
Gregory D. Smith

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RESEARCH INTEREST

- **Mathematical aspects of cell physiology and neuroscience**
 - Stochastic dynamics of signaling complexes in neurons and myocytes
 - Population density and moment-based models of intracellular calcium handling
 - Chemical reaction network theory and gene regulatory network modeling
 - Computational neuroscience of metabotropic receptors; sensory relay by the visual thalamus

CURRENT POSITIONS

- **Professor, Department of Applied Science,**
The College of William & Mary, Williamsburg, VA, 8/13–present.
- **Neuroscience Program Faculty Affiliate,**
The College of William & Mary, Williamsburg, VA, 1/10–present.¹

EDUCATION

- **University of California at Davis. Ph.D. in Biophysics, Dec. 1996.**
- **Massachusetts Institute of Technology. B.S. as recommended by the Dept. of Biology, Feb. 1986.**

PREVIOUS POSITIONS

- **Director, Biomath Initiative,**
The College of William & Mary, Williamsburg, VA, 2/09–8/15.²
- **Associate Professor, Department of Applied Science,**
The College of William & Mary, Williamsburg, VA, 8/05–7/13.
- **Visiting Associate Professor, Mathematical Biosciences Institute, Ohio State University**
Columbus, OH, 9/07–6/08.
- **Assistant Professor, Department of Applied Science, College of William & Mary**
Williamsburg, VA, 8/01–7/05.
- **Assistant Professor, Department of Mathematics, Arizona State University**
Tempe, AZ, 8/99–8/01.

¹Faculty Affiliate in Neuroscience (beginning 2001, formalized in 2010). Courtesy Faculty member in the Departments of Mathematics and Physics (2002–present).

²The Directorship position was retired upon the successful institutionalization of an undergraduate biomathematics major and minor as part of the new Computational and Applied Mathematics and Statistics program (2015). Biomathematics activities are thriving at W&M at both graduate and undergraduate levels.

- **National Research Service Award (NEI) Individual Fellowship, Center for Neural Science New York University, New York, NY, 1/99–8/99.**
John Rinzel, post-doctoral advisor.
- **Intramural Research Training Assistantship, Mathematical Research Branch, NIDDK National Institutes of Health, Bethesda MD, 1/97–12/98.**
John Rinzel, post-doctoral advisor.
- **Research Assistant, Institute for Theoretical Dynamics & Biophysics Graduate Group University of California, Davis, 9/92–12/96.**
Joel E. Keizer, graduate advisor.
- **Laboratory Assistant, Department of Pediatrics University of California, San Francisco, CA, 6/90–6/92.**
- **Teacher/Counselor, Learning Experiences, Inc. Coatesville, PA, 7/87–6/90.**

HONORS, PRIZES AND AWARDS

- W&M nominee (1 of 6) for the 2014 SCHEV Outstanding Faculty Award.³
- Recipient of a 2013 Plumeri Award for Faculty Excellence.⁴
- Recipient of the 2011 Phi Beta Kappa Award for the Advancement of Scholarship.⁵
- One of ten faculty identified by the College to potentially serve as mentors for Beckman Scholars. 06–09.
- Early faculty development (CAREER) award from the National Science Foundation Division of Molecular and Cell Biology (see below).
- National Research Service Award Individual Fellowship from the National Eye Institute (see above).

COURSES TAUGHT, JOURNAL CLUBS, AND WORKSHOPS⁶

- Instructor, **Cellular Biophysics and Modeling** (APSC 351/651), Spring 13, Fall 14, Fall 15, Fall 16
Required course in W&M's Neuroscience program; ~90–110 students enrolled.

Cellular Biophysics and Modeling ... was by far one of the most informative and applicable I have taken at the College. I recently attended the Society for Neuroscience conference in Chicago, and would have been completely lost during many of the keynote speeches had I not gained the understanding of electrophysiology and mathematical models that I did in your course. Although I found your course to be very challenging, I believe it led to major improvements in my knowledge of neuroscience as well as my comfort level with biomathematics. Concepts that I found incomprehensible and daunting at the beginning of the semester seemed to make intuitive sense by the final exam, more so in this class than in any other I have taken. (Written 11/15 by student who took CMB in Fall 2014.)

- Instructor, **Writing in Neuroscience** (NEUR 300) Fall 16. 1 student.
- Instructor, **Networks in Systems Biology** (APSC 490/791 Topics in Applied Science) Spring 16. ~ 10 students.

³This is an annual statewide award that recognizes 12 of Virginia's outstanding faculty members.

⁴This award is given annually by the Provost to "twenty faculty members from across the College in tangible recognition that the faculty of the College are the heart and soul of our enterprise."

⁵This award is given annually by the Alpha of Virginia Chapter of Phi Beta Kappa to a "younger member of the faculty who has demonstrated scholarly achievement and promise for continued excellence."

⁶ For additional educational activities see GRADUATE AND POST-DOCTORAL TRAINING and UNDERGRADUATE RESEARCH EXPERIENCES and UNDERGRADUATE HONORS THESES.

- Instructor, **Mathematical Physiology I**: Coupled Markov chains (APSC 751), Spring 15. Undergraduates participated under APSC 490 Studies in Applied Science.
- Guest Lecturer, **Random Walks in Biology**: John Conway's Game of Life (APSC 456), 2/15.
- Co-organizer, **Biomath Journal Club**, 08–present (usually w/ Leah Shaw).
- Leader, **Computational Biology Journal Club**, 03–present. My research group's weekly journal club runs every semester and my graduate students are required to present scientific articles that are relevant to their research training. Undergraduates research students often audit or receive credit as *Readings in Applied Science*.
- Instructor, **Computational Neuroscience** (APSC 450), Fall 12.
- Lead organizer and instructor, **Computational Cell Biology International Summer School**, Cold Spring Harbor Laboratory, Cold Spring Harbor, NY. July 24–August 13, 2012, July 22–August 12, 2013 (w/ Loew L and Albert R). The CSHL CCB Course is an intensive three-week event involving ~24 graduate students and ~20 lecturers. Each year 1–4 W&M undergraduates audit with support from my NSF grants or W&M's CSUMS and HHMI programs.⁷
- Instructor, **Mathematical Physiology II**: Modeling Cardiac Myocytes (APSC 751), Spring 12.
- Instructor, **Mathematical Physiology I**: Modeling Cardiac Myocytes (APSC 751), Fall 11.
- Lead organizer and instructor, **Computational Cell Biology International Summer School**, Cold Spring Harbor Laboratory, Cold Spring Harbor, NY. June 1–July 21, 2011 (w/ Tyson J, Loew L).
- Instructor, **Cellular Biophysics and Modeling** (APSC 651/451, BIO451), Spring 11.
- Instructor, **Computational Neuroscience** (APSC 450 / BIO 404-08), Fall 10.
- Guest Lecturer, **Integrated molecular and cellular biology for non-biologists** (MG660), Ohio State University, Fall 10 (2×). Invited by Andrea Doseff & Erich Grotewold.
- Co-organizer and instructor, **Computational Cell Biology International Summer School**, Cold Spring Harbor Laboratory, Cold Spring Harbor, NY. June 2–July 22, 2010 (w/ Fall C, Tyson J, Loew L).
- Instructor, **Mathematical Physiology II: Exploring the Thalamus** (APSC 752), Spring 10.
- Instructor, **Mathematical Physiology I: Gene Regulatory Networks** (APSC 751), Fall 09.
- Instructor, **Independent Study in Applied Science** (APSC 403) and **Writing in the Neurosciences** (NSCI 300), Fall 09. Supervised Neil Christian's (Neuroscience 09) research and writing on the topic of neural engineering.
- Co-organizer and instructor, **Computational Cell Biology International Summer School**, Cold Spring Harbor Laboratory, Cold Spring Harbor, NY. June 26–July 16, 2009 (w/ Fall C, Tyson J, Loew L, Elston T).
- Instructor, **Bioinformatics and Molecular Evolution** (APSC 654/454, BIO454), Spring 09.
- Instructor, **Cellular Biophysics and Modeling** (APSC 651/451, BIO451), Fall 08.
- Co-organizer and instructor, **Computational Cell Biology International Summer School**, Cold Spring Harbor Laboratory, Cold Spring Harbor, NY. June 27–July 17, 2008 (w/ Fall C, Tyson J, Loew L, Elston T).

⁷This is a prestigious educational activity with high scientific merit that impacts many domestic and international graduate students, post-docs and junior faculty.

- Co-instructor, **Introduction to Mathematical Modeling in Cellular Physiology and Neuroscience**, Mathematical Biosciences Institute, Ohio State University, October 1–4, 2007 (w/ David Terman).
- Instructor, **Bioinformatics and Molecular Evolution** (APSC 654/454), Spring 07.
- Instructor, **Cellular Biophysics and Modeling** (APSC 651/451), Fall 06.
- Instructor, **Mathematical and Computational Biology Seminar** (MAT 490, APSC 690), Fall 06 (w/ Sebastian Schrieber).
- Instructor, **Mathematical Physiology II** (APSC 752), Spring 06.
- Co-organizer, **Mathematical and Computational Biology Seminar**, Spring 06 (w/ Sebastian Schrieber).
- Instructor, **Mathematical Physiology I** (APSC 751), Fall 05.
- Participant, **Mathematical and Computational Biology Seminar**, Fall 05 (organized by Schrieber)
- Instructor, **Introductory Bioinformatics** (APSC 654/454), Spring 05.
- Participant, **Matrix and Operator Theory Problems in Mathematical Biology Seminar**, Spring 05 (organized by Chi-Kwong Li)
- Instructor, **Cellular Biophysics and Modeling** (APSC 651/451), Fall 04.
- Instructor, **Topics in Applied Science: Mathematical Physiology II** (APSC 791), Spring 04.
- Organizer, **Markov Chain Workshop**, Spring 04 (w/ Li, Mathias, and Schrieber).
- Instructor, **Studies in Applied Science** (APSC 490), Spring 04. Christin Welle worked through material of *Cellular Biophysics and Modeling*.
- Instructor, **Topics in Applied Science: Mathematical Physiology I** (APSC 791), Fall 03.
- Organizer, **Markov Chain Workshop**, Fall 03 (w/ Li, Mathias, and Schrieber).
- Instructor, **Cellular Biophysics and Modeling** (APSC 651/451), Spring 03. This course, previously taught as Topics in Applied Science, was approved by COGS and EPC this semester.
- Instructor, **Topics in Applied Science: Bioinformatics, Experiment and Theory** (APSC 691/490), Fall 02. I coordinated this team-taught survey course. Other instructors included Margaret Saha (Biology), Heather Sasinowska (INCOGEN), Maciek Sasinowski (INCOGEN), Michael Trosset (Math), and Kimberly Reece (VIMS).
- Instructor, **Ordinary Differential Equations** (MAT 302), Fall 02. Outreach to the Department of Mathematics upon arriving at William and Mary.
- Instructor, **Topics in Applied Science: Cellular Biophysics and Modeling** (APSC 691/490 & BIO 680), Spring 02.
- Instructor, **Math Methods for Genetic Analysis: Basic Algorithms of Computational Molecular Biology** (MAT 351), ASU, Spring 01.
- Instructor, **Mathematical Physiology: Dynamic Phenomena in Cell Biology** (MAT 598), ASU, Fall 00.
- Instructor, **Intro to Ordinary Differential Equations** (MAT 274), ASU, Fall 00.
- Instructor, **Brief Calculus** (MAT 210), ASU, Fall 99, Spring 00.

- Teaching Assistant, **Mathematical Physiology**, UC Davis, 96.
- Teaching Assistant, **Embryology Laboratory**, UC Davis, 92–93.
- Undergraduate tutor in physical chemistry and biology, UC Davis, 94–96.
- Math and science teacher at residential facility for delinquent and dependent teenagers, 87–90. I obtained certification from the Commonwealth of Pennsylvania State Board of Private Academic Schools.

PENDING RESEARCH FUNDING AS PRINCIPAL OR CO-PRINCIPAL INVESTIGATOR

- National Science Foundation, Mathematical Biology, **The spatial dynamics of mobile elements on genomic patterns of gene expression and gene-transposon proximities**. co-PIs: Joshua R. Puzey and Gregory D. Smith. \$570K. 6/16–5/19.
- RFA-DA-16-009 NIH Blueprint Training in Computational Neuroscience: From Biology to Model and Back Again (T90/R90). **Computational neuroscience: realistic modeling, cross-disciplinary training at The College of William & Mary**. co-PIs: Christopher Del Negro and Gregory D. Smith. \$1,279K. 1/17–12/21.

CURRENT RESEARCH FUNDING AS PRINCIPAL OR CO-PRINCIPAL INVESTIGATOR

- National Science Foundation, Mathematical Biology, **A new class of whole cell models with bidirectional coupling of local (subcellular) and global (cellular) calcium responses**. PI: Gregory D. Smith. Grant #DMS-1121606. \$350K. 10/11–9/14. No cost extension to 9/16.

CURRENT FUNDING AS PARTICIPANT OR CONSULTANT

- National Science Foundation, Division of Mathematical Sciences, **Expeditions in Training, Research, and Education for Mathematics and Statistics through Quantitative Explorations of Data (EXTREEMS-QED): Computational and Statistical theory and techniques in the study of large data sets**. co-PIs: Junping Shi, Chi-Kwong Li, Gexin Yu. Senior personnel: Sarah Day, John Delos, Larry Leemis, Leah Shaw, Gregory Smith, Ilya Spitovsky. \$880K. 08/13–07/18.

PRIOR RESEARCH FUNDING AS PRINCIPAL OR CO-PRINCIPAL INVESTIGATOR

- National Science Foundation, Division of Mathematical Sciences, **Computational Science Training for Undergraduates in the Mathematical Sciences (CSUMS): Theory, techniques, and research in computational mathematics**. PI: Chi-Kwong Li. Co-PIs: Andreas Stathopoulos, Junping Shi, Robert Lewis, Virginia Torczon, Sarah Day, David Lutzer, David Phillips, and Gregory Smith. Grant #DMS-0703532. \$884K. 9/07–8/12. No cost extension 8/12–8/13.
- Faculty Interdisciplinary Initiatives Grant, The College of William & Mary. **Digital reconstruction and simulation of breathing-related neurons in perinatal mice: an interdisciplinary proposal in computational neuroscience**. co-PIs: Christopher A. Del Negro and Gregory Smith. \$10K. Summer 2012.
- Faculty Interdisciplinary Initiatives Grant, The College of William & Mary. **Computational modeling of neural mechanisms underlying stop signal reaction time task performance in rats**. co-PIs: Joshua Burk and Gregory Smith. Summer 2011. \$10K.
- Joint DMS/NIGMS Initiative to Support Research in the Area of Mathematical Biology, **Ensemble density analysis of stochastic models of cardiac excitation-contraction coupling**. co-PIs: M. Saleet Jafri, Gregory D. Smith, and Eric Sobie. Grant #0443843. Total \$2,000K. 2/1/05–1/31/10. Subcontract for \$660K to W&M from George Mason University. No cost extension to 2/28/11.

- National Science Foundation, Division of Molecular and Cell Biology, **CAREER: The dynamics of IP₃-dependent Ca²⁺ release sites**. PI: Gregory D. Smith. Grant #0133132. \$500K. 6/02–6/07. No cost extension to 6/08.
- National Science Foundation, Division of Integrative Biology and Neuroscience, **The effect of feedback inhibition on sensory relay by visual thalamus**. PI: Gregory D. Smith. Grant #00079931 (ASU) and #0228273 (W&M). \$262K. 8/00–8/04.
- Virginia Department of Planning and Budget, Commonwealth Technology Research Fund, Industry Inducement Program, **Bringing the future of bioinformatics to Virginia**. co-PIs: Dennis M. Manos, Robert G. Voigt, Margaret S. Saha, Gregory D. Smith. Grant #CTRF IN2002-03. \$3,252K. 11/01–10/04. No cost extension to 6/06. This economic development grant has attracted the Institute for Computational Genomics, Inc. to Williamsburg from Clemson, SC.
- The Thomas F. and Kate Miller Jeffress Memorial Trust, **The dynamics of IP₃-dependent Ca²⁺ release sites**. PI: Gregory D. Smith. Grant #J-640. \$27K. 1/02–12/02. No cost extension to 12/03.
- University of New Mexico School of Medicine, Department of Pathology, Cancer Research Center, **Center for the Spatio-Temporal Modeling of Cell Signaling Networks**. PI: Gregory D. Smith. Primary UNM contact: Bridget Wilson. Subcontract for approx. \$5.5K Summers 02–04 funded via NIH-NIGMS Grant #P20 GM066283 (PI: Janet Oliver).
- ASU Faculty Grant-In-Aid program. **A mathematical model of Ca²⁺ responses in pulmonary artery smooth muscle cells**. PI: Gregory D. Smith. \$7K. 1/00–12/00.

PRIOR RESEARCH FUNDING AS PARTICIPANT OR CONSULTANT

- National Science Foundation, **Computational Cell Biology International Summer School**. PI: David Stewart, Director, Cold Spring Harbor Laboratory Meetings and Courses. Instructors: Gregory Smith, Leslie Loew, Reka Albert, Suzanne Scarlata. ~\$70K per year. Summer 2011–2014. The founding instructors were: Christopher Fall, Gregory Smith, John Tyson, Leslie Loew, Timothy Elston. \$270K (Summer 2008–2010).
- National Science Foundation, Division of Applied Mathematics, **Matrix analysis in engineering and science**. PI: Roy Mathias. \$100K. 8/03–8/04. Listed as participant w/ Chi-Kwong Li and Sebastian Schrieber in this research experiences for undergraduates grant.
- Defense Advanced Research Projects Agency. **Advanced neural implants and control**. PI: Daryl Kipke. As one of 13 co-PIs, I was responsible for biophysical modeling of electrode-tissue interactions and simulations related to electrode optimization. \$6,000K. 7/00–6/03. My participation ended upon leaving ASU.
- Alfred P. Sloan Foundation, **Professional Masters Degree in Computational Biosciences**. PIs: Rosemary Renaut; co-PIs: J. Kenneth Hooper. \$162K. I contributed extensively to this proposal and am listed as one of 15 participating faculty. 7/01–6/03. My participation ended upon leaving ASU.

TOTAL PUBLICATIONS: 51 research articles, 7 book chapters, 5 proceedings and 5 + 3 others

PUBLICATIONS: REFEREED RESEARCH ARTICLES (51)⁸

51. Hammack RH and Smith GD. **Cycle bases of reduced powers of graphs**. *ARS Mathematica Contemporanea*. In press. See arXiv:1601.02896 for preprint.
50. Wang X, Hardcastle K, Weinberg SH, Smith GD. **Population density and moment-based approaches to modeling domain Ca²⁺-mediated inactivation of L-type Ca²⁺ channels**. *Acta Biotheoretica* 64(1):11-32, 2016. [[doi:10.1007/s10441-015-9271-y](https://doi.org/10.1007/s10441-015-9271-y)]

⁸Numbers in brackets are citations (Google Scholar, August 2013). Undergraduate research students are indicated by *.

49. Wang X, Hao Y, Weinberg SH and Smith GD. **Ca²⁺-activation kinetics modulate successive puff/spark amplitude, duration and inter-event interval correlations in a Langevin model of stochastic Ca²⁺ release.** *Mathematical Biosciences* 264:101107, 2015. [[doi:10.1016/j.mbs.2015.03.012](https://doi.org/10.1016/j.mbs.2015.03.012)]
48. Wang X, Weinberg S, Hao Y, Sobie EA and Smith GD. **Calcium homeostasis in a local/global whole cell model of permeabilized ventricular myocytes with a Langevin description of stochastic calcium release.** *American Journal of Physiology: Heart and Circulatory Physiology*. 308(5):H510-H523, 2015. [[doi:10.1152/ajpheart.00296.2014](https://doi.org/10.1152/ajpheart.00296.2014)] [PMID: 25485896]
47. Weinberg S and Smith GD. **The influence of Ca²⁺ buffers on free [Ca²⁺] fluctuations and the effective volume of Ca²⁺ microdomains.** *Biophysical Journal* 106(12):2693-2709, 2014. [[doi:10.1016/j.bpj.2014.04.045](https://doi.org/10.1016/j.bpj.2014.04.045)] [PMID: 24940787]
46. Weinberg S and Smith GD. **Discrete-state stochastic models of calcium-regulated calcium influx and subspace dynamics are not well-approximated by ODEs that neglect concentration fluctuations.** *Computational and Mathematical Methods in Medicine: Special issue on Cardiovascular System Modeling*. Volume 2012, Article ID 897371. [[doi:10.1155/2012/897371](https://doi.org/10.1155/2012/897371)]
45. Siegal-Gaskins D, Mejia-Guerra MK, Smith GD, and Grotewold E. **Emergence of switch-like behavior in a large family of simple biochemical networks.** *PLoS Comput. Bio.* 7(5):e1002039, 2011. [[doi:10.1371/journal.pcbi.1002039](https://doi.org/10.1371/journal.pcbi.1002039)] [13] (7)
44. LaMar MD, Kemper P, and Smith GD. **Reduction of calcium release site models via moment fitting of phase-type distributions.** *Phys. Biol.* 8:026015, 2011. [[doi:10.1088/1478-3975/8/2/026015](https://doi.org/10.1088/1478-3975/8/2/026015)]
43. Lamprecht R, Smith GD, and Kemper P. **Stochastic Petri net models of signaling complexes and their analysis.** *Natural Computing. Special Issue: Petri Nets and BioSystems* 10:1045–75, 2011. [[doi:10.1007/s11047-009-9143-y](https://doi.org/10.1007/s11047-009-9143-y)] [6] (2)
42. Hartman JM*, Sobie EA, and Smith GD. **Spontaneous calcium sparks and homeostasis in a minimal model of local and global calcium responses in quiescent ventricular myocytes.** *American Journal of Physiology: Heart and Circulatory Physiology* 299(6):H1996–2008, 2010. [[doi:10.1152/ajpheart.00293.2010](https://doi.org/10.1152/ajpheart.00293.2010)] [PMID: 20852058] [8] (8) *Selected and evaluated by Daniel Beard, a member of the Faculty of 1000.*
41. Huertas MA, Smith GD, and Györke S. **Calcium alternans in a cardiac myocyte model that uses moment equations to represent heterogenous junctional SR calcium.** *Biophys. J.* 99(2):377–387, 2010. [[doi:10.1016/j.bpj.2010.04.032](https://doi.org/10.1016/j.bpj.2010.04.032)] [PMID: 20643055] [9] (8)
40. Williams GSB, Sobie EA, Smith GD, Jafri MS. **Models of cardiac excitation-contraction coupling in ventricular myocytes.** *Mathematical Biosciences*. 226:1–15, 2010. [[doi:10.1016/j.mbs.2010.03.005](https://doi.org/10.1016/j.mbs.2010.03.005)] [19] (12)
39. LaMar MD and Smith GD. **The effect of node-degree correlation on synchronization of identical pulse-coupled oscillators.** *Physical Review E*. 84(4):046206, 2010. [[doi:10.1103/PhysRevE.81.046206](https://doi.org/10.1103/PhysRevE.81.046206)] [12] (6)
38. Thul R, Smith GD, Coombes S. **Sensitisation waves in a bidomain fire-diffuse-fire model of propagating calcium waves.** *Physica D: Nonlinear Phenomena* 238(21):2142–2152, 2009. [[doi:10.1016/j.physd.2009.08.011](https://doi.org/10.1016/j.physd.2009.08.011)] [3] (3)
37. Siegal-Gaskins D, Grotewold E, and Smith GD. **The capacity for multistability in gene regulatory motifs.** *BMC Systems Biology* 3:96, 2009. [[doi:10.1186/1752-0509-3-96](https://doi.org/10.1186/1752-0509-3-96)] [15] (10)
36. Hao Y, Kemper P, and Smith GD. **Reduction of calcium release site models via fast/slow analysis and iterative aggregation/disaggregation.** *Chaos* 19:037107, 2009. Focus issue: *Intracellular Ca²⁺ Dynamics—A Change of Modeling Paradigm?* [[doi:10.1063/1.3223663](https://doi.org/10.1063/1.3223663)] [4]

35. Goyal R, Angermann JE, Ostrovskaya O, Buchholz JN, Smith GD, Wilson SM. **Enhanced capacitative calcium entry and sarcoplasmic-reticulum calcium storage capacity with advanced age in murine mesenteric arterial smooth muscle cells.** *Exp. Gerontol.* 44(3):201–7, 2009. [[doi:10.1016/j.exger.2008.10.007](https://doi.org/10.1016/j.exger.2008.10.007)] [2]
34. Goyal R, Creel KD, Chavis E, Smith GD, Longo LD, Wilson SM. **Maturation of intracellular calcium homeostasis in sheep pulmonary arterial smooth muscle cells.** *American Journal of Physiology: Lung Cellular and Molecular Physiology* 295(5):L905–14, 2008. [[doi:10.1152/ajplung.00053.2008](https://doi.org/10.1152/ajplung.00053.2008)] [10]
33. DeRemigio H, LaMar MD, Kemper P, and Smith GD. **Markov chain models of coupled intracellular calcium channels: Kronecker structured representations and iterative solution methods.** *Physical Biology* 5(3):36003, 2008. [[doi:10.1088/1478-3975/5/3/036003](https://doi.org/10.1088/1478-3975/5/3/036003)] [[PMID: 18626127](https://pubmed.ncbi.nlm.nih.gov/18626127/)] [10] (5)
32. Williams GSB, Huertas MA, Sobie EA, Jafri MS, and Smith GD. **Moment closure for local control models of Ca^{2+} -induced Ca^{2+} release in cardiac myocytes.** *Biophys. J.* 95(4):1689–703, 2008. [[doi:10.1529/biophysj.107.125948](https://doi.org/10.1529/biophysj.107.125948)] [[PMID: 18487291](https://pubmed.ncbi.nlm.nih.gov/18487291/)] [19] (16)
31. Groff JR and Smith GD. **Ryanodine receptor allosteric coupling and the dynamics of Ca^{2+} sparks.** *Biophys. J.* 95:135–154, 2008. [[doi:10.1529/biophysj.107.119982](https://doi.org/10.1529/biophysj.107.119982)] [[PMID: 18359795](https://pubmed.ncbi.nlm.nih.gov/18359795/)] [28] (20)
30. Groff JR and Smith GD. **Calcium-dependent inactivation and the dynamics of calcium puffs and sparks.** *J. Theor. Biol.* 253(3):483–99, 2008. [[doi:10.1016/j.jtbi.2008.03.026](https://doi.org/10.1016/j.jtbi.2008.03.026)] [[PMID: 18486154](https://pubmed.ncbi.nlm.nih.gov/18486154/)] [19] (11)
29. Williams GSB, Molinelli EJ*, and Smith GD. **Modeling local and global intracellular calcium responses mediated by diffusely distributed inositol 1,4,5-trisphosphate receptors.** *J. Theor. Biol.* 253:170–188, 2008. [[doi:10.1016/j.jtbi.2008.02.040](https://doi.org/10.1016/j.jtbi.2008.02.040)] [[PMID: 18405920](https://pubmed.ncbi.nlm.nih.gov/18405920/)] [9] (7)
28. DeRemigio H, Groff JR, and Smith GD. **Calcium release site ultrastructure and the dynamics of puffs and sparks.** *Mathematical Medicine & Biology.* 25(1):65–85, 2008. [[doi:10.1093/imammb/dqn004](https://doi.org/10.1093/imammb/dqn004)] [[PMID: 18359948](https://pubmed.ncbi.nlm.nih.gov/18359948/)] [14] (10)
27. Thul R, Smith GD, Coombes S. **A bidomain threshold model of propagating calcium waves.** *J. Mathematical Biology* 56(4):435–63, 2008. [[doi:10.1007/s00285-007-0123-5](https://doi.org/10.1007/s00285-007-0123-5)] [20] (13)
26. Williams GSB, Huertas MA, Sobie EA, Jafri MS, and Smith GD. **A probability density approach to modeling local control of Ca^{2+} -induced Ca^{2+} release in cardiac myocytes.** *Biophys. J.* 92(7):2311–28, 2007. [[doi:10.1529/biophysj.106.099861](https://doi.org/10.1529/biophysj.106.099861)] [[PMID: 17237200](https://pubmed.ncbi.nlm.nih.gov/17237200/)] [30] (22)
25. Huertas H and Smith GD. **The dynamics of luminal depletion and the stochastic gating of Ca^{2+} -activated Ca^{2+} channels and release sites.** *J. Theor. Biol.* 246(2):332–54, 2007. [[doi:10.1016/j.jtbi.2007.01.003](https://doi.org/10.1016/j.jtbi.2007.01.003)] [27] (22)
24. Means S, Smith AJ, Shepard J, Shadid J, Fowler J, Wojcikiewicz R, Mazel T, Smith GD, and Wilson BS. **Reaction diffusion modeling of calcium dynamics with realistic ER geometry.** *Biophys. J.* 91(2):537–57, 2006. [[doi:10.1529/biophysj.105.075036](https://doi.org/10.1529/biophysj.105.075036)] [37] (54)
23. Huertas MA and Smith GD. **A multivariate population density model of the dLGN/PGN relay.** *J. Comput. Neurosci.* 21(2):171–89, 2006. [[doi:10.1529/biophysj.105.075036](https://doi.org/10.1529/biophysj.105.075036)] [[PMID: 16788765](https://pubmed.ncbi.nlm.nih.gov/16788765/)] [16] (7)
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UNREFEREED PUBLICATIONS (5)

5. Smith GD. **Mathematical Foundations of Neuroscience by G. Bard Ermentrout and David H. Terman.** MAA Reviews. (The book review service of the Mathematical Association of America). 2011. [[online](#)]
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2. Sherman A and Smith GD. **Relationship between deterministic rate constants and probability of binding.** Appendix in: Kennedy KM, Piper ST, Atwood HL. Synaptic vesicle recruitment for release explored by Monte Carlo simulation at the crayfish neuromuscular junction. *Can. J. Physiol. Pharmacol.*, 77(9):634–650, 1999.
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3. Smith GD. **Cellular Biophysics and Modeling: The Computational Biology of Excitable Cells**. Under contract with Cambridge University Press.
2. Edger P, Smith R, McKain M, Cooley AM, Vallejo-Marin M, Yuan Y, Bewick AJ, Ji L, Platts AE, Bowman M, Childs K, Schmitz RJ, Smith GD, Pires JC, Puzey JR. **Subgenome dominance in an interspecific hybrid, synthetic allopolyploid, and a 140 year old naturally established neo-allopolyploid monkeyflower**. In preparation for *Nature Genetics*.
1. Smith R, Puzey J and Smith GD. **Likelihood ratio tests for analysis of homeolog specific expression bias in hybrids and allopolyploids**. In preparation.

CONFERENCES, ABSTRACTS, AND INVITED SEMINARS⁹

- **Biology and Medicine through Mathematics**, Virginia Commonwealth University, Richmond VA, 5/16. Smith RD, Smith GD, Puzey J. Homeologue expression bias. (*poster*)
- **Biology and Medicine through Mathematics**, Virginia Commonwealth University, Richmond VA, 5/16. Hammack R and Smith GD. Hill's diagrammatic method and reduced graph powers. (*poster*)
- **American Mathematical Society: Special Session on Graph Products**, Joint Mathematics Meetings, Seattle, WA, 1/16. Hammack RH and Smith GD. Cycle bases of reduced powers of graphs. Reference No. 1116-60-1611 (*invited speaker*)

Given a graph G and a positive integer k , the reduced k th power of G , denoted $G^{(k)}$, is the configuration space in which k indistinguishable tokens are placed on the vertices of G , so that any vertex can hold up to k tokens. Two configurations are adjacent if one can be transformed to the other by moving a single token along an edge to an adjacent vertex. The reduced power $G^{(k)}$ is the transition graph of the master Markov chain for k identical and indistinguishable stochastic automata with transition graph G . This talk will give an overview of propositions related to the structural properties of reduced graph powers and, most significantly, present a construction of minimum cycle bases of $G^{(k)}$. The minimum cycle basis construction yields conditions that ensure against violations of microscopic reversibility in biophysical applications, such as Markov chain models of the stochastic gating of coupled ion channels.

- **Mathematics Colloquium**, Virginia Commonwealth University, Richmond VA, 11/15. Mathematical modeling of intercellular calcium dynamics. (*invited speaker*)
- **Mathematics Colloquium & EXTREEMS-QED Seminar**, Department of Mathematics, The College of William & Mary, Williamsburg, VA, 10/15. Hill's diagrammatic method, concerted channel gating, and reduced graph products. (*speaker*)

Terrell Leslie Hill is well-known among physical chemists and biophysicists for his work on the thermodynamics of small systems, free energy transduction, and biochemical cycle kinetics. Textbooks emphasize Hill's elegant description of how the hydrolysis of ATP produces mechanical work (via biased transitions through states of differing free energy). While developing the "sliding filament model" into a quantitative description of muscle action, Hill conceived of a graphical formalism for representing fluxes in unimolecular systems. The formalism is an application of the Markov Chain Tree Theorem, a classical mathematical result that expresses the steady-state probability distribution of an irreducible Markov chain in terms of directed spanning trees of its associated state-transition graph. Hill's diagrammatic method is readily applied to models of ion channel gating and ligand-receptor binding.

To efficiently apply Hill's diagrammatic method to clusters of interacting ligand-gated ion channels, it has been necessary to characterize the structural properties of reduced graph powers - denoted $G^{(N)}$ -

⁹Presenting authors other than myself are underlined. Undergraduate research students are indicated by \star .

that are the transition graphs for the master Markov chain for N identical (but not independent) M -state automata with transition graph G of size $|G| = M$. Richard Hammack (Virginia Commonwealth University) and I have obtained results related to the structural properties of reduced graph powers. Most significantly, we provide a construction of minimum cycle bases of $G^{(N)}$. The minimal cycle basis construction would appear to be prerequisite to the application of Hills diagrammatic method to the analysis of non-equilibrium steady-states of clusters of interacting ligand-gated ion channels. For example, the construction provides conditions that ensure against violations of microscopic reversibility. It is also an interesting combinatorial problem in its own right.

- **Biomath Journal Club / Seminar**, The College of William & Mary, Williamsburg, VA, 10/15. Hill's diagrammatic method, concerted channel gating, and reduced graph products. (*speaker*)
- **Society for Mathematical Biology, Minisymposium: Modeling Calcium Signaling in Cardiomyocytes**, Atlanta, GA, 6/15. Weinberg SH, Smith GD. Calcium buffers do not suppress and may enhance calcium fluctuations in the cardiac dyadic subspace. (*speaker*)
- **The Ninth Q-bio Summer School**, University of New Mexico, Albuquerque, NM, 7/15. Hancock DI. Modeling calcium-mediated calcium release as a Markov process. (*poster*)
- **Society for Mathematical Biology**, Atlanta, GA, 6/15. Hancock DI and Smith RD. (*attendees*)
- **Botany 2015, Molecular Ecology and Evolution**, Washington, DC, 11/14. Edger P, Smith RD, Vallejo-Marin M, Cooley A, Platts A, Childs K, Pires JC, Smith GD, Puzey J. Genomic consequences of hybridization and allopolyploidization in British monkeyflower. Abstract ID: 1097. (*speaker*)

Here we use allopolyploid species in the *Mimulus* genus (including a 140-generation-old neo-allopolyploid), as models to understand how genome structure, specifically transposon class and local transposon density, explain homeolog specific expression differences. Young allopolyploid lineages face the unique challenge of organizing two genomes, contributed by different parent species, evolved in separate contexts, now forced to share a most intimate environment—a nucleus. In the wake of allopolyploidy, homeologous genes (homologous genes derived from different parental subgenomes) are often expressed at non-equal levels. Typically, genome-wide patterns of homeolog expression bias are highly skewed—one parental genome (subgenome) is expressed at higher levels than the other. It is unknown how homeologs become biased over another. More broadly, it is also unknown how one subgenome becomes biasedly expressed as a whole over the other subgenome. A mechanistic understanding of these phenomena is fundamental to understanding allopolyploid gene expression, subgenome fractionation, and allopolyploid evolution.

- **Biomath Journal Club / Seminar**, The College of William & Mary, Williamsburg, VA, 3/15. Hancock DI, Smith GD. *Decoding calcium signaling across the nucleus*. Oliveira AG et al. *Physiology*, 29(5):361-368, 2014. (*speaker*)

Within the nucleus, calcium elevations influence cellular events that are distinct from those regulated by cytosolic calcium (Oliveira et al. 2014). The nuclear envelope and nucleoplasmic reticulum express a large number of molecules in the “calcium signaling toolkit,” including inositol trisphosphate (IP3) receptors (IP3Rs), ryanodine receptors (RyRs), two pore channels (TPCs), transient receptor potential channels (TRP), IP3 kinase isoform B (IP3KB), and the sarco-endoplasmic reticulum calcium ATPase (SERCA pump). Nuclear calcium signals can result from passive diffusion from the cytosol to the nucleoplasm, but there is ample evidence that the nucleus can also exhibit autonomous nucleoplasmic calcium transients. We will review the molecular components relevant to nuclear calcium signaling, focusing on geometric relationships and, in particular, evidence for spatially localized nuclear calcium signaling. We will discuss the merits of a research project that extends the biophysical theory of cytosolic calcium microdomains to the nucleoplasmic context. The Smith lab is well-positioned to perform such an investigation, and perhaps this should be a priority, because localized nuclear calcium signals probably play a role in the regulation of transcription factors and gene expression.

- **Biomath Journal Club / Seminar**, The College of William & Mary, Williamsburg, VA, 3/15. Smith RD, Smith GD, Puzey J. *The effect of local transposon density on homeolog specific expression differences in allopolyploid monkey-flower*. (*speaker*)

Allopolyploids form by hybridization of two species coupled with whole genome duplication. Young allopolyploid lineages face the unique challenge of organizing two genomes contributed by different parent species that evolved in separate contexts. In the wake of allopolyploidy, homeologous genes (homologous genes derived from different parental subgenomes) are often expressed at non-equal levels. Typically, genome-wide patterns of homeolog expression bias are highly skewed one parental genome (subgenome) is expressed at higher levels than the other.

Here we use allopolyploid species in the *Mimulus* genus as models to understand how genome structure, specifically transposon class and local transposon density, explain homeolog specific expression differences. A mechanistic understanding of these phenomena is fundamental to understanding allopolyploid gene expression and evolution, subgenome fractionation and genomic dynamics subsequent to whole genome duplication, an important factor in the evolutionary histories of plants, fungi and vertebrates.

- **EXTREEMS-QED Seminar**, Department of Mathematics, The College of William & Mary, Williamsburg, VA, 3/15. Smith GD. *Conway's Orbifold Notation....* (*speaker*)
- **Biomath Journal Club / Seminar**, The College of William & Mary, Williamsburg, VA, 2/15. Smith GD. *Conway's Orbifold Notation for the 17 Symmetry Types of Repeating Planar Patterns.* (*speaker*)
An introduction to the 17 symmetry types for repeating patterns in the plane (a.k.a., the plane crystallographic groups) and Conway's "orbifold notation" that draws on work of William Thurston and Macbeath. References: The orbifold notation for two-dimensional groups. Conway JH, Huson DH. *Structural Chemistry* 13:(3-4)247-257, 2002. Conway JH, Burgiel H, Goodman-Strauss C. *The Symmetries of Things*. A K Peters/CRC Press, 2008.
- **Williamsburg Montessori School**, Williamsburg, VA, 2/15. Smith GD. *Orbifolds: The Symmetries of Repeating Patterns.* (*guest instructor, 3 × 1 hr.*)
- **Society for Neuroscience Annual Meeting**, Washington, DC, 11/14. Smith GD, Weinberg SH. Calcium buffers do not suppress (but may enhance) intrinsic free calcium concentration fluctuations in calcium microdomains. Program No. 684.01 (*poster*)
- **Society for Neuroscience Annual Meeting**, Washington, DC, 11/14. Wang X, Hardcastle K*, Weinberg SH, Smith GD. A population density and moment-based approach to modeling domain calcium-mediated inactivation of L-type calcium channels. Program No. 212.06 (*poster*)
- **Biomath Seminar**, Virginia Commonwealth University, Richmond VA, 10/14. Smith GD. Modeling the stochastic dynamics of localized calcium elevations and whole cell calcium responses. (*invited speaker*)
- **Biomath Journal Club / Seminar**, The College of William & Mary, Williamsburg, VA, 9/14. Smith GD. (*presenter*) Chalancon G, Ravarani CN, Balaji S, Martinez-Arias A, Aravind L, Jothi R, Babu MM. Interplay between gene expression noise and regulatory network architecture. *Trends Genet.* 28(5):221-32, 2012.
- **EXTREEMS-QED summer program**, The College of William & Mary, Williamsburg, VA, 6/14. Smith GD. (*instructor, 2 × 2 hrs.*) Tutorial on Matlab and data analysis.
- **2014 Frontiers in Applied and Computational Mathematics (FACM)**, New Jersey Institute of Technology, Newark NJ, 5/14. Smith GD. Modeling the bidirectional coupling of localized calcium elevations and whole cell calcium responses. (*invited speaker*)
- **Biomath Journal Club / Seminar**, The College of William & Mary, Williamsburg, VA, 4/14. Smith GD. (*presenter*) Advantages and limitations of current network inference methods. De Smet R, Marchal K. *Nat Rev Microbiol.* 8(10):717-29, 2010.
- **2014 Student Capstone Conference, Virginia Modeling, Analysis and Simulation Center (VMASC)**, Old Dominion University, Suffolk, VA, 2/13. Wang X, Weinberg SH, Hao Y, Sobie EA,

Smith GD. Calcium homeostasis in a local/global whole cell model of permeabilized ventricular myocytes with a Langevin description of stochastic calcium release (*speaker*)

- **Nonlinear dynamics and stochastic methods: from neuroscience to other biological applications**, University of Pittsburgh, Pittsburgh, PA, 3/14. (*attendee*)
- **Krasnow Institute for Advanced Study Seminar**, George Mason University, Fairfax, VA, 10/13. Smith GD. Modeling the bidirectional coupling of localized calcium elevations and whole cell calcium responses. (*invited speaker*)
- **2013 Cardiac Physiome Workshop**, Bar Harbor, ME, 10/13. Sponsored by the Virtual Physiological Rat Project, a National Center for Systems Biology. Smith GD. Modeling the bidirectional coupling of localized calcium elevations and whole cell calcium responses. (*invited speaker*)
- **Biomedical Engineering Society (BMES) Annual Meeting**, Seattle, WA, 9/13. Weinberg SH, Smith GD. Fluctuations in calcium concentration influence calcium spark dynamics in cardiac myocytes. (*poster*)
- **Biomath Journal Club / Seminar**, The College of William & Mary, Williamsburg, VA, 9/13. Smith GD. (*summarized* 4 papers) Computational methods for transcriptome annotation and quantification using RNA-seq. Garber M, Grabherr MG, Guttman M, Trapnell C. *Nat Methods* 8(6):469–77, 2011. RNA-Seq: a revolutionary tool for transcriptomics. Wang Z, Gerstein M, Snyder M. *Nat Rev Genet.* 10(1):57–63, 2009. Differential expression analysis for sequence count data. Anders S, Huber W. *Genome Biol.* 11(10):R106, 2010. NPEBseq: nonparametric empirical bayesian-based procedure for differential expression analysis of RNA-seq data. Bi Y, Davuluri RV. *BMC Bioinformatics* 14:262, 2013.
- **Society for Mathematical Biology, Minisymposium: Modeling ionic flows in biological cells**, Tempe, AZ, 6/13. Weinberg SH, Smith GD. Influence of calcium concentration fluctuations on the dynamics of calcium-regulated calcium channels. (*speaker*)
- **Mathematical Biosciences Institute Workshop 5: Cellular and Subcellular**, Columbus, OH, 4/13. Smith GD. Modeling the bidirectional coupling of localized calcium elevations and whole cell calcium responses. (*invited speaker*)
- **Computational Cell Biology: The interplay between models and experimentation**, Cold Spring Harbor, NY, 3/13. Weinberg SH, Smith GD. Influence of calcium buffers on concentration fluctuations and stochastic dynamics of calcium-triggered calcium release. (*speaker*)
- **Biophysical Society Annual Meeting**, Philadelphia, PA, 2/13. Hardcastle H*, Weinberg SH, Smith GD. A population density domain model for calcium-inactivation of L-type calcium channels. 2354-Pos. (*poster*)
- **Biophysical Society Annual Meeting**, Philadelphia, PA, 2/13. Wang X, Hao Y, Weinberg SH, Sobie EA, Smith GD. Analysis of spark versus non-spark mediated SR calcium leak using a Langevin description of stochastic calcium release. 2246-Pos. (*poster*)
- **Biophysical Society Annual Meeting**, Philadelphia, PA, 2/13. Weinberg SH, Smith GD. Calcium concentration fluctuations and subspace volume influence calcium-regulated calcium channel gating and subspace dynamics. 1881-Plat (*platform presentation*)
- **Society for Neuroscience Annual Meeting**, New Orleans, LA, 10/12. Hardcastle K*, Smith GD, Burk JA. A population activity model of cortico-striatal circuitry underlying behavioral inhibition in rats. Program No. 711.03 (*poster*)
- **Biomath Journal Club / Seminar**, The College of William & Mary, Williamsburg, VA, 9/12. Smith GD. (*presenter*) Subcellular calcium dynamics in a whole-cell model of an atrial myocyte. Thul R, Coombes S, Roderick HL, Bootman MD. *Proc Natl Acad Sci USA* 109(6):2150–5, 2012.

- **Federation of American Societies for Experimental Biology (FASEB) Science Research Conference: Calcium and Cell Function**, Snowmass Village, CO. 6/12. Smith GD, Zwartz G, Espinoza F, Byars J, Lidke K, McKinstry S*, Wilson BS. Spatial dynamics of Orail diffusion, Stim1 coupling and Ca²⁺ transport in FcεRI-stimulated mast cells. (*poster, selected for contributed talk*)
- **The New Mexico Center for the Spatiotemporal Modeling of Cell Signaling**, University of New Mexico School of Medicine, Albuquerque, NM, 5/12. Smith GD, Zwartz G, Espinoza F, Byars J, Lidke K, McKinstry S*, Wilson BS. Spatial dynamics of Orail diffusion... (*invited speaker*)
- **Cold Spring Harbor Laboratory Meeting on Computational Cell Biology**, Cold Spring Harbor, NY, 3/12. Morohashi K, Pomeranz M, Smith GD and Grotewold E. An incoherent feed forward loop defines discrete expression patterns during early *Arabidopsis thaliana* trichome development. (*poster*)
- **Society for Neuroscience Annual Meeting**, Washington, DC, 11/11. Hardcastle K*, Smith GD, Burk JA. A population activity model of cortico-striatal circuitry underlying behavioral inhibition in rats. (*poster*)
- **The New Mexico Center for the Spatiotemporal Modeling of Cell Signaling**, University of New Mexico School of Medicine, Albuquerque, NM, 10/11. Smith GD Modeling the stochastic dynamics of localized Ca²⁺ elevations and whole cell Ca²⁺ responses. (*invited speaker*)
- **2011 NHLBI-VCU World Congress on Mathematical Modeling and Computational Simulation of Cardiovascular and Cardiopulmonary Dynamics**, Williamsburg, VA, 6/11. Co-organizer of *Modeling normal and pathological calcium signaling pathways in the heart* sessions (w/ Sobie EA and Jafri MS). Modeling the bidirectional coupling between localized Ca²⁺ elevations and whole cell Ca²⁺ responses Huertas MA, Sobie EA, Györke S, and Smith GD. (*invited speaker*)
- **Biomath Journal Club / Seminar**, The College of William & Mary, Williamsburg, VA, 4/11. Smith GD. (*presenter*) Alternans and arrhythmias: from cell to heart. Weiss JN, Nivala M, Garfinkel A, Qu Z. *Circ Res.* 108(1):98–112, 2011.
- **The 2011 William & Mary Graduate Research Symposium**, Williamsburg, VA, 2/11. Hao Y and Smith GD. A Langevin description of the stochastic dynamics of calcium release sites composed of multiple intracellular channels.
- **The 2011 William & Mary Graduate Research Symposium**, Williamsburg, VA, 2/11. Carpenter RM, Györke S, Smith GD. Modeling the effects of calsequestrin's role in regulation of local calcium release and depletion in cardiac myocytes.
- **Cold Spring Harbor Laboratory Meeting on Computational Cell Biology**, Cold Spring Harbor, NY, 4/11. Tuan HTM, Williams GSB, Smith GD, Jafri MS. A GPU-enabled ultrafast Monte Carlo simulation algorithm applied to the molecular events of calcium signaling in the heart.
- **Information Theory Workshop: Short Course on Model Selection and Multimodal Inference**. Instructor: Anderson D. Organizers: Lipcius R and Ralph G. Williamsburg, VA, 1/11. (*attendee*)
- **AMS-SIAM Special Session on Applications of Stochastic Processes in Neuroscience**, Joint Mathematics Meetings, New Orleans, LA, 1/11. Organizers: Thomas P, Josic K, and Chow CC. Modeling the stochastic dynamics of localized Ca²⁺ elevations and whole cell Ca²⁺ responses (1067-92-48). Huertas MA and Smith GD. (*invited speaker*)
- **Krasnow Institute for Advanced Study Seminar**, George Mason University, Fairfax, VA, 12/10. (*invited speaker*)
- **Mathematical Biology Seminar**, Department of Mathematics, Virginia Commonwealth University, Richmond, VA, 11/10. (*invited speaker*)

- **AMS Southeastern Sectional Meeting**, Special Session on Differential Equations and Applications to Physics and Biology, Richmond, VA, 11/10. Hao Y and Smith GD. A Langevin description of the stochastic dynamics of calcium release sites composed of multiple intracellular channels. (*invited speaker*)
- **Biomath Journal Club / Seminar**, The College of William & Mary, Williamsburg, VA, 9/10. Smith GD. (*presenter*) Biological systems theory. Gunawardena J. *Science* 328(5978):581–2, 2010. Structural sources of robustness in biochemical reaction networks. Shinar G, Feinberg M. *Science* 327(5971):1389–91, 2010.
- **SIAM Conference on the Life Sciences**, Pittsburgh, PA, 7/10. Huertas MA, Williams GSB, Sobie EA, Jafri MS, Györke S, Smith GD. Stochastic dynamics of local and global Ca^{2+} responses in cardiac myocytes. (*speaker*)
- **Ohio Collaborative Conference on Bioinformatics**, Columbus, OH, 6/10. Siegel-Gaskins D, Smith GD, and Grotewold E. Identification of novel genetic switch topologies in a large class of biochemical networks
- **Mathematical Biosciences Institute Postdoc Seminar**, Columbus, OH, 4/10. Siegel-Gaskins D, Grotewold E, and Smith GD. Emergence of switch-like behavior in a large family of simple biochemical networks.
- **Biomath Journal Club / Seminar**, The College of William & Mary, Williamsburg, VA, 9/10. Smith GD. (*presenter*) Reduction methods for compositionally-defined continuous time Markov chains.
- **Biophysical Society Annual Meeting**, San Francisco, CA, 2/10. Hartman JM*, Sobie EA, Smith GD. Calcium sparks and homeostasis in a minimal model of local and global calcium responses in quiescent ventricular myocytes. 552-Pos. (*poster*)
- **Biophysical Society Annual Meeting**, San Francisco, CA, 2/10. Hao Y, Kemper P, Smith GD. Automated reduction of calcium release site models via state aggregation. 551-Pos. (*poster*)
- **Biophysical Society Annual Meeting**, San Francisco, CA, 2/10. Carpenter RM, Györke S, Smith GD. Modeling the effect of genetic manipulation of calsequestrin on local Ca^{2+} release and depletion in cardiac myocytes. 548-Pos. (*poster*)
- **Biophysical Society Annual Meeting**, San Francisco, CA, 2/10. Williams GSB, Chikando A, Smith GD, Jafri MS. A technique to accelerate stochastic Markov chain Monte Carlo simulation of calcium-induced calcium release in cardiac myocytes. 1541-Pos. (*poster*)
- **Society for Neuroscience Annual Meeting**, Chicago, IL, 12/09. Kaplan C*, Smith GD, Burk JA. Computational modeling of attention task performance decrements induced by M1 receptor blockade or PKC inhibition in rats. Program No. 873.22 (*poster*)
- **Biomath Journal Club / Seminar**, The College of William & Mary, Williamsburg, VA, 9/09. Smith GD. (*presenter*) Defining network topologies that can achieve biochemical adaptation. Ma W, Trusina A, El-Samad H, Lim WA, Tang C. *Cell* 138(4):760–73, 2009.
- **International Conference on Mathematical Biology and Annual Meeting of The Society for Mathematical Biology**, University of British Columbia, Vancouver, 7/09. Hartman JM* and Smith GD. Calcium sparks and calcium homeostasis in a hybrid model of local and global calcium responses. (*speaker*)
- **GMU-WM Computational Science Training for Undergraduates in the Mathematical Sciences (CSUMS) Spring Workshop**. Williamsburg, VA. 3/09. (*participant*)
- **Biophysical Society Annual Meeting**, Boston, MA, 3/09. Huertas MA, Smith GD, and Györke S. Analysis of calcium alternans in a cardiac myocyte model that uses moment equations to represent heterogenous junctional SR calcium. (*poster*)

- **Biophysical Society Annual Meeting**, Boston, MA, 3/09. Williams GSB, Huertas MA, Sobie EA, Smith GD, and Jafri MS. A local control model for cardiac excitation-contraction coupling in rat ventricular myocytes: Insights into dynamic phenomena involving calcium release. (*poster*)
- **Biophysical Society Annual Meeting**, Boston, MA, 3/09. DeRemigio H, Kemper P, LaMar MD, and Smith GD. Markov chain models of coupled intracellular calcium channels: Kronecker structured representations and benchmark stationary distribution calculations. (*poster*)
- **Annual Meeting of Taiwanese Mathematics Society**, National Tsing Hua University, Hsinchu City, Taiwan, 12/08. (*invited speaker*)
- **Mathematics Department Seminar**, National Chung Cheng University, Chia Yi, Taiwan, 12/08. (*invited speaker*)
- **Biology Department Seminar**, National Chung Cheng University, Chia Yi, Taiwan, 12/08. (*invited speaker*)
- **International Workshop on Mathematical Biology: Modeling and Analysis**, Department of Mathematics, National Taiwan Normal University, Taipei, Taiwan, 12/08. (*invited speaker*)
- Mathematical Biology Institute Focus Group Meeting, **Mathematical and Computational Models in Biological Networks**, Ohio State University. 10/08. (*attendee*)
- **Dynamical Systems in Physiological Modeling**, Purdue University, West Lafayette, IN. 10/08. (*invited speaker*)
- **Gordon Conference on Theoretical Biology and Biomathematics**, Il Ciocco, Lucca (Barga), Italy, 6/08. (*co-vice chair and session chair*)
- **Frontiers in Applied and Computational Mathematics**, New Jersey Institute of Technology. 5/08. (*invited speaker*)
- **AMS Southeastern Sectional Meeting**, Special Session on Mathematical Modeling in Biology, Baton Rouge, LA, 3/08. DeRemigio H, Kemper P, LaMar MD, and Smith GD. Markov chain models of calcium release sites: Kronecker representations with exact and approximate solution methods. (*speaker*)
- **Quantitative Biology Institute Seminar**, Ohio University, Athens, OH. 2/08. (*invited speaker*)
- **Biophysical Society Annual Meeting**, Long Beach, CA, 2/08. Huertas MA, Williams GSB, Sobie EA, Jafri MS, and Smith GD. A moment closure approach to modeling local control models of Ca^{2+} -induced Ca^{2+} release in cardiac myocytes. 494-Pos. (*poster*)
- **Pacific Symposium on Biocomputing**, The Big Island of Hawaii, 1/08. DeRemigio H, Kemper P, LaMar MD, and Smith GD. Markov chain models of coupled intracellular calcium channels: Kronecker structured representations and benchmark stationary distribution calculations. (*speaker*)
- **Mathematical Biology Institute Seminar**, Modeling local control of calcium-induced calcium release in cardiac myocytes, Ohio State University. 12/07. (*invited speaker*)
- Mathematical Biology Institute Workshop, **Information Processing in the Visual System**, organized by Paul Bressloff and Alessandra Angelucci, Ohio State University. 4/07. (*invited speaker*)
- DeRemigio H and Smith GD. The spatial organization of Ca^{2+} release sites and the dynamics of puffs and sparks. Mathematical Biology Institute Workshop, **Workshop for Young Researchers in Mathematical Biology**, Ohio State University. 3/07. (*poster*)
- Groff JR and Smith GD. A computational investigation of the effects of allosteric coupling between ryanodine receptors on the dynamics of calcium sparks. Mathematical Biology Institute Workshop, **Workshop for Young Researchers in Mathematical Biology**, Ohio State University. 3/07. (*poster*)

- **Cold Spring Harbor Laboratory Meeting on Computational Cell Biology**, Cold Spring Harbor, NY, 3/07. Smith GD. A probability density approach to modeling local control of calcium-induced calcium release in cardiac myocytes. (*speaker*)
- **Biophysical Society Annual Meeting**, Baltimore, MD, 3/07. Huertas MA and Smith GD. Moment closure approximations for a new class of whole cell models of Ca^{2+} handling representing heterogeneous domain Ca^{2+} concentrations. 1210-Pos. (*poster*)
- **Biophysical Society Annual Meeting**, Baltimore, MD, 3/07. DeRemigio H and Smith GD. The spatial organization of Ca^{2+} release sites and the dynamics of puffs and sparks. 1211-Pos. (*poster*)
- **Biophysical Society Annual Meeting**, Baltimore, MD, 3/07. Williams GSB, Huertas MA, Sobie EA, Jafri MS, and Smith GD. A probability density approach to modeling local control of calcium-induced calcium release in cardiac myocytes. 1212-Pos. (*poster*)
- **Biophysical Society Annual Meeting**, Baltimore, MD, 3/07. Groff JR and Smith GD. A computational investigation of the effects of allosteric coupling between ryanodine receptors on the dynamics of calcium sparks. 1219-Pos. (*poster*)
- **Society for Neuroscience Annual Meeting**, Atlanta, GA, 10/06. Huertas MA and Smith GD. A multivariate population density model of the dLGN/PGN relay. (*poster*)
- Mathematical Biology Institute Workshop, **Cardiac Electrophysiology and Arrhythmia**, organized by Jim Keener and Rai Winslow, Ohio State University. 9/06. (*invited speaker*)
- **Bioinformatics and Computational Biology Colloquium**, Department of Bioinformatics and Computational Biology, George Mason University, Manassas, VA, 9/06. (*invited speaker*)
- **Joint SIAM-SMB Conference on the Life Sciences**, Raleigh, NC, 7/06.
 Minisymposium: Stochastic aspects of Ca^{2+} signaling. (*invited organizer*)
 Stochastic gating of instantaneously coupled Ca^{2+} -regulated Ca^{2+} channels. (*speaker*)
Williams GSB, Huertas MA, and Smith GD. Probability Density Approaches to Modeling Local and Global Intracellular Calcium Dynamics. (*poster*)
Huertas H and Smith GD. The effect of luminal depletion on the dynamics of Ca^{2+} -regulated Ca^{2+} channels. (*speaker*)
Mazzag B, Tignanelli C*, and Smith GD. Analysis of the effect of residual calcium on the gating of Ca^{2+} -regulated Ca^{2+} channels. (*speaker*)
- **Gordon Conference on Theoretical Biology and Biomathematics**, Tilton, NH, 6/06. (*invited speaker*)
- **Workshop on Molecular Evolution**, Marine Biological Laboratory, Woods Hole, MA, 6/06. (*participant*)
- **Mathematical Modeling of Cellular Calcium Signals Meeting**, School of Mathematical Sciences, University of Nottingham, UK, 4/06. (*invited speaker*)
- **Computational Biology Seminar**, Department of Applied Mathematics, Oxford University, UK, 4/06. (*invited speaker*)
- **Center for Cardiovascular Bioinformatics and Modeling Seminar**, Department of Biomedical Engineering and Institute for Computational Medicine, Johns Hopkins University, Baltimore, MD, 4/06. (*invited speaker*)
- **Biophysical Society Annual Meeting**, Salt Lake City, UT, 2/06. Williams GSB, Huertas MA, Sobie EA, Jafri MS, and Smith GD. A probability density model of stochastic functional unit activity in cardiac myocytes. 1079-Pos. (*poster*)

- **Biophysical Society Annual Meeting**, Salt Lake City, UT, 2/06. Williams GSB and Smith GD. A probability density approach to modeling local and global Ca^{2+} dynamics in cells with diffusely distributed intracellular Ca^{2+} channels. 1077-Pos. (*poster*)
- **Biophysical Society Annual Meeting**, Salt Lake City, UT, 2/06. DeRemigio H and Smith GD. The dynamics of stochastic attrition viewed as an absorption time on a terminating Markov chain. 1076-Pos. (*poster*)
- **Biophysical Society Annual Meeting**, Salt Lake City, UT, 2/06. Huertas MA and Smith GD. The effect of luminal depletion on the dynamics of Ca^{2+} -regulated Ca^{2+} channels. 1078-Pos. (*poster*)
- **Mathematics Department Seminar**, University of Pittsburgh, Department of Mathematics, Pittsburgh, PA, 12/05. (*invited speaker*)
- **Society for Neuroscience Annual Meeting**, Washington, DC, 11/05. Huertas MA and Smith GD. The response of a two-dimensional population density model of the lateral geniculate nucleus/perigeniculate nucleus network to optic tract stimulation. Program No. 688.15 (*poster*)
- **Society for Neuroscience Annual Meeting**, Washington, DC, 11/05. Groff JR and Smith GD. The effect of interneuron feed-forward inhibition on detectability and stimulus reconstruction using stochastic thalamocortical relay cell model responses. Program No. 506.12 (*poster*)
- **Fourteenth Annual Computational Neuroscience Meeting**, Madison, WI, 7/05. Huertas MA and Smith GD. A two-dimensional probability density approach to modeling the dLGN/PGN network. (*poster*).
- **Fourteenth Annual Computational Neuroscience Meeting**, Madison, WI, 7/05. Groff JR and Smith GD. Effect of interneuron feedforward inhibition via the F2 terminal on retinogeniculate transmission. (*poster*).
- **SIAM Conference on Applications of Dynamical Systems**, “New twists on solitary waves in excitable media” minisymposium, Snowbird UT, 5/05. Ca^{2+} diffusion, dynamics, and domains. (*speaker*)
- **SIAM Conference on Applications of Dynamical Systems**, Snowbird UT, 5/05. Mazzag B, Tiganelli C*, and Smith GD. Analysis of the effect of residual Ca^{2+} on the gating of Ca^{2+} -regulated Ca^{2+} channels. (*poster*)
- **Third Symposium on Computational Cell Biology**, Lenox, MA. 3/05. Mazzag B, Tiganelli C*, Smith GD. Analysis of the effect of residual Ca^{2+} on the gating of Ca^{2+} -regulated Ca^{2+} channels. (*poster*)
- **Third Symposium on Computational Cell Biology**, Lenox, MA. 3/05. Means SA, Mazel T, Smith AJ, Shadid J, Smith GD, and Wilson BS. Reaction-diffusion modeling of endoplasmic reticulum calcium dynamics with realistic geometry: effects of IP_3R Ca^{2+} channel clustering. (*poster*)
- **Mathematical Biology Seminar**, University of Utah, Department of Mathematics, Salt Lake City, UT, 9/04. Mazzag B, Tiganelli C*, and Smith GD. The feedback of a localized calcium domain on calcium-gated channels. (*invited speaker*)
- **Cortical Function: A View from the Thalamus**, A discussion meeting to celebrate the career of RW Guillery organized by VA Cassagrande and SM Sherman. Madison, WI. 9/04. (*attendee*)
- **Mathematical Biology Seminar**, University of Utah, Department of Mathematics, Salt Lake City, UT, 9/04. A Stochastic Automaton Network Descriptor ... (*invited speaker*)
- International Conference for Mathematics in Biology and Medicine, **Annual Meeting for the Society for Mathematical Biology**, Ann Arbor, MI. 7/04. Mazzag B, Tiganelli C*, Smith GD. Analysis of the effect of residual Ca^{2+} on the gating of Ca^{2+} -regulated Ca^{2+} channels. (*poster*).

- **Thirteenth Annual Computational Neuroscience Meeting**, Baltimore, MD, 8/04. Huertas MA, Groff JR, Smith GD. The effect of feedback inhibition in network simulations of retinogeniculate transmission. (*poster*).
- **CNS 04 Workshop: Cellular and sub-cellular models of excitable cells**, Baltimore, MD, 8/04. Stochastic automata network models of instantaneously-coupled intracellular Ca^{2+} channels. (*invited speaker*).
- **Laboratory of Biological Modeling, NIDDK, NIH**, Bethesda, MD, 6/04. Stochastic automata network models of instantaneously-coupled intracellular Ca^{2+} channels. (*invited speaker*)
- **Biophysical Society Annual Meeting**, Baltimore, MD, 2/04. Zhang J, Nguyen VD*, Smith GD. Direct calculation of puff statistics from stochastic automata network models of instantaneously-coupled intracellular Ca^{2+} channels. Program No. 578 (*poster*)
- **Biophysical Society Annual Meeting**, Baltimore, MD, 2/04. Mazzag B, Tignanelli C*, Smith GD. Analysis of the effect of residual Ca^{2+} on the gating of Ca^{2+} -regulated Ca^{2+} channels. Program No. 579 (*poster*)
- Mathematical Biology Institute Workshop, **Signal Transduction I: The many roles of Ca^{2+}** , Ohio State University. 1/04. (*invited speaker*)
- **The 11th Annual Dynamical Neuroscience Satellite Symposium**, Neuronal Variability and Noise, New Orleans, LA. 11/03. (*attendee*)
- **Society for Neuroscience Annual Meeting**, New Orleans, LA, 11/03. Huertas MA, Groff JR, Smith GD. The effect of feedback inhibition in network simulations of retinogeniculate transmission. Program No. 68.12 (*poster*)
- **SIAM Conference on Applied Linear Algebra**, College of William and Mary, 7/03. (*attendee*)
- Mathematical Biology Institute Workshop, **Nonlocal Integro-Differential Equations in Mathematics and Biology**, Ohio State University. 3/03. (*attendee*)
- **NSF-NIH Joint Math Symposium: Accelerating Mathematical-Biological Linkages**, National Institutes of Health, Bethesda, MD. 2/03. (*attendee*)
- **W&M/VBI/INCOGEN CTRF Bioinformatics Workshop II**, Virginia Bioinformatics Institute, 12/02. Bridging the divide between mathematical modelers and experimental biologists. (*panelist*)
- **Experimental Biology Conference**, New Orleans, LA, 4/02. Wilson SM, Mason HS, Smith GD, Nicholson N, Johnston L, Janiak R, and Hume JR. Activation of capacitative Ca^{2+} entry in canine pulmonary and renal arterial smooth muscle cells. *FASEB J.* 16:870.2, 2002. (*platform presentation*)
- **Biophysical Society Annual Meeting**, San Francisco, CA, 2/02. Wilson SM, Smith GD, Johnston L, and Hume JR. Activation of capacitative Ca^{2+} entry in pulmonary arterial smooth muscle cells. *Biophys. J.* 82(1):651A, 2002. (*poster*)
- **Biophysical Society Annual Meeting**, San Francisco, CA, 2/02. Smith GD, Dai L, Muira R, Sherman A. Asymptotic analysis of buffered Ca^{2+} diffusion near a point source. *Biophys. J.* 82(1):282A, 2002. (*poster*)
- **Society for Neuroscience Annual Meeting**, San Diego, CA, 11/01. Smith GD and Sherman SM. Detectability of excitatory versus inhibitory drive in a stochastic thalamocortical relay neuron model. *Soc. Neurosci. Abstr.*, Vol. 27, Program No. 723.21, 2001. (*poster*)
- **Society for Neuroscience Annual Meeting**, San Diego, CA, 11/01. Williams JC, Smith GD, Vetter RJ, and Kipke DR. Correlation analysis of electrical interface properties of chronic neural implants. *Soc. Neurosci. Abstr.*, Vol. 27, Program No. 166.1, 2001. (*poster*)

- **Fourth International Workshop on Signal Transduction in the Activation and Development of Mast Cells and Basophils**, Bethesda, MD, 11/01. (*attendee*)
- **VIMS/W&M/VCU Collaborative Research Meeting**, Virginia Biotech Research Park, Richmond, VA, 8/01. (*invited speaker*)
- **Seminar**, Catholic University of America, Department of Bioengineering, Washington, DC, 4/01. Fourier analysis... (*invited speaker*)
- **Seminar**, Georgetown University, Department of Mathematics, Washington, DC, 3/01. Asymptotic analysis... (*invited speaker*)
- **Neuroscience Seminar**, Georgetown University Medical Center, Department of Neuroscience Washington, DC, 3/01. Fourier analysis... (*invited speaker*)
- **Defense Advanced Research Projects Agency BioFutures Kickoff**, Washington, DC, 11/00. Mathematical models of cortical stimulation, recording, impedance spectra and a microcapillary bioreactor cell culture. (*poster*)
- **Gordon Research Conference on Theoretical Biology and Biomathematics**, Tilton, NH, 6/00. Asymptotic analysis... (*invited speaker*)
- **Special Seminar**, Institute for Theoretical Dynamics, Davis, CA, 5/00. Asymptotic analysis... (*invited speaker*)
- **Workshop On Nonlinear Dynamics of Calcium in Living Organisms**, Santa Fe, NM, 3/00. Asymptotic analysis... (*invited speaker*)
- **Society for Neuroscience Annual Meeting**, Miami Beach, FL, 10/99. Smith GD, Cox CL, Sherman SM, and Rinzel J. Spike-frequency adaptation... *Soc. Neurosci. Abstr.*, Vol. 25, Program No. 573.15, 1999. (*poster*)
- **Nonlinear Dynamics in Biology and Chemistry, A Symposium to Honor Joel E. Keizer and His Three Decades in Science**, Davis, CA, 9/99. Asymptotic analysis... (*speaker*)
- **Computational Cell Biology Workshop, Biophysical Society Annual Meeting**, Baltimore, MD, 2/99. A simple numerical model... (*invited speaker*)
- **Society for Neuroscience Annual Meeting**, Los Angeles, CA, 11/98. Fourier analysis... Smith GD, Cox CL, Sherman SM, and Rinzel J. (*poster*)
- **Interdisciplinary Conference on Waves and Continuation Methods in Biology**, Univ. of Pittsburgh, Pittsburgh PA, 9/98. Fourier analysis... (*poster*).
- **Seventh Annual Computational Neuroscience Meeting**, Santa Barbara, CA, 7/98. Fourier analysis... (*poster*).
- **Intro. to Computational Genomics**, SIAM Short Course, Toronto, Canada, 7/98. (*student*)
- **Mini-symposium on Mathematical Modeling in Physiology**, Society for Mathematical Biology, SIAM Annual Meeting, Toronto, Canada, 7/98. Fourier analysis... (*speaker*)
- **Workshop on Neural Modeling of Brain and Cognitive Disorders**, University of Maryland, 6/98.
- **Calcium Dynamics in Cells**, Workshop Six of the Institute for Mathematics and its Applications Annual Program in "Emerging Applications of Dynamic Systems," University of Minnesota, 2/98. A simple numerical model... (*speaker*)

- **Computational Neuroscience**, Workshop Five of the Institute for Mathematics and its Applications Annual Program in “Emerging Applications of Dynamic Systems,” University of Minnesota, 1/98.
- **Society for Neuroscience Annual Meeting**, New Orleans, LA, 10/97.
- **Sixth Annual Computational Neuroscience Meeting**, Big Sky, MT, 7/97.
- **Ca²⁺ Fertilization Wave Workshop**, South Lake Tahoe, CA, 4/97. Calculations of local Ca²⁺ elevations and the spark-to-wave transition in cardiac myocytes. (*speaker*)
- **Methods in Computational Neuroscience Course**, Marine Biological Laboratory, Woods Hole, MA, 8/96. (*student*)
- **Minisymposium on Ca²⁺ Oscillations and Waves, Special Year in Mathematical Biology**, University of Utah, Salt Lake City, UT, 3/96. Calculations of puffs and sparks. (*speaker*)
- **Workshop on Nonlinear Dynamics of Networks of Neurons**, Scripps Institution of Oceanography, UCSD, San Diego, CA, 12/95.
- **International Conference on Receptor Regulated Ca²⁺ Influx**, Asilomar Conference Center, Pacific Grove, CA, 5/95. The effect of Ca²⁺ influx... Smith GD, Lee RJ, Oliver JM, and Keizer J. (*poster*)
- **Biophysical Society Annual Meeting**, San Francisco, CA, 2/95. Validity of the rapid buffering approximation... Smith GD, Wagner J, and Keizer J. (*poster*)
- **Mechanisms of Ca²⁺ Oscillations and Waves**, Marconi Conference Center, Marshall, CA, 12/93.
- **CRM-UBC Summer School on Mathematical Biology**, University of British Columbia, Vancouver, BC, Canada, 7/93. (*student*)

GRADUATE AND POST-DOCTORAL TRAINING

Research Associates Supported and Supervised

- **Seth Weinberg**, Ph.D. Spring 2012–Spring 2014. Seth received his doctorate in Bioengineering from Johns Hopkins. He is supported by the Dean of Arts and Sciences as part of the W&M Biomath Initiative directed by Smith. After W&M, Seth was Research Assistant Professor at the Virginia Modeling, Analysis and Simulation Center (VMASC), Old Dominion University. He is now an Assistant Professor (tenure track) in the Department of Biomedical Engineering at Virginia Commonwealth University.
- **Dan Siegel-Gaskins**, Ph.D. Spring 09–Spring 11. Dan was jointly supervised with Erich Grotewold (Dept. of Plant Cellular and Molecular Biology and Plant Biotechnology Center, OSU). Dan was supported by the Mathematical Biosciences Institute at OSU and Grotewold’s external funds. He was located primarily at OSU and visited W&M.
- **Drew LaMar**, Ph.D. Spring 07–Summer 11. Drew has been supported by the HHMI-funded postdoctoral and undergraduate biological sciences education program grant to W&M (Spring 07–Spring 2010). Previously he was supported by the Dean of Arts and Sciences as part of the W&M Biomath Initiative directed by Smith (Summer 2010–Summer 11). Drew is currently Assistant Professor of Biology at The College of William & Mary.
- **Marco Huertas**, Ph.D. Summer 03–Summer 09. In January 2007 Marco was promoted to the rank of Research Assistant Professor. In June 2007 Marco officially took leave from William and Mary as his VISA requirements demand two years residence in Guatemala, but he remained part of my research group and was continually funded via subcontract through my NSF funding, support from the Vice-Provost for Research at W&M, and NIH funding of our collaborator Sándor Györke at OSU. Marco took a post-doctoral research associate position at the Neuroscience Center for Excellence at the Louisiana

State University Health Sciences Center. He is now Research Scientist at University of Texas Medical School in the Department of Neurobiology and Anatomy.

- **Bori Mazzag**, Ph.D. Summer 03–Summer 05. Supported by NSF funding. In Fall 05 Bori accepted a tenure-track assistant professor position in the Department of Mathematics at Humboldt State University.
- **Yinshui Fan**, Ph.D. Fall 01–Spring 02. Supported by NSF funding.

Graduate Students Supported and Supervised

- **Lauren Shriver** (Spring 16–present). Lauren is a pre-qual graduate student in good standing.
- **Daniel Hancock** (Fall 14–present). Daniel is a post-qual Ph.D. student in good standing.
- **Ronald Smith** (Fall 14–present). Ron is a post-qual Ph.D. student in good standing.
- **Futa Ikeda** (Fall 13–Spring 14). Futa graduated with an M.S. and is now working at In Silico Solutions, LLC. [<http://insilico.us.com/index.html>]
- **Xiao Wang** (Fall 10–Spring 15). Xiao graduated with a Ph.D. in Applied Science.
Dissertation title: *Langevin, population density and moment-based modeling of local and global aspects of intercellular calcium signaling*. Committee: Gregory Smith*, Leah Shaw, Junping Shi, Eric Sobie.
Xiao's Bachelor's degree in Mathematics from Fudan University. Xiao served as Vice President of the Chinese students and Scholars Association of W&M (8/13–5/14). In her last year of graduate training, Xiao was a Quantitative Research Intern at Quantlab Financial, LLC, Houston, TX (6/14–8/14). Xiao is currently an Associate of Class of 2016 at Citigroup Global Markets, Inc. in New York, NY.
- **Ruth Lamprecht** (Spring 09–Spring 13). Ruth graduated with a Ph.D. in Computer Science.
Dissertation title: *Translating Spatial Problems into Lumpable Markov Chains*.
Committee: Peter Kemper*, Gregory Smith, Weizhen Mao, Evgenia Smirni, Virginia Torczon.
Ruth was supervised by Peter Kemper (Computer Science), but I was involved in her training and served on her dissertation committee. I co-authored a scientific article and a refereed conference proceeding with Ruth and Peter. My research interests motivated an additional refereed conference proceedings: Lamprecht R and Kemper P. On the Detection of Symmetries in Compositional Markov Models. 6th International Conference on the Quantitative Evaluation of Systems (QEST), September 2009.
- **Yan (Amy) Hao** (Fall 06–Spring 11). Yan graduated with a Ph.D. in Applied Science.
Dissertation title: *Automated reduction of Markov chain models of calcium release sites*.
Committee: Gregory Smith*, Peter Kemper, Larry Leemis, Leah Shaw
Yan took an post-doctoral position in the Department of Mathematics at Arizona State University. Currently she is a tenure-track assistant professor in the Mathematics Department at The Hobart and William Smith Colleges in Geneva NY.
- **Ryan Carpenter** (Spring 07–Spring 11). Ryan remains on continuous enrollment, but he was denied support based on performance beginning Summer 2011. He is an Instructor in the Department of Mathematics at Christopher Newport University (Fall 2011–present)
- **Victoria Atkins** (Fall 10–Spring 12). Female minority student Victoria Atkins was recruited by me, trained by me through her successful advance to Ph.D. candidacy, prior to the mutually agreeable decision that her aptitudes are better suited for experimental (Del Negro) as opposed to theoretical (Smith) research and scholarship.

- **Hilary DeRemigio** (Fall 03–Spring 08). Hilary graduated with a Ph.D. in Applied Science.
Dissertation title: *Markov chain models of instantaneously coupled intracellular calcium channels*.
Committee: Gregory Smith*, Leah Shaw, Peter Kemper, Eric Sobie
Since graduating Hilary DeRemigio (now Hilary DeRemigio Fletcher) has been an Assistant Professor in the Department of Mathematical Sciences at the United States Military Academy.
- **George Stuart Blair Williams** (Fall 03–Spring 08). Blair graduated with a Ph.D. in Applied Science.
Dissertation title: *Probability density methods for modeling local and global aspects of intracellular calcium signaling*. Committee: Gregory Smith*, Carey Bagdassarian, Eric Bradley, Eric Sobie
Blair took a post-doctoral research associate position at George Mason University, VA. He is now a post-doctoral fellow at Center for Biomedical Engineering and Technology, University of Maryland.
- **Jeff Groff** (Spring 03–Fall 07). Jeff graduated with a Ph.D. in Applied Science.
Dissertation title: *Markov chain models of calcium puffs and sparks*.
Committee: Gregory Smith*, Mark Hinders, Christopher Del Negro, Eric Sobie
Jeff took a visiting assistant professor in the Department of Physics at Gettysburg College, PA (07–08). Jeff is currently a tenure track assistant professor in the Institute for Environmental Studies at Shepherd University, WV, a multidisciplinary teaching and research institute that houses faculty and students in the Environmental and Physical Sciences (08–present).
- **Vivian Zhang** (Fall 02–Spring 04). Vivian graduated with an M.S. in Applied Science and entered the applied mathematics Ph.D. program at UC Davis.
- **John Hayes** (Fall 02–Spring 04). John received an M.S. in Applied Science under my direction and subsequently became a Ph.D. candidate in the Del Negro laboratory. John has graduated with a Ph.D. in Applied Science (see dissertation below) and is now a post-doctoral researcher in the Del Negro lab.
- **Chuan Wei** (Fall 02–Spring 03). Chuan graduated with an M.S. in Applied Science.

Dissertation Committee Service at W&M

- Mary A. Mohr, *Quantitative analysis of periodic breathing and very long apnea in preterm infants* (w/ John Delos*, William Cooke, Dennis Manos, Rex Kincaid, Karen Fairchild). 7/15. (*reader*).
- Shadrack A. Antwi, *Dynamic social networks with beneficial and detrimental interactions* (w/ Leah Shaw*, Rex Kincaid, Andrew Collins). 3/15. (*reader*).
- Yunhan Long, *Spread and interaction of epidemics and information on adaptive social networks* (w/ Leah Shaw*, Larry Leemis, Christopher Del Negro, Ira Schwartz). 9/14. (*reader*).
- Wei Xu, *Studies of molecular dynamics of FMOC amino acids using solid state deuteron nuclear magnetic resonance spectroscopy* (w/ Robert Vold*, Gina Hoatson, Gunter Luepke). 9/14. (*reader*).
- Krishanthi Weragalaarachchi, *Morphological study of *Dbx1*+ respiratory rhythm-generating neurons in preBotzinger complex in neonatal mice* (w/ Christopher Del Negro*, Leah Shaw, Joshua Burk). M.S. Thesis. 4/12. (*reader*).
- Shahla Nasserar, *The logarithmic method and the solution to the TP_2 -completion problem* (w/ Charles Johnson*, Gunter Luepke, Ilya Spitkovsky). 4/10. (*reader and Applied Science liaison*).
- William H. Kaczynski, *Computational applications in stochastic operations research* (w/ Lawrence Leemis*, John Drew, Christopher Del Negro, Rex Kincaid). 6/09. (*reader and Applied Science liaison*).
- John A. Hayes, *Phenotypic properties and intrinsic currents of neurons involved in the neuronal generation of mammalian breathing* (w/ Christopher Del Negro*, Margaret Saha, Patrice Guyenet). 6/07. (*reader*)

- Yuemei Zhang, *UV cure kinetics of dimethacrylate thin and thick samples* (w/ David Kranbuehl*, Christopher Del Negro, William Starnes, and Christopher Abelt). 10/06. (*reader*).
- Wen Gao. *Sonar sensor interpretation for ectogeneous robots* (w/ Mark Hinders*, Zia-ur Rahman, and Weizhen Mao). 5/05. (*reader*)
- Kevin Leonard. *Ultrasonic guided wave tomography of pipes* (w/ Mark Hinders*, Zia-ur Rahman, and Robert Welsh). 5/04. (*reader*)
- Jidong Hou. *Ultrasonic signal detection and recognition using dynamic wavelet fingerprint* (w/ Mark Hinders*, Gene Tracy, Zia-ur Rahman). 4/04. (*reader*)
- John Hayes. *A framework for implementing bioinformatics knowledge-exploration systems*. (w/ Krista Miller, Maciek Sasinowski, Michael Trosset, and Dennis Manos). 04/04. (*reader and advisor of record*)
- Thomas Milligan. *On certain sets of matrices: distance matrices, ray nonsingular matrices and matrices generated by reflections* (w/ Chi-Kwong Li*, Roy Mathias, Michael Tsatsomeros). 4/04. (*reader and Applied Science liaison*)
- George A. Andrews, Jr. *Spontaneous pulse formation in bistable systems* (w/ Gene Tracy*, Dennis Manos, Bill Cooke, and Roy Champion). 12/03. (*reader*)
- Brian Killough. *A semi-empirical cellular automata model for wildfire monitoring from a geosynchronous space platform* (w/ Mark Hinders*, Joel Levine, and Zai-ur Rahman). Fall 02–Spring 03. (*reader*)
- John E. Lynch. *Ultrasonographic measurement of periodontal attachment levels* (w/ Mark Hinders*, Erick Madaras, and Jeffrey Rogers). 6/01. (*reader*)

External Dissertation Committee Service

- Shawn Means, Mathematics, University of Auckland, *Spatio-temporal calcium dynamics of the interstitial cells of Cajal*. (advisor James Sneyd). 9/10. (*external reader*).
- Michael Sheller, Bioengineering, Arizona State University (advisors Jiping He and James Ryaby). 11/08. (*external reader*).
- Greg Lemon, School of Mathematics and Statistics, University of Sydney, *Mathematical Modeling of Some Aspects of Intracellular Second Messenger Signaling* (advisors: Bill Gibson and Max Bennett). 10/03. (*external reader*)
- Dritan Zela, Mathematics, Arizona State University, *A two-dimensional model for the horizontal-cell-to-cone feedback in the cat outer retina* (advisor: Steve Baer). 12/01. (*external reader*)

UNDERGRADUATE RESEARCH EXPERIENCES¹⁰

International Genetically Engineered Machine (iGEM) Competition

- Summer and Fall 2015: Mentored John Marken’s mathematical modeling contribution to W&M’s iGEM project “Measurement of Promoter-Based Transcriptional Noise...” (lead faculty advisor, Margaret Saha). The W&M team won the Grand Prize in the undergraduate division of the *iGEM Jamboree* held September 24–28, 2015 in Boston. More than 250 teams from five continents entered the competition, and W&M was the only North American entry among the finalists.
- Summer and Fall 2016: Co-advisor of W&M’s iGEM team. Margaret Saha is lead faculty advisor. I am the team’s primary faculty resource for quantitative and theoretical aspects of the iGEM project.

¹⁰The most significant accomplishments of undergraduate research students are listed in CONFERENCES, ABSTRACTS, AND INVITED SEMINARS (above).

Undergraduate members of the computational biology laboratory at W&M¹¹

- Daniel Borrus (17, Neuroscience): Fall 15 (informal), Spring 16 (informal).
- Levi Keatts (16, Neuroscience): Spring 16 (NSCI 400).
- Fabiana Arrazola (17, Neuroscience & Music): Spring 16 (NSCI 400).
- Prashant Saini (18, Biology w/ Computer Science minor): Spring 16 (informal).
- John Marken (17, Mathematics): John is a W&M 1693 Scholar. Fall 13, Spring 14–present.
- Lulu Xu (16, Mathematics): Summer 14 (EXTREMES)
- Jeffrey Liu (15, Biophysics): Spring 14–Spring 15. Jeffrey’s interdisciplinary concentration in biophysics was approved by Charles Center under my supervision in Spring 14. He is also doing an honors thesis.
 - Interdisciplinary studies senior thesis: *Modeling the effect of cooperative binding on ligand-driven fluctuations in metabotropic glutamate receptors*. Spring 15.
- Andrew Smith (16, Neuroscience): Fall 13 (informal).
- Eric Dove (16, Neuroscience and Mathematics double major): Spring 13 (HHMI).
- Kiah Hardcastle (14, Neuroscience and Mathematics double major)¹²: Spring 10 (HHMI), Summer 10 (HHMI), Fall 10, Spring 11, Summer 11 (Monroe), Fall 11.
 - Neuroscience senior thesis: *A population density model of domain calcium-mediated inactivation of L-type calcium channels*, Spring 13.
 - *A population-activity model of cortico-striatal circuitry underlying impulsive action selection*. Undergraduate Science Research Symposium. 2/12.
 - 2012 CSUMS Workshop, George Washington University. 4/12.
 - Kiah was selected to be an ALSAM scholar for academic year 11–12.
 - Kiah upon graduation Kiah received an Excellence in Neuroscience Award. She is currently in the Neuroscience Ph.D. program at Stanford.
- Sarah McKinstry (12, Neuroscience): Summer 11 (Biomath), Fall 11, Spring 12.
 - “Computational modeling of STIM and Orai dynamics in mast cells.” Undergraduate Science Research Symposium. 2/12.
 - Sarah is studying epidemiology and enrolled in Emory’s Masters of Public Health program.
- James Janopaul-Naylor (14, Neuroscience and Mathematics): Summer 11 (CSUMS), Fall 11, Spring 12, Fall 12.
 - “Characterizing the inspiratory rhythm with a computational model.” Undergraduate Science Research Symposium. 2/12.
 - 2013 Goldwater scholar.
 - James undergraduate research under the direction of Del Negro beginning Spring 13–present.

¹¹Abbreviations denoting funding source: Biomath, Charles Center Summer Scholarship awarded by the W&M Biomath Initiative; CSUMS, Research Program funded by Computational Science Training for Undergraduates in the Mathematical Sciences (see above); SmithNSF, REU stipends associated with my NSF funding; HHMI, Summer or Freshman Research Program funded by a Howard Hughes Medical Institute grant through the Undergraduate Biological Sciences Education Program (Saha); Monroe, The James Monroe Scholar Program. If no funding source is noted, the student may have received credit under *Research in Applied Science*. There are no doubt a few omissions or errors in tracking of REUs.

¹²Graduating class, major.

- Olivia Walch (11, Mathematics and Biophysics double major): Fall 09, Spring & Summer 10 (CSUMS), Fall 10, Spring 11.
 - Olivia’s interdisciplinary concentration in biophysics was approved by Charles Center under my supervision in Spring 10.
 - “Modeling synaptic plasticity in a thalamocortical relay neuron,” MAA Undergraduate Poster Session, Joint Mathematics Meetings, New Orleans, LA. 1/11.
 - Applied Science senior thesis: *Modeling synaptic facilitation and depression in thalamocortical relay cells*, Spring 11.
 - Olivia is enrolled in University of Michigan’s applied mathematics Ph.D. program.
- George Cortina: Fall 10.
- Joel Frohlich: Fall 10.
- Rachel Gray (12, Biology): Fall 09.
- Christian Sciacca (11, Biology): Spring 09.
- McKenzie Jump (11, Neuroscience): Spring 09, Summer 09 (HHMI), Spring 10 (APSC REU), Fall 10, Spring 11, Fall 11.
- Sarah Kim (12, Neuroscience): Spring and Fall 09, Spring 10.
- Matt Peppe (11, Math & Chemistry): Spring 09, Summer 09 & 10 (CSUMS).
 - “Assortativity in Networks of Neurons,” MAA Undergraduate Poster Session, Joint Mathematics Meetings, New Orleans, LA. 1/11.
- Claire Kaplan (09, Neuroscience): Fall 08, Spring 09 (APSC REU), Summer 10.

Claire Kaplan is a Clinical Psychology doctoral student at University of Maryland College Park. She received an NSF graduate research fellowship in Fall 2016.
- Jana Hartman (09, Physics): Summer 08 (Biomath REU), Fall 08 & Spring 09 (Physics Senior Thesis), Summer 09 (Biomath), Fall 10.
 - Physics senior thesis: *Calcium spark frequency and ER leak in a hybrid model of local and global calcium responses*, Spring 09.
- Claire Zimmeck (09, Neuroscience): Summer 08, Fall 2008 (APSC REU)
- Puja Parekh (09, Neuroscience): Fall 06.
- Andrew McGowen (08, Physics & Religious Studies): Summer 06 (Physics REU), Fall 06 (APSC REU).
- Adam Carpenter (08, Math): Summer 06 .
- Evan Molinelli (07, Physics): Fall 05 & Spring 06 (physics senior thesis), Fall 06 & Spring 07 (APSC REU).
- Greg Pelander (06, Neuroscience): Summer & Fall 05 (Math REU).
- Jyotsna (Joey) Singh (07, Biology): Spring & Summer 05.
- Rita Schneider (Fairfield University, 05): Summer 04 (Physics REU).
 - Pi Mu Epsilon National Meeting at MathFest, Providence, RI. “Monte Carlo Simulation of Instantaneously-Coupled Ryanodine Receptors.” 8/04. (*speaker*)

- Becky Ellison (03, Mathematics): Spring 03.
- Chris Tignanelli C* (05, Bioinformatics): Spring 03, Summer 03 (HHMI REU Fellowship), Fall 03, Summer 04 (Math REU), Fall 04, Spring 05.
 - Chris’ interdisciplinary concentration in bioinformatics was approved by Charles Center under my supervision in Spring 03.
 - Biophysical Society Annual Meeting, Baltimore, MD. 2/04. (*poster co-author*)
 - Undergraduate honors thesis: *The effect of residual Ca²⁺ on the stochastic gating of Ca²⁺-regulated Ca²⁺ channels*, Spring 05.
 - Co-author of a manuscript that appeared in 05 (see above).
- Paul Brewer (03, Physics): Summer 02 (Physics REU), Fall 02 & Spring 03 (physics senior thesis).
 - Mathematics of Biological Systems Summer School at University of Alberta. 3/02. (*student*)
 - Annual Computational Neuroscience Meeting in Chicago, IL. 7/02. (*attendee*)

In Fall 2008 Paul Brewer entered the Colorado State University graduate program in Ecology (laboratory of Joe von Fischer).
- Coleen Loomis (02, Mathematics): Summer 02 (Verizon Fellowship), Fall 02.
- Vien Nguyen (05, Physics): Fall 01–Fall 05.
 - Biophysical Society Annual Meeting, Baltimore, MD. 2/04. (*poster co-author*)
 - Vien is first author of a manuscript that appeared in 05.
 - Undergraduate honors thesis: *The dynamics Ca²⁺ puffs: a study of instantaneously-coupled intracellular Ca²⁺ channels*, Spring 05.
- Shannon McNulty, Fall 01.
- Danielle Thibodeau (ASU Bioengineering and Honors College), Spring 01.
- Injune Hansie Wang, (UC Berkeley, Mathematics), NIH Summer Research Experience for Undergraduates. Sponsor: Arthur Sherman. As a post-doc at MRB/NIDDK, I was Hansie’s unofficial mentor.

Service on undergraduate theses committees at W&M

- Reader for Martín Salgado-Flores (16) Honors Thesis in Mathematics, *Computing all isolated invariant sets at a finite resolution* (w/ Sarah Day*, Yu-Min Chung and Anh Ninh).
- Reader for Eileen Ablondi (16) Honors Thesis in Neuroscience, *The role of spontaneous intercellular calcium transients in neurotransmitter phenotype specification in *Xenopus laevis** (w/ Margaret Saha*, Peter Kemper, and Diane Shakes).
- Reader for Andrew Halleran (16) Honors Thesis in Computational and Applied Mathematics and Statistics, *Embryonic Response to Notch Signaling Perturbation* (w/ Margaret Saha*, Dennis Manos and Christopher Del Negro).
- Reader for Sean Chadwick (15) Honors Thesis in Psychology/Neuroscience, *Central auditory processing disorder: towards a therapeutic EEG neurofeedback brain computer interface*. (w/ Paul Kieffaber*, Christy Porter, Chris Ball).
- Reader for Rachel Hyneman (15) Honors Thesis in Physics, *Near-field effects in radio frequency emission from particle showers in a dense medium*. (w/ Patricia Vahle*, Stephanie Wissel*).

- Reader for Lindsay Schleifer (13) Honors Thesis in Biology, *How neural cells acquire an identity: Role of Ca^{2+} signaling and voltage-gated Ca^{2+} channels in neurotransmitter phenotype specification*. (w/ Margaret Saha*, Randy Coleman, Josh Burk and Eric Bradley).
- Reader for Diana Elena Gal (12), Psychology Thesis, *Evaluating the mismatch negativity response to emotionally salient, frequency modulated tones*. (w/ Paul Kieffaber* and Cheryl Dickter).
- Reader for Albert Ng-Sui-Hing (12), Biology Honors Thesis, *Analysis of calcium activity and neurotransmitter phenotype of developing retinal neurons of *Xenopus laevis* embryos*. (w/ Eric Bradley*, Margaret Saha, and John Griffin).
- Reader for Allison Corish (12), Mathematics Honors Thesis, *Global dynamics of pulse-coupled oscillators*. (w/ Sarah Day*, Rex Kincaid, and Drew LaMar).
- Reader for John Coleman (12), Physics Honors Thesis, *Unknown title*. (w/ John Delos* and Henry Krakauer).
- Reader for Brittany Lewis (11), Neuroscience Honors Thesis, *Correlating calcium activity to neurotransmitter phenotype and expression of voltage-gated calcium channels in *Xenopus**. (w/ Margaret Saha*, Matt Wawersik, and Randy Coleman).
- Reader for Adam Goodreau (11), Biology Honors Thesis, *TRPM4/5s Role in Inspiratory Calcium-Activated Nonspecific Cation Current* (w/ Margaret Saha*, Mark Forsyth, Diane Shakes)
- Reader for Ben Brush (10), Neuroscience Honors Thesis, *Investigating the molecular and ionic mechanism of respiratory function in the preBöttinger Complex of neonatal mice in vitro*. (w/ Christopher Del Negro*, Margaret Saha, and Joshua Burk).
- Reader for Daniel Hairprasad (09), Mathematics Honors Thesis (w/ Jianjun Paul Tian* and Michael Lewis).
- Reader for Alicia Frame (07), Biology Honors Thesis, *Effects of Feather Pigmentation on Bacterial Degradation Rates* (w/ Swaddle*, Forsyth, and Cristol).
- Reader for Christen Raymond (03), Biology, *Individual neuroendocrine variation within a natural population of mice and among inbred laboratory rat strains*. (w/ Heideman* and Swaddle)
- Reader for Evan McCreedy (04), Computer Science, *A fault-tolerant and adaptive implementation of mpiBLAST for large-scale or distributed heterogeneous clusters*. (w/ Nikolopoulos* and Torzon)

PROFESSIONAL SERVICE

- External reviewer for faculty promotion to Associate Professor with tenure at a Carnegie Doctoral/Research-Extensive University. 2013.
- **Scientific Program Committee Member** for the 2011 NHLBI-VCU World Congress on Mathematical Modeling and Computational Simulation of Cardiovascular and Cardiopulmonary Dynamics (w/ Witten TM*, Delos J, Larkin J, Panfilov A, Holden A, Glass L, Cain J, Goldstein D, Morrison T, Olufson M, Pencina M).
- **Associate Editor** (member of the editorial board) for *Mathematical Medicine and Biology: Journal of the Institute for Mathematics and Its Applications*. 2010–2014.
- **Representative Service as Referee for Scientific Journals**¹³

– *American Mathematical Monthly*, 14 (2×).

¹³Once per year listed; same for the following bullet.

- *American Journal of Physiology*, 97.
- *Biophysical Journal*, 96, 97, 01, 02, 07 (2×), 08 (4×), 11, 12, 13.
- *Biophysical Chemistry*, 08.
- *Bulletin of Mathematical Biology*, 00.
- *European Journal of Neuroscience*, 03.
- *Journal of Computational Neuroscience*, 97, 99, 04 (2×), 07 (2×).
- *Journal of General Physiology*, 11.
- *Journal of Molecular and Cellular Cardiology*, 10.
- *Journal of Neurophysiology*, 06.
- *Journal of Neuroscience*, 02.
- *Journal of Nonlinear Science*, 05.
- *Journal of Theoretical Biology*, 00, 02 (2×), 06 (2×), 07 (2×), 08, 09, 10
- *Mathematical Medicine and Biology*, 05, 06, 12 (ed.), 14 (ed.)
- *New Journal of Physics*, 03.
- *Philosophical Transactions*, 08.
- *Physica D Nonlinear Phenomena*, 03.

- **Representative Service Reviewing Grant Proposals**

- National Science Foundation review panel. 05, 07, 09, 11, 12, 14, 15.
- Jeffress Trust Scientific Review Committee. 15, 16.
- NIH Modeling and Analysis of Biological Systems (MABS) Study Section ad hoc reviewer. 10.
- Proposal review at request of program officers of the NSF, NIGMS, Wellcome Trust, etc., in the areas of my expertise. 00, 02 (6×), 03, 05, 06, 07, and others.
- NIH Neurotransmitters, Receptors, and Calcium Signaling Study Section temporary member. 05.

- **Representative Service advocating for junior scientists (letters of reference)¹⁴**

- Jeffrey Liu in his pursuit of medical school admission.
- The Barry Goldwater Scholarship and Excellence in Education Program, Lyuba Bolkhovitinov, 16. Lyuba is a neuroscience major whose goal is to obtain a Ph.D. in neuroscience and conduct research and teach at the university level.
- NSF GRF, Claire Kaplan, Graduate Student, Clinical Psychology Doctoral Program University of Maryland College Park. 14.
- NSF GRF, Kiah Hardcastle, Graduate Student, Neuroscience Graduate Program, Stanford University. 14.
- NIH K25 proposal, Blair Williams, Postdoctoral Fellow, BioMET, University of Maryland School of Medicine. 14.

- **Representative Service to Department of Applied Science**

- Academic Progress Committee. 16–17.
- Chair, Applied Science Curriculum Development Committee. 14–15.
- Retention, Promotion and Tenure Committee for Del Negro's promotion from Associate to Full Professor (w/ Kelley*, Hinders, Luepke). 14–15.

¹⁴Junior colleagues at other institutions; sometimes former graduate or undergraduate research students.

- Chair, Applied Science Retention, Promotion and Tenure Committee for Shaw’s promotion from Assistant Professor to Associate Professor with tenure. 11–12.
- Chair, Applied Science Retention, Promotion and Tenure Committee for Shaw’s promotion from Assistant Professor to Associate Professor with tenure. 11–12.
- Ad Hoc Retention, Promotion, and Tenure Committee for Schniepp’s mid-tenure review. 11–12.
- Chair, Applied Science Retention, Promotion and Tenure Committee for Del Negro’s promotion from Assistant Professor to Associate Professor with tenure. 08–09.
- Academic Progress Committee (w/ Kelly* and Luepke). 08–09. (w/ Shaw* and Luepke). 09–10. (w/ Shaw* and Lukaszew). 10–11. (w/ Shaw* and Del Negro). 11–12 (w/ Shaw* and Del Negro). Fall 12 (w/ Shaw* and Kelley). Spring 12. (w/ Shaw* and Kelley). 12–13.
- Facilities Committee Chair (w/ Luepke and Hinders). 09–10. (w/ Luepke and Hinders). 10–11. (w/ Luepke and Hinders). Fall 11. (w/ Luepke).
- Ad Hoc Retention, Promotion, and Tenure for Shaw’s mid-tenure review. 09–10.
- Joint Physics/Applied Science VMEC Search Committee (w/ Vold*, Luepke, Krakauer, Armstrong, Cooke). 06–07.
- Chair, Faculty Search Committee leading to hire of Leah Shaw (w/ Hinders and Del Negro). 06–07.
- Activities related to the Southern Association of Colleges and Schools (SACS) accreditation review (w/ Davanay and Bradley). Fall 03–Spring 05.
- Chair, Computer Systems Committee (w/ Bradley). Fall 01–Spring 08.
- Chair, Faculty Search Committee (w/ Holloway and Del Negro). 05–06.
- Joint Physics/Applied Science VMEC Search Committee (w/ Holloway, Bradley, Luepke, Hoatson, Griffieon, Krakauer, Zhang). 05–06.
- Co-chair, Curriculum Committee (w/ Hinders). 04–05.
- Applied Science Representative to the Committee on Graduate Studies. Fall 02–Spring 05.
- Chair, Admissions/Recruiting Committee. 03–04.
- Chair, Faculty Search Committee leading to hire of Christopher Del Negro. 02–03.
- Admissions/Recruitment Committee (w/ Hinders*). 01–02, 02–03.
- Faculty Search Committee (w/ Hinders*, Vold). 01–02.

• **Representative Service to College and Other Departments at W&M**

- Member of the Faculty Affairs Committee (an elected office). 16–present.
- Area III Representative to the Faculty Assembly (an elected office). 06–07, 08–09.
- Director of the W&M Biomath Initiative (Spring 09–Spring 15). This Directorship involves research, teaching and service activities that generate scientific community, foster interdisciplinary collaborations, and provide mentorship and training of graduate students and junior faculty with interests in biomathematics.
- Faculty Hearing Committee. AY14–15.
- Plumeri Award Selection Advisory Committee. AY14–15. At the request of Dean Conley.
- Procedural Review & Personnel Policy Committees. Fall 08–Spring 12 (member), Fall 12 (alternate)
- Search Committee for Ombudsperson for Arts & Sciences graduate programs (w/ Meyer*, Barnes, Martin, Sanderson). 12.
- Biomath Faculty Search Committee (w/ Saha*, Griffin, Leu, Heidemann). 10–11.
- Reviewed internal proposals for [confidential] (at request of Joel Schwartz). 10 & 12.
- Reviewed internal proposals for the [confidential] (at request of Dean Strickwerda). 10.
- Faculty Research Committee. 05–06, 06–07, 08–09.

- Annual Graduate Research Symposium Session Chair. 09.
- Advisor for Neuroscience majors. 04–07.
- Search committee for Computational Science Cluster Applications Analyst (John van Rosendale* and others). Spring 06.
- First Year Committee for Caitlin Kight (w/ Swaddle, Biology). 05–06.
- Search committee for the Assistant to the Dean of Graduate Studies and Research (w/ Sanderson*, Lockeman, Miller, and Phillips). Spring 05.
- HHMI Summer Grant Committee (w/ Saha, chair). Spring 03 & 04.
- Ad hoc committee to determine appropriateness of an IGERT proposal in the area of computational biology and/or bioinformatics (w/ Finifter*, Kreps, Voigt, von Baeyer, and Bradley). Fall 02.
- Contributed to sub-proposal in support of a mathematical and computational biology component in a proposed Ph.D. degree program in Mathematics (w/ Shi*, Schreiber, and Trosset). Fall 02.
- Consulted with Gene Roche and others in the Information Technology office regarding the upgrade of W&M's central UNIX statistical server.
- Co-organized the weekly Applied Mathematics Colloquia series sponsored by the Depts. of Mathematics and Applied Science and the Computational Science Cluster (w/ Trosset* and Lewis). Fall 02.