

## CURRICULUM VITAE

**Richard Bertram**

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Department of Mathematics and  
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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.

## Leadership Positions

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

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

1/2015–12/2017: **Chair** of the SIAM Activity Group on Life Sciences. I oversee all functions of this activities group, including organization of the SIAM Conference on the Life Sciences, to be held in Boston in the summer of 2017.

7/2014–6/2015: **Chair** of the Modeling and Analysis of Biological Systems (MABS) Study Section of the NIH. I am 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.

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.

## Honors and Awards

1. **Marion Bradley Brennan Professor of Mathematics**, an endowed 3-year award from Florida State University, 2015–2018.
2. **Developing Scholar Award**, Florida State University, 2006.
3. **Penn State Collaborative and Curricular Innovations Award** for “Seminar Course on Mathematical Biology”, 1997.

## Research Support

### A. Current

1. NIH R01 DK080714, *Microfluidic Devices for Determining Dynamics of Islets of Langerhans* (PI: M. Roper, Co-I: R. Bertram), National Institutes of Health, \$870,000 (direct), \$1,320,497 (total), 4/1/13–3/31/17.
2. FSU Council on Research and Creativity, *Patch Clamp for Interdisciplinary Collaboration* (PI: R. Hyson, Co-PIs: R. Bertram, W. Wu, F. Johnson), \$42,208 (total), 2015. (Equipment grant)
3. NSF IOS 1456965, *Parallel Encoding of Sequence and Structure in a Motor Memory Trace* (PI: Frank Johnson, Co-PIs: Richard Bertram, Richard Hyson, Wei Wu), \$520,621 (total), 8/15–7/18.

### B. Completed

1. NIH R01 DK043200, *Regulation of Prolactin Secretion at the Lactotroph* (PIs: R. Bertram, A. Gonzalez-Iglesias, J. Tabak), \$1,623,538 (direct), \$2,386,601 (total), 2/10–1/15.
2. NSF DMS 1220063, *Mathematical Analysis of Electrical Oscillations in Anterior Pituitary Cells* (PI: R. Bertram, Co-PIs: J. Tabak, A. Gonzalez-Iglesias), \$199,631 (direct), \$275,000 (total), 9/12–9/15.
3. NSF IOS 1146607, *Spatial Organization of a Neural Network for Serial-Order Behavior* (PI: F. Johnson, Co-PIs: R. Bertram, R. Hyson, W. Wu), \$258,994 (direct), \$350,000 (total), 3/12–2/15 (no-cost extension).
4. NSF DMS 0917664, *A Mathematical Study of the Biochemical and Electrical Dynamics of Pancreatic Islets* (PI: R. Bertram), \$168,702 (direct), \$237,549 (total), 9/09–8/12.
5. NIH R01 DC002035, *Cell Survival in a Neural Circuit for Learning* (PIs: R. Bertram, F. Johnson, W. Wu), \$400,000 (direct), \$574,001 (total), 7/09–6/11.

6. NIH R01 DA193356, *A Joint Computational/Experimental Study of Hypothalamic-Pituitary Interactions* (PI: R. Bertram, Co-PIs: M. E. Freeman and M. Egli), \$1,250,000 (direct), \$1,754,832 (total), 7/04–6/09.
7. NSF DMS 0613179, *Oscillation and Synchronization of Pancreatic Islets* (PI: R. Bertram), \$ 138,603 (direct), \$190,524 (total), 9/06–8/09.
8. NSF DMS 0311856, *Phantom Bursting Models and Complex Bursting Patterns in Pancreatic Islets* (PI: R. Bertram), \$92,928 (direct), \$127,298 (total), 9/03–8/07.
9. First-Year Assistant Professor Award (PI: R. Bertram), FSU Research Council, \$6667 (total), Summer 2002.
10. NSF DMS 9981822 *Modeling and Analysis of Multimodal Bursting in Pancreatic  $\beta$ -Cells* (PI: R. Bertram), \$57,087 (direct), \$78,202 (total), 9/99–8/03.

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

1. Modeling Electrical Activity in Physiological Systems (PIs: R. Bertram, S. Sinha), Indo-US Science and Technology Forum (joint US and Indian governmental program), all expenses provided for 7 US and 10 Indian scientists to meet in Agra, India, March 4-9, 2012.
2. Entrainment and Synchronization of the Pancreatic Islet (Sponsor: R. Bertram) Predoctoral fellowship awarded to Bernard Fendler by the Florida/Puerto Rico Affiliate of the American Heart Association, \$43,540 (total), 7/07–6/09.
3. Computational Methods for the Determination of the Atomic Structure of Membrane Proteins (Sponsor: R. Bertram) Predoctoral fellowship awarded to Tom Asbury by the Florida/Puerto Rico Affiliate of the American Heart Association, \$40,000 (total), 7/04–6/06.
4. Undergraduate Program in Mathematical Biology (PI: C. Panetta, Co-PIs: R. Bertram and J. Paultet), a one-year REU grant from the NSF-DMS \$30,000 (total), Summer 1999.
5. Undergraduate Program in Mathematical Biology (PI: C. Panetta, Co-PIs: R. Bertram and J. Paultet), a one-year REU grant from the NSF-DMS \$30,000 (total), Summer 1998.

## **Publications**

All are peer reviewed, unless indicated otherwise.

\* denotes student

### **A. Published**

Total number of published chapters and articles: 114

Total number of non-self citations: 1,518

H-index: 21

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 Burster 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]

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. Cimborra\*, *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. Percy, 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]

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.
7. X. Zhang\*, A. Grimley\*, **R. Bertram**, M. G. Roper, *Microfluidic System for Generation of Sinusoidal Glucose Waveforms for Entrainment of Islets of Langerhans*, Analytical Chemistry, 82:6704-6711, 2010.

8. M. Tomaiuolo, **R. Bertram**, A. E. Gonzalez-Iglesias, J. Tabak, *Investigating Heterogeneity of Intracellular Calcium Dynamics in Anterior Pituitary Lactotrophs Using a Combined Modeling/Experimental Approach*, *Journal of Neuroendocrinology*, 22:1215-1324, 2010.
9. S. S. Stojilkovic, J. Tabak, **R. Bertram**, *Ion Channels and Signaling in the Pituitary Gland*, *Endocrine Reviews*, 31:845-915, 2010. [Review article, peer reviewed]

2011

1. J. Thompson\*, M. Basista\*, W. Wu, **R. Bertram**, F. Johnson, *Dual Pre-Motor Contribution to Songbird Syllable Variation*, *Journal of Neuroscience*, 31:322-330, 2011.
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.
3. J. Tabak, J. Rinzel, **R. Bertram**, *Quantifying the Relative Contributions of Divisive and Subtractive Feedback to Rhythm Generation*, *PLoS Computational Biology*, 7(4):e1001124. doi:10.1371/journal.pcbi.1001124, 2011.
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 Neurons*, *Journal of Neuroendocrinology*, 23:883-893, 2011.

10. J. Tabak, M. Tomaiuolo, A. E. Gonzalez-Iglesias, L. S. Milesco, **R. Bertram**, *Fast Activating Voltage- and Calcium-Dependent Potassium (BK) Conductance Promotes Bursting in Pituitary Cells: A Dynamic Clamp Study*, *Journal of Neuroscience*, 31:16855-16863, 2011.
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

1. T. Vo\*, **R. Bertram**, M. Wechselberger, *Bifurcations of Canard-Induced Mixed Mode Oscillations in a Pituitary Lactotroph Model*, *Discrete and Continuous Dynamical Systems*, 32:2879-2912, 2012.
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.
3. Z. Chu, M. Tomaiuolo, **R. Bertram**, S. Moenter, *Two Types of Burst Firing in Gonadotropin-Releasing Hormone (GnRH) Neurons*, *Journal of Neuroendocrinology*, 24:1065-1077, 2012.
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

1. R. E. Szawka, M. O. Poletini, C. M. Leite, M. P. Bernuci, B. Kalil, L. B. D. Mendoca, R. O. G. Carolino, C. V. V. Helena, **R. Bertram**, C. R. Franci, J. A. Anselmo-Franci, *Release of Norepinephrine in the Preoptic Area Activates Anteroventral Periventricular Nucleus Neurons and Stimulates the Surge of Luteinizing Hormone*, *Endocrinology*, 154:363-374, 2013.

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.
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.
4. **R. Bertram**, *Endocrine Cell Function and Dysfunction*. In: Jaeger D., Jung R. (Ed.) Encyclopedia of Computational Neuroscience: SpringerReference, Springer-Verlag Berlin Heidelberg 2013. DOI: 10.1007/SpringerReference\_349777 2013-09-03, 14:59:05 UTC. [Review article, not peer reviewed]
5. A. Daou\*, M. T. Ross\*, F. Johnson, R. L. Hyson, **R. Bertram**, *Electrophysiological Characterization and Computational Models of HVC Neurons in the Zebra Finch*, Journal of Neurophysiology, 110:1227-1245, 2013.
6. J. Ren, A. Sherman, **R. Bertram**, P. B. Goforth, C. S. Nunemaker, C. D. Waters\*, L. S. Satin, *Slow Oscillations of KATP Conductance in Mouse Pancreatic Islets Provide Support for Electrical Bursting Driven by Metabolic Oscillations*, American Journal of Physiology, 305:E805-E817, 2013.

2014

1. **R. Bertram**, A. Sherman, L. S. Satin, *Electrical, Calcium, and Metabolic Oscillations in Pancreatic Islets*, in Islam (Ed.) The Islets of Langerhans, 2nd edition, Vol. 1, pp. 453-474, Springer Dordrecht, Heidelberg, New York, London, 2014. [Book chapter, peer reviewed]
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.
3. P. A. Fletcher\*, F. Clément, A. Vidal, J. Tabak, **R. Bertram**, *Interpreting Frequency Responses to Dose-Conserved Pulsatile Input Signals in Simple Cell Signaling Motifs*, PLoS One, 9(4):e95613, 2014.
4. M. Watts, B. Fendler\*, M. J. Merrins, L. S. Satin, **R. Bertram**, A. Sherman, *Calcium and Metabolic Oscillations in Pancreatic Islets: Who's Driving the Bus?*, SIAM Journal on Applied Dynamical Systems, 13:683-703, 2014.
5. K. Elliott\*, W. Wu, **R. Bertram**, F. Johnson, *Disconnection of a Basal Ganglia Circuit in Juvenile Songbirds Attenuates the Spectral Differentiation of Song Syllables*, Developmental Neurobiology, 74:574-590, 2014.
6. R. Dhumpa, T. M. Truong, X. Wang, **R. Bertram**, and M. G. Roper, *Negative Feedback Synchronizes Oscillations in Islets of Langerhans*, Biophysical Journal, 106:2275-2282, 2014.

7. A. E. Gonzalez-Iglesias and **R. Bertram**, *The Molecular Cell Biology of Anterior Pituitary Cells*, in Cellular Endocrinology in Health and Disease, editors: Alfredo Ulloa-Aguirre and P. Michael Conn, Elsevier, ISBN: 978-0-12-408134-5, 2014. [Book chapter, not peer reviewed]
8. **R. Bertram**, A. Daou\*, R. L. Hyson, F. Johnson, W. Wu, *Two Neural Streams, One Voice: Pathways for Theme and Variation in the Songbird Brain*, Neuroscience, 277:806-817, 2014. [Review article, peer reviewed]
9. S. Sengül\*, R. Clewley, **R. Bertram**, J. Tabak, *The Contributions of Divisive and Subtractive Feedback in the Hodgkin-Huxley Model*, Journal of Computational Neuroscience, 37:403-415, 2014.
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.

2015

1. A. E. Gonzalez-Iglesias, P. A. Fletcher\*, J. A. Arias-Cristancho\*, R. Cristancho-Gordo, C. V. Helena, **R. Bertram**, J. Tabak, *Direct Stimulatory Effects of Oxytocin in Female Rat Gonadotrophs and Somatotrophs In Vitro: Comparison to Lactotrophs*, Endocrinology, 156:600-612, 2015.
2. **R. Bertram**, *Mathematical Modeling in Neuroendocrinology*, Comprehensive Physiology, 5:911-927, 2015.
3. P. J. Duncan\*, S. Sengül\*, J. Tabak, P. Roth, **R. Bertram**, M. J. Shipston, *Large Conductance  $Ca^{2+}$ -Activated  $K^+$  (BK) Channels Promote Secretagogue-Induced Transition from Spiking to Bursting in Murine Anterior Pituitary Corticotrophs*, Journal of Physiology, 593:1197-1211, 2015.
4. B. E. Peercy, A. S. Sherman, **R. Bertram**, *Modeling of Glucose-Induced cAMP Oscillations in Pancreatic  $\beta$  Cells: cAMP Rocks when Metabolism Rolls*, Biophysical Journal, 109:439-449, 2015.
5. C. V. Helena, N. Toporikova, B. Kalil\*, A. M. Stathopoulos\*, R. O. Carolino, J. A. Anselmo-Franci, **R. Bertram**, *KNDy Neurons Modulate the Magnitude of the Steroid-Induced Luteinizing Hormone Surges in Ovariectomized Rats*, Endocrinology, 156:4200-4213, 2015.
6. **R. Bertram**, J. Tabak, W. Teka\*, T. Vo\*, M. Wechselberger, *Geometric Singular Perturbation Analysis of Bursting Oscillations in Pituitary Cells*, in Mathematical Analysis of Complex Cellular Activity, Frontiers in Applied Dynamical Systems, volume 1, editor: James Sneyd, Springer International Publishing, ISBN: 978-3-319-18113-4, pp. 1-52, 2015. [Book chapter, peer reviewed]

## B. Accepted for Publication

1. **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), editor: Gareth Leng, Wiley Pub., in press, 2014. [book chapter, peer reviewed]
2. J. P. McKenna\*, J. Ha, M. J. Merrins, L. S. Satin, A. Sherman, **R. Bertram**, *Ca<sup>2+</sup> Effects on ATP Production and Consumption Have Key Regulatory Roles on Oscillatory Islet Activity*, Biophysical Journal, in press, 2015.
3. M. Merrins, C. Poudel\*, J. McKenna\*, J. Ha, A. Sherman, **R. Bertram**, L. Satin, *Phase Analysis of Metabolic Oscillations and Membrane Potential in Pancreatic Islet  $\beta$  Cells*, Biophysical Journal, in press, 2015.

## C. Submitted for Publication

1. 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*, submitted, 2015.
2. P. Fletcher\*, J. Tabak, **R. Bertram**, *From Global to Local: Exploring the Relationship Between Parameters and Behaviors in Models of Electrical Excitability*, submitted, 2015.
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*, submitted, 2015.

## Abstracts (during the last 5 Years)

1. V. Matveev, **R. Bertram**, A. Sherman, *Effect of Spatial Arrangement of Presynaptic Calcium Channels on Calcium Current Cooperativity of Neurotransmitter Release*, Annual Computational Neuroscience Meeting, Stockholm, Sweden, 2011.
2. M. J. Merrins, **R. Bertram**, A. Sherman, L. S. Satin, *6-Phosphofructo-2-kinase/fructose-2,6-bisphosphatase (PFKFB) Modulates Slow Oscillations in Pancreatic Islets*, Biophysical Society Annual Meeting, Baltimore, MD, 2011.
3. B. E. Peercy, **R. Bertram**, A. Sherman, *Metabolically Induced cAMP Oscillations in Pancreatic Beta Cells*, Biophysical Society Annual Meeting, Baltimore, MD, 2011.
4. V. Matveev, **R. Bertram**, A. Sherman, *Effect of Spatial Organization of Ca<sup>2+</sup> Channels on Ca<sup>2+</sup> Current Cooperativity of Exocytosis*, Biophysical Society Annual Meeting, Baltimore, MD, 2011.



5. C. Helena, R. Cristancho-Gordo, A. Gonzalez-Iglesias, J. Tabak, **R. Bertram**, M. Freeman, *Systemic Oxytocin Induces a Prolactin Secretory Rhythm via the Pelvic Nerve in Ovariectomized Rats*, Annual Meeting of the Endocrine Society, Boston, MA, 2011.
6. A. Gonzalez-Iglesias, R. Christancho-Gordo, **R. Bertram**, J. Tabak, *Oxytocin Stimulates Calcium signaling and Hormone Release in Rat Lactotrophs, Somatotrophs and Gonadotrophs*, World Congress of Neurohypophysial Hormones, Boston, MA, 2011.
7. V. V. Matveev, **R. Bertram**, A. Sherman, *Calcium Current Cooperativity and Variability of Synaptic Response: Domain Overlap Vs. Domain Sharing*, Annual Meeting of the Society for Neuroscience, Washington, DC, 2011.
8. M. J. Basista, W. Wu, **R. Bertram**, F. Johnson, *Spatially-Organized Neural Activity Underlies a Temporally-Organized Behavior*, Annual Meeting of the Society for Neuroscience, Washington, DC, 2011.
9. A. Daou, W. Wu, **R. Bertram**, F. Johnson, *A Computational Tool for Automated Large-Scale Analysis and Measurement of Birdsong Syntax*, Annual Meeting of the Society for Neuroscience, Washington, DC, 2011.
10. A. M. Stathopoulos, C. V. Helena, P. Fletcher, **R. Bertram**, *Acute Effects of Vasoactive Intestinal Polypeptide on Prolactin Release*, Annual Meeting of the Society for Neuroscience, Washington, DC, 2011.
11. M. Tomaiuolo, J. Tabak, G. Leng, **R. Bertram**, *Model Calibration and Testing on the Same Cell*, Annual Meeting of the Society for Neuroscience, Washington, DC, 2011.
12. P. A. Fletcher, N. A. Ciccone, U. B. Kaiser, **R. Bertram**, *Frequency Response of Gonadotropin-Releasing Hormone-Induced Follicle-Stimulating Hormone Transcription*, SIAM Conference on Applications of Dynamical Systems, Snowbird, Utah, 2011.
13. M. J. Basista, W. Wu, **R. Bertram**, R. L. Hyson, F. Johnson, *Syllable-Specific Topography of a Premotor Vocal Sequence Generating Region*, Annual Meeting of the Society for Neuroscience, New Orleans, LA, 2012.
14. P. Fletcher, D. Lyons, C. Broberger, J. Tabak, **R. Bertram**, *Modeling Bursting and Responses to TRH and Prolactin in the Tuberoinfundibular Dopaminergic Neurons of the Arcuate Nucleus*, Annual Meeting of the Society for Neuroscience, New Orleans, LA, 2012.
15. K. C. Elliott, A. Daou, W. Wu, **R. Bertram**, R. L. Hyson, F. Johnson, *A Cortical Premotor Region That Generates Vocal Sequences Receives Spatially-Organized Afferent Innervation*, Annual Meeting of the Society for Neuroscience, New Orleans, LA, 2012.

16. A. Daou, M. Ross, F. Johnson, R. Hyson, **R. Bertram**, *A Computational Model of the Different Classes of Neurons in the HVC of the Zebra Finch*, Annual Meeting of the Society for Neuroscience, New Orleans, LA, 2012.
17. C. R. Watson, A. M. Stathopoulos, J. T. Corthell, **R. Bertram**, P. Trombley, *Olfactory Bulb Monoamine concentrations Vary with Time of Day*, Annual Meeting of the Society for Neuroscience, New Orleans, LA, 2012.
18. C. V. Helena, A. M. Stathopoulos, **R. Bertram**, *Role of Kisspeptin/Neurokinin B/Dynorphin (KNDy) Neurons in the Prolactin Secretory Rhythm Induced by Cervical Stimulation in Ovariectomized Rats*, Annual Meeting of the Society for Neuroscience, New Orleans, LA, 2012.
19. A. M. Stathopoulos, C. V. Helena, P. A. Fletcher, **R. Bertram**, *Semicircadian Rhythm in Hypothalamic Dopamine release After Cervical Stimulation in Ovariectomized Rats*, Annual Meeting of the Society for Neuroscience, New Orleans, LA, 2012.
20. P. Velez, C. V. Helena, A. M. Stathopoulos, P. Fletcher, J. Tabak, P. Q. Trombley, **R. Bertram**, *Electrophysiological Recordings from Dopaminergic Neurons in the Arcuate Nucleus of Female Rats*, Annual Meeting of the Society for Neuroscience, New Orleans, LA, 2012.
21. J. Tabak, A. E. Gonzalez-Iglesias, R. Cristancho-Gordo, **R. Bertram**, *Multiple Actions of Hypothalamic Oxytocin on Pituitary Cells*, Annual Meeting of the Society for Neuroscience, New Orleans, LA, 2012.
22. A. E. Gonzalez-Iglesias, R. Cristancho-Gordo, J. A. Arias-Cristancho, **R. Bertram**, *Peripheral Administration of Oxytocin Acutely Increases Systemic Prolactin Levels and Advances the Onset of the Prolactin Surge in Proestrus Rats*, Annual Meeting of the Society for Neuroscience, New Orleans, LA, 2012.
23. M. T. Ross, A. Daou, **R. Bertram**, F. Johnson, R. L. Hyson, *The Contribution to Song of Known Ionic Currents in the HVC of the Zebra Finch*, Annual Meeting of the Society for Neuroscience, San Diego, CA, 2013.
24. K. C. Elliott, W. Wu, **R. Bertram**, R. L. Hyson, F. Johnson, *Anatomical Evidence for Parallel Processing in a Cortical Pre-Motor Region During the Sensorimotor Period of Vocal Learning*, Annual Meeting of the Society for Neuroscience, San Diego, CA, 2013.
25. S. Sengül, R. Clewley, **R. Bertram**, J. Tabak, *The Contributions of Two Negative Feedback Processes in the Hodgkin-Huxley Model*, Annual Meeting of the Society for Neuroscience, San Diego, CA, 2013.
26. 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.

27. 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.
28. 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.
29. 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.
30. 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.
31. 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.
32. 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.
33. 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.
34. 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.
35. 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.
36. 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.

37. 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.
38. 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.
39. 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.
40. 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.

## Invited Talks

1. Colloquium speaker, *An Investigation of Pulsatile Insulin Secretion Through Mathematical Modeling and Experiments*, Physiology, University of Michigan, 2015.
2. Symposium speaker, *Synergistic Oscillations in Islet Metabolism and Intracellular Signaling Molecules*, at Society for Mathematical Biology Annual Meeting, Atlanta, GA, 2015.
3. Plenary speaker, *Rhythms in Insulin Secretion: Origin and Synchronization*, Biodynamics 2015, Edinburgh, Scotland, 2015.
4. Colloquium speaker, *Why Do Insulin Levels Oscillate?*, Biomedical Engineering, Georgia Institute of Technology, Atlanta, GA, 2014.
5. Colloquium speaker, *GPUfit: A Tool for Real-Time Model Calibration and Prediction Testing*, Biomathematics, Duke University, Durham, NC, 2014.
6. Symposium speaker, *Using Mathematical Models to Determine the Source of Heterogeneity in Cellular Calcium Dynamics*, at SIAM Conference on the Life Sciences, Charlotte, NC, 2014.
7. Symposium speaker, *Insulin Pulsatility and Islet Synchronization*, at FSU Life Sciences Symposium, Tallahassee, FL, 2014.
8. Symposium speaker, *Mathematical Models of Islet Synchronization*, at workshop on Type 1 and Type 2 Diabetes, Fields Institute, Toronto, Canada, 2014.
9. Symposium speaker, *Synchronization of Pancreatic Islets*, at Frontiers of Applied and Computational Mathematics, New Jersey Institute of Technology, Newark, NJ, 2014.

10. Colloquium speaker, *Understanding the Neural Basis of Birdsong in the Zebra Finch with the Help of Mathematical Modeling*, Biology, West Virginia University, 2013.
11. Colloquium speaker, *A Hybrid Approach to Understanding Cell Dynamics*, Mathematics, West Virginia University, 2013.
12. Colloquium speaker, *A Mathematical Model for Pancreatic Islet Oscillations and Their Synchronization*, Computational Mathematics, Tulane University, New Orleans, LA, 2013.
13. Colloquium speaker, *A Mathematical Model for Pancreatic Islet Oscillations and Their Synchronization*, Mathematics, University of Exeter, Exeter, England, 2013.
14. Symposium speaker, *A Hybrid Experimental/Modeling Approach to Studying Pituitary Cell Dynamics*, at Biodynamics 2013, Bristol, England, 2013.
15. Symposium speaker, *A Hybrid Approach for Understanding Cell Dynamics*, at workshop on Cellular and Subcellular Models, Mathematical Biosciences Institute, Ohio State University, 2013.
16. Colloquium speaker, *The Dual Oscillator Model for Islet Oscillations*, Mathematics, University of Waterloo, Waterloo, Ontario, Canada, 2012.
17. Symposium speaker, *The Relationship Between Two Fast/Slow Analysis Techniques for Bursting Oscillations*, at SIAM Conference on the Life Sciences, San Diego, CA, 2012
18. Symposium speaker, *The Dual Oscillator Model for Pancreatic Islets*, at 9th AIMS International Conference on Dynamical Systems, Differential Equations, and Applications, Orlando, FL, 2012.
19. Symposium speaker, *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.
20. Symposium speaker, *Fast Negative Feedback Facilitates Bursting in Pituitary Cells*, at Modelling Electrical Activity in Physiological Systems, Agra, India, 2012.
21. Symposium speaker, *Mixed Mode Oscillations Underlie Bursting in Pituitary Cells*, at SIAM Conference on Applications of Dynamical Systems, Snowbird, Utah, 2011.
22. Symposium speaker, *The Emerging Roles of Oxytocin in Rhythmic Prolactin Secretion*, at 7th International Congress of Neuroendocrinology, Rouen, France, 2010.
23. Symposium speaker, *Mixed Mode Oscillations as a Mechanism for Pseudo-Plateau Bursting*, at Frontiers in Applied and Computational Mathematics, Newark, NJ, 2010.

24. Symposium speaker, *A Mathematical Study of Electrical Bursting in Pituitary Cells*, at workshop on Dynamical Systems and Neuroendocrinology, Paris, France, 2009.
25. Colloquium speaker, *Mathematical Aspects of Bursting Oscillations in Nerve and Endocrine Cells*, Mathematics, University of Louisville, 2009.
26. Colloquium speaker, *Using Mathematical Modeling and Experiments to Understand the Mechanism of Pulsatile Insulin Secretion*, Mathematics, University of Utah, 2009.
27. Colloquium speaker, *A Combined Modeling/Experimental Study of Pulsatile Insulin Secretion*, Computational Biology, George Mason University, 2009.
28. Symposium speaker, *Topics in Mathematical Neuroscience*, at Graduate Student Workshop, Mathematical Biosciences Institute, Ohio State University, 2008.
29. Symposium speaker, *Bursting in Pituitary Cells: A Totally Different Animal*, at Frontiers in Applied and Computational Mathematics, Newark, NJ, 2008.
30. Colloquium speaker, *The Neural Control of Hormone Secretion*, Physics, University of South Florida, 2007.
31. Symposium speaker, *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.
32. Colloquium speaker, *Mathematical Analysis of the Neural Control of Hormone Secretion*, Mathematics, University of British Columbia, Vancouver, Canada, 2006.
33. Symposium speaker, *Modeling network interactions between the hypothalamus and pituitary*, at Frontiers in Applied and Computational Mathematics, Newark, NJ, 2005.
34. Symposium speaker, *Complex Bursting Patterns in Pancreatic Islets*, at SIAM Conference on the Life Sciences, Portland, OR, 2004.
35. Symposium speaker, *A Mechanism for High-Pass Filtering of Neuronal Signals*, at SIAM Conference on Applications of Dynamical Systems, Snowbird, UT, 2003.
36. Colloquium speaker, *A Biophysical Phantom Bursting Model*, Mathematics, New Jersey Institute of Technology, 2003.
37. Colloquium speaker, *Complex Bursting in Pancreatic Islets*, Mathematics, New Jersey Institute of Technology, 2003.
38. Symposium speaker, *The Role of G-Proteins in Synaptic Filtering*, at workshop on Neural Dynamics, Mathematical Biosciences Institute, Ohio State University, 2002.

39. Colloquium speaker, *The Role of G-Proteins in Presynaptic Inhibition, Facilitation, and Synaptic Filtering: A Computational Study*, Applied Mathematics, Rice University, 2002.
40. Symposium speaker, *Global Optimization Methods for Solving Protein Structures*, at SIAM Conference on the Life Sciences, Boston, MA, 2002.
41. Symposium speaker, *A Biophysical Phantom Bursting Model for Pancreatic  $\beta$ -Cells*, at SIAM Conference on the Life Sciences, Boston, MA, 2002.
42. Symposium speaker, *Intrinsic and Network Bursting in Pancreatic  $\beta$ -Cells*, at Society for Mathematical Biology Annual Meeting, Hilo, HI, 2001.
43. Symposium speaker, *The Role of G-Proteins in Presynaptic Inhibition, Facilitation, and Synaptic Filtering*, at SIAM Conference on Applications of Dynamical Systems. Snowbird, UT, 2001.
44. Colloquium speaker, *Bursting Models in Biology*, Engineering, Georgia Institute of Technology, 2001.
45. Symposium speaker, *Physiology and Methods of Modeling in the Synapse*, at PIMS Summer Workshop on Mathematical Physiology, University of British Columbia, Vancouver, Canada, 1999.
46. Symposium speaker, *Phantom Bursting in Pancreatic  $\beta$ -Cells*, at workshop on Hormone Secretion and Control, Institute for Mathematics and Its Applications, Minneapolis, MN, 1999.
47. Colloquium speaker, *Topological and Phenomenological Classification of Bursting Oscillations*, Naval Research Laboratory, Washington, DC, 1994.

## 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. Standing member of the Modeling and Analysis of Biological Systems (MABS) Study Section, NIH (appointed July 1, 2010; appointed as Chair July, 2014 through June, 2015).
2. NSF grant review panel member, 2005–2010, 2014.
3. Grant review panel member for the American Association for the Advancement of Science, 2011.
4. NICHD/NIH intramural site review team member, 2008.
5. Ad hoc member of the MABS NIH study section, 2006 and 2008.
6. NINDS/NIH Specialized Neuroscience Research Program site review team member, 2007.
7. Grant review panel member for the Texas Higher Education Coordinating Board, 2006.
8. 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
  - Isreal 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



## **B. Editorial Boards**

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

## **C. Other**

1. Organizing Committee for the SIAM Conference on the Life Sciences, San Diego, CA, 2012.
2. External Examiner, PhD defense in Mathematics, University of Auckland, Auckland, New Zealand, 2014.
3. External Examiner, PhD defense in Mathematics, University of Waterloo, Ontario, Canada, 2012.
4. External Examiner, PhD defense in Mathematics, University of Auckland, New Zealand, 2010.
5. External Examiner, PhD defense in Physics, Simon Fraser University, Vancouver, Canada, 2006.
6. 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.
7. 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  
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

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

All committee work listed was performed at FSU.

1. Executive Committee, Mathematics Department, 2008–present
2. Faculty Evaluation Committee, Mathematics Department, 2005–2010
3. Science Area Promotion & Tenure Committee, 2010
4. Graduate Recruitment Committee, Mathematics Department, 2001–present
5. Graduate Recruitment Committee, Molecular Biophysics Program, 2006–present
6. Graduate Recruitment Committee, Neuroscience Program, 2006, 2007
7. Chair Selection Committee, Mathematics Department, 2007
8. Chair Selection Committee, Chemistry Department, 2013
9. Faculty Search Committee, Mathematics Department, 2005
10. Faculty Search Committee, School of Computational Science, 2005
11. University Bridges Program Proposal Committee, 2002
12. University Brain Initiative Steering Committee, 2014

#### **Professional Societies**

Society for Industrial and Applied Mathematics (SIAM)  
Society for Mathematical Biology  
Society for Neuroscience  
Endocrine 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: Methods of Applied Mathematics 1, Computational Methods in Biology, Biomathematics Projects

## B. High School Trainees

- Kelsey Mayo, Florida High School, 2000.

## C. Undergraduate Trainees

1. Jose Arias-Cristancho, Biology, Tallahassee Community College, 2012–present.
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, University of Sydney, Australia, Fall 2012.
- Alessia Tagliavini, University of Padua, Italy, Fall 2014.

## E. Master's Degrees Supervised

- Jessie Swanson, *A Mathematical Model of the Presynaptic Terminal with G-Protein-Regulated Calcium Channels and Ancillary Ca<sup>2+</sup> 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 Computational 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: Postdoctoral Fellow, Laboratory of Biological Modeling, National Institutes of Health.
5. Wondimu Teka, *Nonlinear Dynamics Underlying Fast Bursting in Pituitary Cells*, Biomathematics Program, FSU, awarded 2012. Current position: Postdoctoral Fellow at Indiana University-Purdue University Indianapolis.
6. Arij Daou, *From Songs to Ion Channels and Mathematical Modeling*, Biomathematics Program, FSU, awarded 2013. Current position: Postdoctoral Fellow, University of Chicago.
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, 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.
9. Andrea Stathopoulos, *Hypothalamic Factors Involved in the Regulation of Prolactin Surges in the Female Rat*, Neuroscience Program, FSU, awarded 2015. Current position: Adjunct Professor, Tallahassee Community College.
10. Diana Flores (current candidate), Biomathematics Program

11. Dan Weingard (current candidate), Biomathematics Program
12. Sergiusz Wesolowski (current candidate, co-directed with Wei Wu), Biomathematics Program
13. Joe McKenna (current candidate), Biomathematics Program
14. Danny Galvis (current candidate), Biomathematics Program
15. Vehpi Yildirim (current candidate), Biomathematics Program

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

1. Maurizio Tomaiuolo, Postdoctoral Fellow 2009–2012. Current position: Research Scientist level II at the Biotechnology High Performance Computing Software Application Institute, Frederick, Maryland.
2. Patricio Velez, Postdoctoral Fellow 2012-2013. Current position: Staff scientist at a pharmaceutical company in Chile.
3. Cleyde Helena, Postdoctoral Fellow, 2009–2015.
4. Joel Tabak, Associate Scientist/Scholar, 2007–present.
5. Arturo Iglesias, Assistant Scientist/Scholar, 2009–2015.

#### **H. Dissertation Committees**

1. Sanguk Kim, Molecular Biophysics, defended 2002
2. Vedrana Marin, Biochemistry, defended 2005
3. Ilker Sen, Molecular Biophysics, defended 2007
4. Srisairam Achuthan, Biomathematics, defended 2007
5. Aya Kataoka, Molecular Biophysics, defended 2008
6. Maurizio Tomaiuolo, Biological Science, defended 2008
7. John Thompson, Neuroscience, defended 2008
8. Juan Gutierrez, Biomathematics, defended 2009
9. Deborah Striegel, Biomathematics, defended 2009
10. De’Nise McKee, Biological Science, defended 2009
11. Bo Laing, Molecular Biophysics, defended 2009
12. Milton Truong, Biochemistry, defended 2010

13. David Shen, Mathematics, defended 2010
14. Janna Fierst, Biological Science, defended 2010
15. Kyle Noble, Molecular Biophysics, defended 2011
16. Xinyu Zhang, Chemistry, defended 2011
17. Zulma Jimenez, Chemistry, defended 2012
18. Tyrone Ryba, Biomedical Sciences, defended 2012
19. Kerry Gilmore, Chemistry, defended 2012
20. Jonathan Bates, Biomathematics, defended 2013
21. Mark Whidden, Biomathematics, defended 2013
22. Gregory Toole, Biomathematics, defended 2013
23. Adam Smith, Psychology, defended 2013
24. Yuanting Lu, Biomathematics, defended 2013
25. Chao Lu, Biochemistry, defended 2013
26. Lacy Olson, Psychology, defended 2014
27. Paul Stewart, Biochemistry, defended 2014
28. Qiuping Xu, Biomathematics, defended 2015
29. Kevin Elliott, Neuroscience, current
30. Abigail Pastore, Biological Science, current
31. Angela Jarrett, Biomathematics, current
32. Mark Basista, Neuroscience, current
33. Elias Nakouzi, Chemistry, current
34. Mao Li, Biomathematics, current
35. Sarah Kim, Biomathematics, current
36. Zhihui Zhang, Molecular Biophysics, current
37. Justin Eilertsen, Applied Mathematics, current
38. Austin Schwartz, Molecular Biophysics, current

39. Diego Diaz Martinez, Biomathematics, current
40. Atanaska Dobрева, Biomathematics, current
41. Briana Carroll, Neuroscience, current
42. Matthew Ross, Neuroscience, current
43. Kirill Korshunov, Neuroscience, current
44. Jacob Arnett, Mathematics, current