member, 2017.
2. Ad hoc member of the Biophysics of Neural Systems (BPNS) Study Section, NIH, 2016.
3. Standing member of the Modeling and Analysis of Biological Systems (MABS) Study Section, NIH, 2010-2015 (appointed as Chair July, 2014 through June, 2015).
4. NSF grant review panel member, 2005–2010, 2014, 2017.
5. Grant review panel member for the American Association for the Advancement of Science, 2011.
6. NICHD/NIH intramural site review team member, 2008.
7. Ad hoc member of the MABS NIH study section, 2006, 2008, and 2018.
8. NINDS/NIH Specialized Neuroscience Research Program site review team member, 2007.
9. Grant review panel member for the Texas Higher Education Coordinating Board, 2006.
10. Ad hoc referee for research grant proposals submitted to:
  - National Institutes of Health
  - National Science Foundation
  - Netherlands Foundation for Fundamental Research on Matter
  - Thomas F. and Kate Miller Jeffress Memorial Trust
  - French Ministry of Research
  - Israel Science Foundation
  - The United States Civilian Research and Development Foundation
  - Natural Sciences and Engineering Research Council (NSERC) of Canada
  - Wellcome Trust
  - Czech Science Foundation

Diabetes UK  
Engineering and Physical Sciences Research Council of the United Kingdom  
Fund for Scientific Research-FNRS of Belgium

## **B. Editorial Boards**

1. Editorial Board member, *Bulletin of Mathematical Biology*, 2016–present.
2. Editorial Board member, *Mathematical Biosciences*, 2008–present.
3. Reviews Editor, *Mathematical Biosciences*, 2009–2013.
4. Associate Editor, *Mathematical Biosciences*, 2014–present.
5. Editorial Board member, *Biophysical Journal*, 2010–2016.
6. Editorial Board member, *Islets*, 2008–2013.

## **C. Other**

1. External Examiner, PhD defense in Mathematics, University of Auckland, Auckland, New Zealand, 2016.
2. External Examiner, PhD defense in Mathematics, University of Auckland, Auckland, New Zealand, 2014.
3. Organizing Committee for the SIAM Conference on the Life Sciences, San Diego, CA, 2012.
4. External Examiner, PhD defense in Mathematics, University of Waterloo, Ontario, Canada, 2012.
5. External Examiner, PhD defense in Mathematics, University of Auckland, New Zealand, 2010.
6. External Examiner, PhD defense in Physics, Simon Fraser University, Vancouver, Canada, 2006.
7. Bellman Prize Committee. This committee of biomathematicians from around the world selects the best paper published in the journal *Mathematical Biosciences* during the previous 2 years. 2009, 2013.
8. Referee for papers submitted to:

Biophysical Journal	Journal of Neurophysiology
Journal of Computational Neuroscience	Cell Biochemistry and Biophysics
IEEE Transactions on Neural Networks	SIAM Journal on Applied Math
Bulletin of Mathematical Biology	Physica D
Journal of Computational Chemistry	Journal of Theoretical Biology
American Journal of Physiology	Diabetes

Biophysical Chemistry	Neurocomputing
Neural Computation	Mathematical Biosciences
PLoS Computational Biology	Chaos
Reproduction	Cell Calcium
Journal of Biological Physics	Brain Research
Physical Reviews E	Cognitive Neurodynamics
General and Comparative Endocrinology	J. Diabetes Science and Technology
Journal of Neuroendocrinology	J. Nonlinear Science
Islets	Endocrinology
Trends in Endocrinology and Metabolism	
Discrete and Continuous Dynamical Systems B	
Communications in Nonlinear Science and Numerical Simulation	
Mathematical Methods in the Applied Sciences	
IEEE Transactions on Biomedical Engineering	
Proceedings of the National Academy of Sciences of the USA	
Molecular and Cellular Endocrinology	

#### **D. Institutional Committees**

All committee work listed was performed at FSU.

1. University Bridges Program Proposal Committee, 2002
2. Graduate Recruitment Committee, Mathematics Department, 2001–present
3. Faculty Search Committee, Mathematics Department, 2005
4. Faculty Search Committee, School of Computational Science, 2005
5. Faculty Evaluation Committee, Mathematics Department, 2005–2010, 2017–present
6. Graduate Recruitment Committee, Molecular Biophysics Program, 2006–present
7. Graduate Recruitment Committee, Neuroscience Program, 2006, 2007
8. Executive Committee, Mathematics Department, 2008–2017
9. Chair Selection Committee, Mathematics Department, 2007
10. Science Area Promotion & Tenure Committee, 2010
11. Chair Selection Committee, Chemistry Department, 2013
12. University Brain Initiative Steering Committee, 2014
13. Faculty Search Committee (Chair), Mathematics Department, 2016 and 2018
14. Executive Committee, Program in Neuroscience, 2017–present
15. Review panel for Provosts Postdoctoral Fellows Program, 2018

16. Chair of the GPC subcommittee to review the Dept. of History/Philosophy of Science, 2018
17. Brennan Awards Selection Committee (Chair), Mathematics Department, 2018

### **Professional Societies**

Society for Industrial and Applied Mathematics (SIAM)  
Society for Mathematical Biology  
Society for Neuroscience  
American Physiological Society  
Biophysical Society

### **Teaching and Training Activities**

#### **A. Courses Taught**

- Undergraduate: Calculus 1, Calculus 2, Calculus 3, Business Calculus, Ordinary Differential Equations, Ordinary and Partial Differential Equations, Mathematical Modeling in Biology, Introduction to Real Analysis, Dynamical Systems, Numerical Analysis 1
- Graduate: Networks, Methods of Applied Mathematics 1, Computational Methods in Biology, Biomathematics Projects, Introduction to Systems Biology, Introduction to Computational Neuroscience

#### **B. High School Trainees**

- Kelsey Mayo, Florida High School, 2000.

#### **C. Undergraduate Trainees**

1. Jose Arias-Cristancho, Biology, Tallahassee Community College, 2012–2015.
2. Nery Ruano, Biological Sciences, FSU, 2014.
3. Tanja Batchelor (Honors thesis), Biomathematics, FSU, 2008–2009.
4. Michelle Outlaw (Hughes Fellow), Biomedical Mathematics, FSU, 2007–2008.
5. Rudy Arceo (Honors thesis), Biomedical Mathematics, FSU, 2006–2007.
6. Wendy Cimborra (Honors thesis), Applied Mathematics, FSU, 2003–2004.
7. Alicia Baptiste, Biomedical Mathematics, FSU, 2003–2004.
8. Keola Wierschem, Physics, FSU, 2002–2003.
9. Mandy Swann, Applied Mathematics, FSU, 2001.

10. Jessie Swanson, Applied Mathematics, FSU, 1999–2000.
11. Matthew Behan (Honors thesis), Mathematics, Penn State University at Erie, 1998–1999.
12. Bernadette Baumeister, Mathematics, Penn State University at Erie, 1998–1999.
13. Julie Cain (Honors thesis), Mathematics, Penn State University at Erie, 1997–1998.

#### **D. Visiting Scholars Supervised**

- Theodore Vo (graduate student), University of Sydney, Australia, Fall 2012.
- Alessia Tagliavini (graduate student), University of Padua, Italy, Fall 2014.
- Wilfredo Blanco (assistant professor), State University of Rio Grande do Norte UERN, Brazil, 2016.
- Isabella Marinelli (graduate student), Basque Center for Applied Mathematics, Bilbao, Fall 2017.

#### **E. Master's Degrees Supervised**

- Jessie Swanson, *A Mathematical Model of the Presynaptic Terminal with G-Protein-Regulated Calcium Channels and Ancillary  $Ca^{2+}$  Channel  $\beta$  Subunits*, Applied Mathematics, FSU, awarded 2002. Current position: Analyst at Raytheon Corporation.

#### **F. Doctoral Degrees Supervised**

1. Thomas Asbury, *From Data to Structure: Using Orientational Information Within PISEMA Spectra to Build Atomic Models*, Molecular Biophysics Program, FSU, awarded 2006. Current position: Scientist at Affymetrix Corp.
2. Natalia Toporikova, *Regulation of Rhythmic Prolactin Secretion: Combined Mathematical and Experimental Study*, Biomedical Mathematics Program, FSU, awarded 2007. Current position: Assistant Professor of Biology at Washington and Lee University, Lexington, VA.
3. Bernard Fendler, *Synchronization of Pancreatic Islets: A Quantitative Investigation of Nonlinear Oscillations in the Endocrine Pancreas*, Physics Program, FSU, awarded 2010. Current position: Computational Biologist at Foundation Medicine, Boston, MA.
4. Margaret Watts, *Slow Variable Dominance in Pancreatic  $\beta$ -Cell Models*, Biomathematics Program, FSU, awarded 2011. Current position: Assistant Professor, Doane College, Crete, NE.

5. Wondimu Teka, *Nonlinear Dynamics Underlying Fast Bursting in Pituitary Cells*, Biomathematics Program, FSU, awarded 2012. Current position: U.S. Food and Drug Administration, Washington, DC.
6. Arij Daou, *From Songs to Ion Channels and Mathematical Modeling*, Biomathematics Program, FSU, awarded 2013. Current position: Assistant Professor, American University of Beirut, Beirut, Lebanon.
7. Sevgi Sengül, *Unveiling Mechanisms for Electrical Activity Patterns in Neurons and Pituitary Cells Using Mathematical Modeling and Analysis*, Biomathematics Program, FSU, awarded 2014. Current position: Assistant Professor, Department of Industrial Engineering, Antalya International University, Antalya, Turkey.
8. Patrick Fletcher, *Theoretical, Computational, and Experimental Topics in Anterior Pituitary Cell Signaling*, Biomathematics Program, FSU, awarded 2015. Current position: Postdoctoral Fellow, Laboratory of Biological Modeling, National Institutes of Health, Bethesda, MD.
9. Andrea Stathopoulos, *Hypothalamic Factors Involved in the Regulation of Prolactin Surges in the Female Rat*, Neuroscience Program, FSU, awarded 2015. Current position: Visiting Assistant Professor, Wittenberg University, Springfield, OH.
10. Vehpi Yildirim, *Mathematical Modeling and Analysis of Gene Knockout Compensation in Pancreatic  $\beta$ -Cells*, Biomathematics Program, FSU, awarded 2017. Current position: Postdoctoral Fellow, Eindhoven University of Technology, Eindhoven, Netherlands.
11. Daniel Weingard, *Scroll Rings: How They Interact with Non-Reactive Spheres, Tori, and Knots*, Biomathematics Program, FSU, awarded 2017. Current position: Quantitative Analyst, Wells Fargo, New York, NY.
12. Joe McKenna, *Insulin Secretion Rhythms: Calcium Regulation of  $\beta$ -Cell Metabolism and Rescue of Islet Oscillations*, Biomathematics Program, FSU, awarded 2017. Current position: Amazon Alexa project, Pittsburgh, PA.
13. Diana Flores, *Intrinsic Plasticity Driven by Auditory Experience in Songbirds: An Electrophysiological and Mathematical Study*, Biomathematics Program, FSU, awarded 2017. Current position: Postdoctoral Fellow, Michigan State University, East Lansing, MI.
14. Sergiusz Wesolowski, *Developing SRSF Shape Analysis Techniques for Applications in Neuroscience and Genomics*, Biomathematics Program, FSU, awarded 2017. Current position: Postdoctoral Fellow, University of Utah, Salt Lake City, UT.
15. Danny Galvis, *Distributed Neural Network Models for Birdsong Production*, Biomathematics Program, FSU, awarded 2018. Current position: Postdoctoral Fellow, University of Exeter, Exeter, England.

16. Ryan Vinson (current candidate), Biomathematics Program
17. Joshua Kimrey (current candidate), Biomathematics Program
18. Yeuran Oh (current candidate), Biomathematics Program
19. Angie Davenport (current candidate), Biomathematics Program
20. Isabella Marinelli (co-major professor with Luca Gerardo Giorda), Basque Center for Applied Mathematics, Spain

### **G. Postdoctoral Fellows and Research Associates Supervised**

1. Maurizio Tomaiuolo, Postdoctoral Fellow 2009–2012. Current position: Senior Research Investigator, Perelman School of Medicine, University of Pennsylvania.
2. Patricio Velez, Postdoctoral Fellow 2012-2013. Current position: Staff scientist at a pharmaceutical company in Chile.
3. Cleyde Helena, Postdoctoral Fellow, 2009–2015. Current position: Account Manager, ASC Group Ltd.
4. Joel Tabak, Associate Scientist/Scholar, 2007–2015. Current position: Senior Lecturer, University of Exeter.
5. Arturo Iglesias, Assistant Scientist/Scholar, 2009–2015.