Peter J. Thomas

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July 24, 2023

1 Education

The Salk Institute for Biological Studies, La Jolla, Calif.
Postdoctoral: Computational Neuroscience and Computational Cell Biology. 2000-2004.
Supervisor: Terrence J. Sejnowski.

The University of Chicago, Chicago, Ill.
Ph.D. in Mathematics, August 2000. Thesis: *Order and Disorder in Visual Cortex: Spontaneous Symmetry Breaking and Statistical Mechanics of Pattern Formation in Vector Models of Cortical Development.* Supervisor: Jack D. Cowan.

The University of Chicago, Chicago, Ill.
Master of Arts in Conceptual Foundations of Science, March 2000.
Mentors: David B. Malament, Robert J. Richards.

The University of Chicago, Chicago, Ill.
Master of Science in Mathematics, June 1994.

Yale University, New Haven, Conn.
Bachelor of Arts in Physics and Philosophy, *cum laude*, June 1990.
Research Mentor: Roderick V. Jensen.

2 Professional Appointments

Professor (tenured), 2018-present
Case Western Reserve University, Department of Mathematics, Applied Mathematics, and

Statistics, Cleveland, Ohio.
Secondary appointments: Dept. Biology, Dept. Cognitive Science, Dept. Electrical, Control and Systems Engineering, Dept. Computer and Data Science.

Affiliate Scholar (without stipend), 2018-present
Oberlin College, Department of Mathematics, Oberlin, Ohio.

Associate Professor (tenured), 2013-2018
Case Western Reserve University, Department of Mathematics, Applied Mathematics, and Statistics, Cleveland, Ohio.
Secondary appointments: Dept. Biology, Dept. Cognitive Science, Dept. Electrical Engineering and Computer Science.

Assistant Professor (tenure-track), 2006-2013
Case Western Reserve University, Department of Mathematics, Cleveland, Ohio.
Secondary appointments: Dept. Biology, Dept. Cognitive Science.

Research Associate, 2006-2013
Oberlin College, Department of Neuroscience, Oberlin, Ohio.

Assistant Professor (tenure-track), Mathematics and Neuroscience, 2004-2006.
Oberlin College, Department of Mathematics, Oberlin, Ohio.

Adjunct Assistant Professor of Biology, 2004-2006.
Case Western Reserve University, Department of Biology, Cleveland, Ohio.

Howard Hughes Medical Institute Research Associate, 2002-2004.
Salk Institute for Biological Studies, Computational Neurobiology Laboratory, La Jolla, Calif.

Sloan-Swartz Center Fellow, 2000-2002.
Salk Institute for Biological Studies, Sloan-Swartz Center for Theoretical Neurobiology and Computational Neurobiology Laboratory, La Jolla, Calif.

National Institutes of Health Graduate Trainee, 1999-2000.
University of Chicago, Department of Mathematics and Center for Computational Neuroscience, Chicago, Ill.

Teaching Assistant, 1998-1999.
University of Chicago, Program in Financial Mathematics, Chicago, Ill.

Lecturer, 1994-1998.
University of Chicago, Department of Mathematics, Chicago, Ill.

High School Science Teacher & Charter Corps Member, Teach for America, 1990-1992.
Baton Rouge Magnet High School, Baton Rouge, La.

3 Membership in Professional Societies

Society for Industrial and Applied Mathematics (SIAM).

Society for Mathematical Biology (SMB).

4 Professional Honors and Awards

Nominated for a John S. Diekhoff Award for Distinguished Graduate Mentoring (Case Western Reserve University) on multiple occasions. (February 2020; February 2022).

Distinguished Scholar in Residence, Mathematical Biosciences Institute, The Ohio State University (Columbus, Ohio), Aug-Dec 2017.

Nominated for a John S. Diekhoff Award for Distinguished Graduate Mentoring (Case Western Reserve University). April 2017.

Visiting Scholar, Humboldt-Universität zu Berlin and Bernstein Center for Computational Neuroscience (Berlin, Germany), May-July 2015.

Simons Foundation Sabbatical Award, January 1, 2014-June 30, 2014 (Humboldt-Universität zu Berlin and Bernstein Center for Computational Neuroscience, Berlin, Germany).

Fulbright Scholar, August 1, 2013-December 31, 2013 (Humboldt-Universität zu Berlin and Bernstein Center for Computational Neuroscience, Berlin, Germany).

Early Career Award, Mathematical Biosciences Institute at The Ohio State University (Columbus, Ohio), August 15-December 15, 2011.

Nominated for a J. Bruce Jackson MD Award for Excellence in Undergraduate Mentoring (Case Western Reserve University). 2011.

Finalist for a Carl F. Wittke Award for Excellence in Undergraduate Teaching (Case Western Reserve University). 2011.

T. Keith Glennan Fellowship. This CWRU program honors tenure-track faculty for excellence in teaching and scholarship. 2010-2011.

Invited Participant, National Cancer Institute Think Tank: *Physical Sciences-Based Frontiers in Oncology: The Coding, Decoding, Transfer, and Translation of Information in Cancer.* October 29-31, 2008.

NIH External Review Board, Undergraduate Program in Computational Neuroscience, The University of Chicago. October 23-24, 2008.

Andrew W. Mellon Foundation Summer Research Stipend. *Computational Cell Biology: Modeling Protein Polymerization using the Gillespie Algorithm*, 2005.

Fellow, American Mathematical Society's Project NExT (New Experiences in Teaching), 2004-2005.

Participant, 1st Annual National Academies Keck *Futures Initiative* Conference, "Signals, Decisions and Meaning in Biology, Chemistry, Physics, and Engineering", 2003.

Howard Hughes Medical Institute Postdoctoral Fellowship Recipient, 2002.

Best Poster Award, Gordon Research Conference on Theoretical Biology and Biomathematics, 2002.

Sloan Foundation Postdoctoral Fellowship Recipient, 2000-2002.

NIH Computational Neuroscience Graduate Training Award Recipient, 1999.

5 Professional Service

Editorial Service:

- co-Editor-in-Chief, *Biological Cybernetics* (January 1, 2018 - present).
- Co-guest-editor (with J. Maclaurin, lead, B. Lindner and J-M. Fellous), *Biological Cybernetics* Special Issue on "Stochastic Oscillators in Biology" (appeared in 2022).
- Technical Program Committee of the 6th ACM International Conference on Nanoscale Computing and Communication (2019).
- Lead Guest Editor (with G. Enciso, P. Iglesias, A. Ijspeert, M. Olufsen, R. Sepulchre and M. Srinivasan), *Biological Cybernetics*, Special Issue on "Control Theory in Biology and Medicine" (2018).

- Lead Guest Editor (with A. Dimitrov, F. Fekri, A. Lazar and S. Moser), *IEEE Transactions on Molecular, Biological and Multiscale Communications*, Claude Shannon Centennial Special Issue *Biological Applications of Information Theory*, 2016 (part 1 and part 2).
- co-Guest Editor (with P. Bressloff, B. Ermentrout, and O. Faugeras), *Journal of Mathematical Neuroscience*, Special Issue *Stochastic Network Models in Neuroscience: A Festschrift for Jack Cowan*, 2016.
- Editorial Board (Review Editor) of Frontiers in Computational Neuroscience, (December 3, 2015 - January 17, 2018).
- co-Guest Editor (with H. Chiel), *Journal of Neural Engineering*, Special Issue *Applied Dynamics: From Neural Dynamics to Neural Engineering*, 2011.

Grant Review Panels:

- National Science Foundation Review Panels (2008, 2009, 2013, 2015).
- National Science Foundation Mail Review (2008, 2009, 2012).

Scholarly Review:

1. 6th ACM International Conference on Nanoscale Computing and Communication: Technical Program Committee (2019)
2. Annals of Applied Probability (2012, 2013)
3. Banff International Research Station proposal evaluator (2019)
4. Bioessays (2003)
5. Biological Cybernetics (2007, 2008, 2014, 2015, 2018, 2019)
6. Biophysical Journal (2008)
7. Biosystems (2002, 2012)
8. BMC Neuroscience (2016)
9. BMC Systems Biology (2011)
10. Bulletin of Mathematical Biology (2011)
11. Cerebral Cortex (2012)
12. Chaos (2015, 2021)
13. Communications in Nonlinear Science and Numerical Simulation (2015, 2017)
14. Entropy (2009)
15. Europhysics Letters (2013, 2014)
16. Examples and Counterexamples (2023)

17. Frontiers in Computational Neuroscience (2014, 2016, 2017)
18. IET Systems Biology (2008)
19. IEEE Journal on Selected Areas in Communications – Series on Molecular, Biological, and Multi-Scale Communications (2014, 2015)
20. IEEE Transactions on Information Theory (2019)
21. IEEE Transactions on Molecular, Biological, and Multi-Scale Communications (2016)
22. IEEE Transactions on Nanobiosciences (2011)
23. IEEE Transactions on Nanotechnology (2013)
24. Information (2017)
25. i-Science (2019)
26. Journal of Computational Neuroscience (2008, 2011, 2012, 2017, 2018, 2021)
27. Journal of Mathematical Biology (2014)
28. Journal of Mathematical Neuroscience (2013, 2015, 2018, 2020)
29. Journal of Neural Engineering (2011)
30. Journal of Neuroscience Methods (2011)
31. Journal of Neurophysiology (2000, 2001, 2002, 2020)
32. Journal of Nonlinear Science (2017)
33. Journal of Theoretical Biology (2013, 2023)
34. Mathematical Biosciences and Engineering (2015)
35. Nature Reviews Neuroscience (2001)
36. Neural Computation (2001, 2002, 2003, 2004, 2005, 2007, 2008, 2013, 2016, 2017, 2020)
37. Neurocomputing (2001)
38. Neuroreport (2001, 2002)
39. Physica D (2002, 2017)
40. Physical Review Letters (2017, 2018)
41. PLoS Computational Biology (2010, 2014, 2015, 2016, 2017, 2019)
42. Proceedings of the National Academy of Sciences (USA) (2012, 2013, 2016, 2017)
43. Proceedings of the Royal Society of London, B (2002)
44. Science (2011)
45. SIAM/ASA Journal on Uncertainty Quantification (2020)

46. SIAM Journal on Applied Dynamical Systems (2013, 2014, 2017, 2018, 2019, 2021, 2023)
47. SIAM Journal on Applied Mathematics (2015)
48. SIAM Journal on Scientific Computing (2010)
49. SIAM Review (2018, 2020)
50. Transactions on Biomedical Engineering (2011, 2012)
51. Trends in Neural Networks (2006)

Conference Organizing

- August 7-12, 2022. Co-organizer, Banff International Research Station Workshop "Mathematical Models in Biology: from Information Theory to Thermodynamics" (workshop 22w5155). `https://www.birs.ca/events/2022/5-day-workshops/22w5155`
- International Conference on Mathematical Neuroscence (ICMNS) 2021 (remote). Organizing committee.
- Society for Mathematical Biology 2021 (remote). Double minisymposium on biological oscillators (co-organized with Y. Wang).
- SIAM Dynamical Systems 2021 (remote). Triple minisymposium on stochastic oscillators. (co-organized with J. MacLaurin).
- October 26-29, 2020. Virtual Workshop on Motor Control. (co-organized with H. Chiel and S. Daun). 40-60+ remote participants per day.
- June 24-25 2020 – SIAM Life Sciences Meeting. Double minisymposia (online) on stochastic oscillators (co-organized with James MacLaurin).
  `https://meetings.siam.org/sess/dsp_programsess.cfm?SESSIONCODE=68534`
  `https://meetings.siam.org/sess/dsp_programsess.cfm?SESSIONCODE=68535`
- July 27-29, 2020. Banff International Research Station Workshop 20w5074. *Mathematical Models in Biology: from Information Theory to Thermodynamics* (co-organized with A. Eckford and M. Hinczewski). Banff, Canada. 50-60+ remote participants per day. `https://www.birs.ca/events/2020/5-day-workshops/20w5074`
- June 23-26, 2019. Scientific Program Committee, 5th International Conference on Mathematical Neuroscience (ICMNS 2019), Copenhagen, Denmark.
- 2013-2017. Organizing committee for the Mathematical Biosciences Institute emphasis semester on *Applications of Control Theory to Biological and Biomedical Systems*; and co-organizer of Workshop 1 (Fall 2017) on *Control and Modulation of Neuronal and Motor Systems*.
- July 10-12, 2017. SIAM Conference on Control and Its Applications (Pittsburgh, Penna). Minisymposium: *Applications of Control in Medicine and Biology* (co-organized with J. Rubin).

- July 10-14, 2017. SIAM Annual Meeting (Pittsburgh, Penna.). Minisymposium: *Applications and Analysis of Piecewise Smooth Dynamical Systems* (co-organized with B. Ermentrout).
- July 10-14, 2016. Organizing Committee, *SIAM Conference on the Life Sciences*, Boston, Mass.
- July 22-23, 2015. Workshop on *Stochastic Neural Dynamcs*, Computational Neuroscience Meeting, Prague, Czech Republic (co-organized with J. Schwabedal).
- Oct 26 - Oct 31, 2014. Banff International Research Station Workshop. *Biological and Bio-Inspired Information Theory* (co-organized with A. Eckford).
- Jul 13 - Jul 18, 2014. Banff International Research Station Workshop. *Stochastic Network Models of Neocortex (a Festschrift for Jack Cowan)* (co-organized with P. Bressloff, C. Chow, B. Ermentrout, S. Kauffman and H. Wilson).
- 2012-2013 Mathematical Biosciences Institute. Virtual Working Group on *Master Equations and Neural Dynamics* (co-organized with E. Shea-Brown).
- 2012 SIAM Life Sciences meeting (San Diego). Double minisymposium: *Stochastic Dynamics in Cell Biology: Simulation, Analysis, and Experiment.*
- 2011 SIAM Dynamical Systems meeting (Snowbird, Utah). Minisymposium: *Flows Structured by Multiple Fixed Points.*
- 2011 Annual AMS-MAA Joint Mathematics Meeting (New Orleans). Special Session: *Applications of Stochastic Processes in Neuroscience.*
- 2010 AMS Central Section meeting (Notre Dame). Special Session: *Applications of Stochastic Processes in Cell Biology.*
- 2010 SIAM Life Sciences meeting (Pittsburgh). Minisymposium: *Stochastic Phenomena in Neural Dynamics.*
- 2007 Society for Mathematical Biology / Japanese Society of Mathematical Biology joint meeting (San José, Calif.). Double Minisymposium: *Mathematical Models of Biological Communication, Chemotaxis & Control.*
- 2007 ICIAM/SIAM joint applied mathematics meeting (Zurich). Minisymposium: *Stochastic Biochemical Systems.*
- 2005 Oberlin Conference on Computation and Modeling. Chair, scientific program committee.

6 Service on Institutional Committees

CWRU Interschool Quantitative Biosciences Program steering committee (2021-current)

CWRU Parking Advisory Committee (2020-current)

Dept. Committee on Planning and Budget (2015-2018; chair 2016-2018; 2021-2022)

Dept. Committee on Communications (2021-22)

Dept. Graduate Committee (2016-current; chair 2016-2017 & 2018-2020)

Dept. Appointments Committee (2014-2016)

College of Arts and Sciences Committee on Education al Programs (2016-2018)

Advising Committee of the Origins Major (2016-2018)

Advisory Board, University Center for Innovation in Teaching and Education (UCITE) (2015-2017)

ad hoc committee on Dept. bylaws (2015)

ad hoc committee on Dept. teaching (2015)

Qualifying exam preparation & grading (Mathematical Modeling, Computational Neuroscience), 2009-current.

Lead Organizer, Mathematical Life Sciences / Theoretical Biophysics Seminar (2007-2013, 2014-2016)

Advisory Board, RIBMS (Research at the Interface of the Biological and Mathematical Sciences) Undergraduate Program (2007-2011)

Department of Mathematics Undergraduate Committee (2008-2011)

University Advisory Committee on Research Computing (2007-2009)

Department of Mathematics Colloquium Committee (2007-2009)

Lead Organizer, New Faculty Lunch Committee (2006-2007)

7 Teaching Activities

CWRU Active Learning Fellow, 2015-16. Participated in semester-long training in active learning techniques.

Courses Developed at Case Western Reserve University

- MATH 319/419, Applied Probability and Stochastic Processes for Biology. This course, which I developed *de novo*, introduces students to applications of stochastic processes in mathematical biology, particularly at the cellular level. It complements the BIOL 300-306 sequence, which focuses on deterministic methods in mathematical biology. It cross-lists as BIOL 319/419, EECS 319, PHOL 419, SYBB 319/419, and EBME 419.
- MATH 378/478, Computational Neuroscience. This course was originally designed by Profs. Chiel (Biology) and Beer (EECS) as BIOL 378/EECS478. I completely redesigned the syllabus, adding significant mathematical content. It cross-lists as BIOL 378/478, COGS 378, NEUR 478, EBME 478, and EECS 478.
- MATH 342, Preparation for Research in Mathematical Biology. I co-developed this one-hour course with Prof. Snyder (Biology) as part of the RIBMS (Research at the Interface of the Biological and Mathematical Sciences) program. It cross-lists as BIOL 309.
- MATH 380, Introduction to Probability. I revised the standard introductory course to incorporate active learning techniques through hands-on exploratory exercises using Matlab.
- MATH 394/494, Information Theory (based on the standard text by Cover and Thomas). I revived this introductory course in 2019 after a hiatus of several years.
- MATH 435, Ordinary Differential Equations. I revived this introductory graduate level course in 2010 after a 15-year hiatus, and rewrote the syllabus.

Courses developed at Oberlin College

- MATH 236, Partial Differential Equations and Applied Complex Analysis. This course, which I developed *de novo*, introduces students to elements of complex analysis through applications to partial differential equations, following the text by Asmar, with hands-on computational exercises involving COMSOL (a finite element numerical package).
- MATH 345, Mathematical Methods for Computational Neuroscience. This course, which I developed *de novo*, introduces students to mathematical modeling within the neurosciences, following the text by Dayan and Abbott, with hands-on computational exercises involving Matlab, XPP, and NEURON.
- MATH 362, Seminar: Mathematical Biology. This course, which I developed *de novo*, introduces students to mathematical modeling in biology, following the text by Edelstein-Keshet, with hands-on computational exercises using Matlab and XPP.

Courses taught at Case Western Reserve University (Fall 2006-Spring 2020) including semesters and enrollments.

1. Biol 306/Math 376: Mathematical Analysis of Biological Models. 2019F (12). Total enrollment: 12.
2. Math 223: Calculus for Science and Engineering III. 2008S (30), 2008F (36), 2009F (63), 2010F (34), 2012F (30). Total enrollment: 193.
3. Math 224: Elementary Differential Equations. 2006F (34), 2012S (13), 2013S (32), 2014F (31), 2015S (34), 2015F (18), 2017S (33), 2018S (62), 2020S (33), 2021F (24). Total enrollment: 314.
4. Math 319/419: Applied Probability and Stochastic Processes for Biology, 2007S (8), 2008F (8), 2011S (7), 2016S (12), 2018S (14), 2020S (10), 2022S (13). Total enrollment: 72.
5. Math 321/421: Fundamentals of Analysis I. 2010F (25). Total enrollment: 25.
6. Math 322/422: Fundamentals of Analysis II. 2011S (19). Total enrollment: 19.
7. Math 342: Preparation for Research in Mathematical Biology 2007S (4). Total enrollment: 4. This was a one credit-hour course only, with shared teaching responsibilities.
8. Math 378/478: Computational Neuroscience. 2008S (31), 2010S (20), 2012S (20), 2013S(10), 2015S (18), 2017S (25), 2019S (24), 2021S (28), 2023S (30). Total enrollment: 206.
9. Math 380: Introduction to Probability. 2015F (39), 2016S (24), 2016F (25), 2018F (29), 2021F (29), 2022F (24). Total enrollment: 170.
10. Math 394/494: Information Theory. 2019S (14). Total enrollment: 14.
11. Math 435: Ordinary Differential Equations 2010S (5), 2014F (10), 2016F (4), 2018F (9), 2019F (2). Total enrollment: 30.
12. Math 441: Mathematical Modeling 2012F (11), 2022F (4). Total enrollment: 15.

Total enrollment in regular (three credit-hour) courses with 100% responsibility: 1074.

Courses taught as a faculty member of Oberlin College (2004-2006)

1. MATH 133: Calculus I. 2005F (24). Total enrollment: 24.
2. MATH 232: Linear Algebra. 2004F (25). 2005S (22). 2005F (15). Total enrollment: 62.
3. MATH 234: Ordinary Differential Equations. 2004F (29). Total enrollment: 29.
4. MATH 236: Partial Differential Equations and Applied Complex Analysis 2006S (7). Total enrollment: 7.
5. MATH 345: Mathematical Methods for Computational Neuroscience 2006S (10). Total enrollment: 10.

6. MATH 362: Seminar: Mathematical Biology 2005S (8). Total enrollment: 8.

Total enrollment in regular (three or four credit-hour) courses with 100% responsibility: 140.

Courses taught as a graduate student at The University of Chicago (1995-1998)

1. MATH 131-132-133: Elementary Functions and Calculus I-II-III
2. MATH 195-196: Mathematical Methods for Biological or Social Sciences I-II
3. MATH 250: Elementary Linear Algebra

Courses assisted as a graduate student at The University of Chicago (1993-1995,1998-1999)

1. MATH 121-122: Mathematical Sciences (for humanities track) (S. Kurtz; R. Thisted, instructors)
2. MATH 277: Mathematical Logic I (T. Slaman, instructor)
3. FIMATH* 330: Differential Equations (J. Cowan, instructor)
4. FIMATH* 320: Numerical Methods-1 (R. Almgren, instructor)
5. FIMATH* 332: Neural Networks (J. Cowan, instructor)
   *Financial Mathematics Program.

Postdoctoral Mentoring

1. 2019-2021. Alexander Moffett. York University, Toronto, Canada. Jointly mentored with A. Eckford and M. Hinczewski. Subsequently joined the Northeastern University branch of the Rice Center for Theoretical Biological Physics as of January 2022.
2. 2016-2019. Yangyang Wang. Mathematical Biosciences Institute / Ohio State University (external mentor, jointly with H. Chiel).
3. 2014-2015. David N. Lyttle. Case Western Reserve University. NSF Postdoctoral Fellow (mentored jointly with H. Chiel). Currently working in the tech sector.
4. 2011-2014. Deena R. Schmidt. Case Western Reserve University. Currently Assistant Professor (tenure-track) at University of Nevada, Reno.
5. 2010-2013. Casey O. Diekman. Mathematical Biosciences Institute / Ohio State University (external mentor, jointly with C. Wilson). Currently Assistant Professor (tenure-track) at New Jersey Institute of Technology.

Theses Supervised at CWRU

1. Linh Huynh, "Inference and Analysis for Stochastic Density-Dependent Population Dynamics, with Application to Drug Resistance". Doctoral dissertation, May 2022.

2. Shusen Pu, "Noise Decomposition for Stochastic Hodgkin-Huxley Models", Doctoral dissertation, October 2020.
3. Hsing-Duan Louh, "Parametric Sensitivity in a Model of a Motor Pattern Generator in *Aplysia*", Master's thesis, July 2020.
4. Alexander Strang, "Applications of the Helmholtz-Hodge Decomposition to Networks and Random Processes", Doctoral dissertation, June 2020.
5. Shu Wang, "Information Theoretic Analysis of a Biological Signal Transduction System", Master's thesis, May 2018.
6. Alexander Cao, "Dimension Reduction for Stochastic Oscillators: Investigating Competing Generalizations of Phase and Isochrons", Master's thesis, April 2017.
7. Casey A. Bennett, "Channel Noise And Firing Irregularity In Hybrid Markov Models Of The Morris-Lecar Neuron", Master's thesis, August 2015.
8. Youngmin Park, "Infinitesimal Phase Response Curves for Piecewise Smooth Dynamical Systems", Master's thesis, August 2013.
9. Suparat Chuechote, "Amplification and Accuracy in a Stochastic 2D Gradient Sensing Pathway Model", Masters's thesis, May 2010.
10. Edward K. Agarwala, "Food for Thought: When Information Maximization Fails to Optimize Utility", Master's thesis, May 2009.
11. Matthew Garvey, "Diffusion Mediated Signaling: Information Capacity and Coarse Grained Representations", Master's thesis, December 2008.
12. Drew P. Kouri, "A Nonlinear Response Model for Single Nucleotide Polymorphism Detection Assays", Master's thesis, June 2008.

Non-thesis Master's degree students

1. James Austrow, Mathematical Neuroscience, May 2021.

Service on thesis committees or as external reader

1. (2023-) Tyler Barker (University of Nebraska at Lincoln, PhD candidate in Computer Science)
2. (2023) Valerie Jeong (University of Auckland / Wahapu, PhD candidate in Mathematics)
3. (2021-) Preethisiri Bhat (Case Western Reserve University, PhD candidate in Biomedical Engineering)
4. (2021-2023) Gideon Idumah (Case Western Reserve University, PhD candidate in Applied Mathematics)

5. (2022) Amy Patterson (Case Western Reserve University, PhD candidate in Biology)
6. (2022) Will Huffmyer (Case Western Reserve University, MS candidate in Biology)
7. (2021) Kelsey Bower (Case Western Reserve University, PhD candidate in Biomedical Engineering)
8. (2021) Kaiyu Deng (Case Western Reserve University, PhD candidate in Mechanical Engineering)
9. (2020) Tenglong Wang (Case Western Reserve University, PhD candidate in Physics)
10. (2020) Zhuocheng Xiao (University of Arizona, PhD candidate in Neuroscience)
11. (2019) Jeffrey P. Gill (Case Western Reserve University, PhD candidate in Biology)
12. (2018) Jonathan Sasse (Case Western Reserve University, MS candidate in Biology)
13. (2016) Nara Yoon (Case Western Reserve University, PhD candidate in Applied Mathematics)
14. (2016) Margaret Callahan (Case Western Reserve University, PhD candidate in Applied Mathematics)
15. (2016) Alex Lonsberry (Case Western Reserve University, PhD candidate in Mechanical Engineering)
16. (2013) Kendrick Shaw (Case Western Reserve University, PhD candidate in Biology)
17. (2012) Rick Hudson (Case Western Reserve University, PhD candidate, Department of Electrical Engineering and Computer Science)
18. (2011) Nilgoun Raihani (Case Western Reserve University, PhD candidate in Applied Mathematics)

Undergraduate Student Mentoring at CWRU

1. 2023 Samuel Qin. BS. Applied Math (CWRU '26). Project "Control of respiratory physiology." Co-supervised with Prof. Rishi Dhingra, CWRU School of Medicine.
2. 2023 Ruchir Kodihalli. BS. Applied Math (CWRU '25). Project "Modeling growth and competition of *Azotobacter vinelandii*." Co-supervised with Sarah Bagby, CWRU Biology.
3. 2023 Andrew Deneris. BS. Applied Math (CWRU '23). Project "Modeling growth and competition of *Azotobacter vinelandii*." Co-supervised with Sarah Bagby, CWRU Biology.
4. 2020-2022 Daniel Chen. BS. Applied Math. BS. Computer Science. (CWRU '22). Project "Explicitly Solvable Continuous-time Inference for Partially Observed Markov Processes".

5. 2020-2021 Chanita Boonkird. CWRU Coding Scholar, project "Simulating Brain-Body Interactions: Neural Networks and Motor Control".
6. 2020-2021 Monish Lavu. CWRU Coding Scholar, project "Simulating Brain-Body Interactions: Neural Networks and Motor Control".
7. 2020-2022 Alberto Safra. Co-advisor for Dean's Approved Major in "Natural Computing & Digital Physics".
8. 2020. Tyler Burleyson. BS. Applied Math (CWRU '22)
9. 2020. Linqing "Lucy" Zheng. BS. Systems Biology (CWRU '22, exp.).
10. 2019-2020. Reid Bolding. BS. Physics (CWRU '20).
11. 2017-2018. Benjamin Kuznet-Speck. BS. Physics (CWRU '18). **Winner of a Goldwater Scholarship.** Co-mentored with M. Hinczewski (MH as lead mentor). Entered Ph.D. program in Physics at the University of California, Berkeley.
12. 2017-2018. Nicholas Barendregt. BS. Applied Mathematics (CWRU '18). First prize, Intersections/SOURCE poster competition (natural sciences), 12/2017. Entered Ph.D. program in Applied Mathematics at University of Colorado.
13. 2017-2018. Gregory Hessler. BS. Applied Mathematics (CWRU '18). Entered PhD. program in Electrical Engineering at Georgia Tech.
14. 2016-2017. Patrick Green. BS. Physics (CWRU '17).
15. 2015. Sararose Nassani. BS. Applied Mathematics (CWRU '17). Entered Ph.D. program in Applied Mathematics, Case Western Reserve University.
16. 2015-2017. Alexander Cao. BS/MS. Applied Mathematics (CWRU '17). Entered Ph.D. program in Applied Mathematics, Northwestern University.
17. 2010-2013. Young-Min Park. BS/MS. Applied Mathematics (CWRU '13). Entered Ph.D. program in Mathematics, University of Pittsburgh.
18. 2012-2014, 2015. Casey Bennett. BS. Physics (CWRU '13), MS. Applied Mathematics (CWRU '15). Employment as of March 2017: Chicago trading firm DRW.
19. 2011-2017 Khalid (Cal) Al-Dhubaib. Advisor for Dean's Approved Major in "Healthcare Data Science". Founder and CEO of Pandata, a medical data science company.
20. 2011-2012, 2014-2015. Alexander J. White. BS. Systems Biology (CWRU '15).
21. 2009-2011. David Kent. BS. Mathematics and BS. Computer Science (CWRU '11). Entered industry (Epic Systems Corporation).
22. 2009-2010. Michael Steward. BS. Mathematics (CWRU '11). Entered Ph.D. program in Mathematics, Ohio State University.
23. 2008-2010. Stephen J. Fleming. BS. Physics and BS. Biochemistry (CWRU '11). Pursued graduate study in Physics at Cambridge University and Harvard University. **Winner of a Churchill Fellowship**.

24. 2008-2009. Heather McGinnis. BS. Mathematics (CWRU '09).
25. 2007-2010. Bennett Rummel. BS. Biomedical Engineering (CWRU '10).
26. 2007-2009. Edward K. Agarwala, MS/BS. Applied Mathematics (CWRU '09, '10). Entered industry (American Greetings).
27. 2006-2008. Drew P. Kouri. MS/BS. Mathematics (CWRU '08). Entered graduate program in Computational and Applied Mathematics, Rice University (Ph.D. 2012). As of 2016 Drew works at Sandia National Laboratories.
28. 2007. Jocelyn E. Eckert, B.S. Systems Biology (CWRU '09).

Undergraduate Student Mentoring at Oberlin College

1. 2005-2006. Emily R. Miraldi. BS. Biochemistry (Oberlin College '06). 2012 Ph.D. in Computational and Systems Biology (MIT). As of 2017 Emily is an Assistant Professor in the Department of Pediatrics at the University of Cincinnati and the Cincinnati Children's Hospital.
2. 2004-2006. Peter B. Kruskal. BS. Mathematics (Oberlin College '06). 2013 Ph.D. in Computational Neuroscience (The University of Chicago). As of 2017 Peter is Head Data Scientist at investment consulting firm DoneGood (Boston area).
3. 2004-2006. Joseph P. Kimmel. BS. Composition (Oberlin Conservatory '06). BS. Computer Science (Oberlin College '06). Entered Ph.D. program in Computational Neuroscience, The University of Chicago.
4. 2004-2005. Andrew Bartholomew. BS. Computer Science (Oberlin College '06). Entered Ph.D. program in Computer Science, Brown University. **Winner of a Goldwater Scholarship**. As of 2017 Andy is working as a software engineer for Airbnb (Bay area).

Undergraduate Student Mentoring at UCSD (as a postdoc).

1. Sierra K. Hampton (UCSD Engineering, 2004).
2. Peter Park (UCSD Engineering, 2004).

8 Research Support

Funded Proposals

1. Principal Investigator (100% responsibility), NSF-DMS 0720142. *AMC-SS: Stochastic Simulation and Analysis of Biochemical Reaction Networks.* 9/1/2007 - 8/31/2010. $120,000. (TDC=$77,670)

2. co-Principal Investigator (50% responsibility, with R. Snyder), NSF-DUE 0634612. *UBM: Undergraduate Research at the Interface of Mathematics and Biology.* 1/1/2007 - 12/31/2010. $240,000. (TDC=$221,995)
3. co-Principal Investigator (33% responsibility, with R. Snyder and P. Wintrode), NSF-EF 1038677. *Revealing Structure via Dynamics: Biological Networks from Protein Folding to Food Webs.* 9/1/2010 - 8/31/2013 $660,000. (TDC=$432,267).
4. co-Principal Investigator (50% responsibility, with H. Chiel), NSF-DMS 1010434. *CRCNS: Robust Dynamics of a Feeding Pattern Generator.* 9/1/2010 - 8/31/2013. $500,000 (TDC=$336,597).
5. Principal Investigator (100% responsibility), Core Fulbright Scholar Program. *Collaborative Investigation of the Effects of Noise on Neuronal Synchronization.* 08/01/13-12/31/13. €16,380 (approx. $22,000).
6. Principal Investigator (100% responsibility), Simons Fellows in Mathematics Program (Sabbatical Support). *Nonstationary Jump Markov Process Models for Neural Dynamics.* 01/01/14-05/30/14. $72,170.
7. Principal Investigator (100% responsibility), NSF-DMS 1413770. *BIOMAPS: Spectral Analysis of Stochastic Neural Oscillators.* 8/1/2014 - 1/31/2019. Total $230,000, plus an additional $7,000 in REU supplements. (TDC=$165,610).
8. co-Principal Investigator (50% responsibility, with K. Abbott), NSF-DEB 1654989. *SG: The stochastic shielding heuristic in ecological networks.* 6/1/2017 - 5/30/2022. $149,923 (TDC=$96,452), plus an additional $ 13,805 in supplemental REU funding and an additional $ 40,253 in postdoctoral funding.
9. co-Principal Investigator (25% responsibility), National Institutes of Health, RFA-NS-18-029: BRAIN Initiative: Exploratory Team-Research BRAIN Circuit Programs. (1 R01 NS118606-01). *A novel approach to analyzing functional connectomics and combinatorial control in a tractable small-brain closed-loop system.* 9/30/2020-6/30/2025. Total budget $1,342,315. (Years 1-3 released initially, budget $807,833, TDC=527,724).
10. Principal Investigator (100% responsibility), NSF-DMS 2052109. *Stochastic shielding for dimension reduction of biological systems.* 7/1/2021-6/30/2024. $300,000 (TDC=$199,937).
11. co-Principal Investigator (33% responsibility), CWRU Expanding Horizon Initiative. *Does strain-level variation contribute to microbial response to change in permafrost soil?* 7/1/2021-12/31/2022 (approx.) $29,986. With Sarah Bagby (PI), Michael Hinczewski (co-PI) and Andrew Eckford (external collaborator).
12. Principal Investigator (100% responsibility), Institute for Computational and Experimental Research in Mathematics (ICERM) at Brown University. Visiting research fellowship. 9/6/2023 - 12/6/2023. $22,386. (TDC=$22,386)

Total extramural support: $3,749,838. (Prorated by % responsibility: $2,185,587).

9 Bibliography

Authorship in the mathematics literature is often, though not always, in alphabetical order (cf. items 5-3). In the biological literature authorship order may reflect seniority (most senior last). In interdisciplinary mathematical biology scholarship, ordering conventions vary.

Prof. Thomas' ORCID is `https://orcid.org/0000-0001-7533-6770`.
His google scholar profile is `https://scholar.google.com/citations?user=5ctD7qIAAAAJ`.
His h-index as of July 24, 2023 is 23.

Names set in italics indicate undergraduate coauthors.

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6. Tyler S. Barker, **Peter J. Thomas**, and Massimiliano Pierobon, "A Metric to Quantify Subjective Information in Biological Chemoreception." **under review**, 2023.

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4. Alexander G. Strang, Will Huffmyer, Hilary Rollins, Karen C. Abbott, and **Peter J. Thomas**, "Noise source importance in linear stochastic models of biological systems that grow, shrink, wander, or persist", **in revision**, 2023.

3. Hilary B. Rollins, William Huffmyer, Alexander G. Strang, **Peter J. Thomas**, and Karen C. Abbott, "Strengthening protection of vulnerable species by managing against stochastic extinction", **in revision**, 2023.

2. Alexander G. Strang, Karen C. Abbott, **Peter J. Thomas**, "How Cyclic are Real Tournaments? Estimation and Uncertainty Quantification", **in preparation**, 2023.

1. Alexander G. Strang, Karen C. Abbott, and **Peter J. Thomas**, "Extending the Stochastic Shielding Method via Moment Closure", **in preparation**, 2023.

9.2 Refereed Journal Articles

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10. Shusen Pu and **Peter Thomas**. "Contributions of molecular ion channel noise to macroscopic spike time variability". *2021 Computational and Systems Neuroscience (COSYNE) meeting.* Online poster presentation by S. Pu.

9. Marshaun N. Fitzpatrick, Yangyang Wang, **Peter J. Thomas**, Roger D. Quinn, and Nicholas S. Szczecinski. "Robotics Application of a Method for Analytically Computing Infinitesimal Phase Response Curves". In *Living Machines Conference on Biomimetic and Biohybrid Systems*, pp. 104-115. Springer, Cham. (July, 2020) `https://link.springer.com/chapter/10.1007/978-3-030-64313-3_12`

8. *Gregory R. Hessler*, Andrew W. Eckford, and **Peter J. Thomas**, "Linear Noise Approximation of Intensity-Driven Signal Transduction Channels", *2019 IEEE Global Communications Conference (GLOBECOM)*. `https://ieeexplore.ieee.org/document/9013249`

7. Casey O. Diekman, **Peter J. Thomas**, and Christopher G. Wilson, "Experimental Validation of a Closed-Loop Respiratory Control Model using Dynamic Clamp." 40th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC'18).

6. Andrew W. Eckford, *Benjamin Kuznets-Speck*, Michael Hinczewski, and **Peter J. Thomas**, "Thermodynamic Properties of Molecular Communication." 2018 IEEE International Symposium on Information Theory. `http://arxiv.org/abs/1805.03535`

5. **Peter J. Thomas** and Andrew W. Eckford, "Shannon Capacity of Signal Transduction for Multiple Independent Receptors", International Society for Information Theory 2016 conference. `http://arxiv.org/abs/1604.03508`

4. Andrew W. Eckford and **Peter J. Thomas**, "Capacity of a Simple Intercellular Signal Transduction Channel", International Society for Information Theory 2013 conference.

3. Casey O. Diekman, Christopher G. Wilson, **Peter J. Thomas**, "Spontaneous Autoresuscitation in a Model of Respiratory Control" (2012 Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC)).

2. *J.M. Kimmel*, R. M. Salter, **P.J. Thomas**, "An Information Theoretic Framework for Eukaryotic Gradient Sensing", *Advances in Neural Information Processing Systems 19*, MIT Press, pp 705-712, 2007.

1. **P.J. Thomas**, D.J. Spencer, *S.K. Hampton, P. Park* and J. Zurkus, "The Diffusion-Limited Biochemical Signal-Relay Channel", *Advances in Neural Information Processing Systems 16*, MIT Press, 2004.

9.4 Invited Reviews, Invited Conference Papers, Editorials, and Commentary

15. J. MacLaurin, J.M. Fellous, **P.J. Thomas** and B. Lindner, "Stochastic oscillators in biology: introduction to the special issue." *Biological Cybernetics*, **online** 26 April, 2022.

https://doi.org/10.1007/s00422-022-00931-y

14. Benjamin Lindner, **Peter J. Thomas**, Jean-Marc Fellous and Paul Tiesinga, "Biological Cybernetics: 60 years and more to come." *Biological Cybernetics*, **115**, 5-6 (February 2021). https://link.springer.com/article/10.1007/s00422-021-00863-z

13. Benjamin Lindner, **Peter J. Thomas**, and Jean-Marc Fellous, "A Renewed Vision for Biological Cybernetics." *Biological Cybernetics*, **114**, 315-316 (June 2020). https://link.springer.com/article/10.1007/s00422-020-00837-7

12. Alexander G. Strang and **Peter J. Thomas**, "Math explains why the Democrats may have trouble picking a candidate." *The Conversation*. June 20, 2019. https://theconversation.com/math-explains-why-the-democrats-may-have-trouble-picking-a-candidate-118884

11. **Peter J. Thomas**, Mette Olufsen, Rodolophe Sepulchre, Pablo A. Iglesias, Auke Ijspeert, and Manoj Srinivasan, "Control Theory in Biology and Medicine: Introduction to the Special Issue." *Biological Cybernetics*, **113**:1 (1-6). April 2019. https://link.springer.com/article/10.1007/s00422-018-00791-5

10. Robert E. Kass, Shun-ichi Amari, Kensuke Arai, Emery N. Brown, Casey O. Diekman, Markus Diesmann, Brent Doiron, Uri T. Eden, Adrienne Fairhall, Grant M. Fiddyment, Tomoki Fukai, Sonja Grün, Matthew T. Harrison, Moritz Helias, Nancy Kopell, Hiroyuki Nakahara, Jun-nosuke Teramae, **Peter J. Thomas**, Mark Reimers, Jordan Rodu, Horacio G. Rotstein, Eric Shea-Brown, Hideaki Shimazaki, Shigeru Shinomoto, Byron M. Yu, and Mark A. Kramer, "Computational Neuroscience: Mathematical and Statistical Perspectives." *Annual Reviews of Statistics and Its Applications*, **5.1** 2017. http://www.annualreviews.org/doi/abs/10.1146/annurev-statistics-041715-033733

9. Alexander G. Dimitrov, Faramarz Fekri, Aurel A. Lazar, Stefan M. Moser, and **Peter J. Thomas**, "Guest Editorial: Biological Applications of Information Theory in Honor of Claude Shannon's Centennial, Part II." *IEEE Transactions on Molecular, Biological, and Multi-scale Communications*. Dec. 2016.

8. Alexander G. Dimitrov, Faramarz Fekri, Aurel A. Lazar, Stefan M. Moser, and **Peter J. Thomas**, "Guest Editorial: Biological Applications of Information Theory in Honor of Claude Shannon's Centennial, Part I." *IEEE Transactions on Molecular, Biological, and Multi-scale Communications*. June 2016.

7. Paul C. Bressloff, Bard Ermentrout, Olivier Faugeras, and **Peter J. Thomas**, "Stochastic Network Models in Neuroscience: A Festschrift for Jack Cowan. Introduction to the Special Issue." *Journal of Mathematical Neuroscience* **6**(1),1-9, 2016. DOI 10.1186/s13408-016-0036-y

6. Andrew W. Eckford, Kenneth A. Loparo, and **Peter J. Thomas**, "Finite-State Channel Models for Signal Transduction in Neural Systems". *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)* (2016).
`http://2016.ieeeicassp.org/Papers/PublicSessionIndex3.asp?Sessionid=1174`
`http://arxiv.org/abs/1609.05517`

5. Andrew W. Eckford and **Peter J. Thomas**, "Information Theory of Intercellular Signal Transduction". *Asilomar Conference on Signals, Systems, and Computers* (2015).

4. **Peter J. Thomas** and Benjamin Lindner, *Thomas and Lindner Reply.* Physical Review Letters **115**, 04 Aug 2015 (eid 069402). [Reply to A. Pikovsky, *Comment on "Asymptotic Phase for Stochastic Oscillators".* Physical Review Letters **115**, 04 Aug 2015 (eid 069401).]

3. **Peter J. Thomas**, "Commentary on *Structured chaos shapes spike-response noise entropy in balanced neural networks*, by Lajoie, Thivierge and Shea-Brown." Frontiers in Computational Neuroscience, 10 March 2015. doi: 10.3389/fncom.2015.00023.
`http://journal.frontiersin.org/article/10.3389/fncom.2015.00023/full`

2. Hillel J. Chiel and **Peter J. Thomas**, "Applied Neurodynamics: From Neural Dynamics to Neural Engineering". *Journal of Neural Engineering.* **8** (2011) 060201.
`http://iopscience.iop.org/1741-2552/8/6/060201`

1. **Peter J. Thomas**, "Cell Signaling: Every Bit Counts". *Science.* **334**:321-322, 21 Oct. 2011.
`http://www.sciencemag.org/content/334/6054/321.full.pdf`

10 Conference Presentations (Non-refereed)

10.1 Plenary Talks

- 2019. International Conference on Mathematical Neuroscience (Copenhagen, Denmark, June 24-26) *Dissecting Molecular Contributions to Interspike Interval Variability in Conductance-Based Neural Models via Stochastic Shielding.*

- 2018. Jack Cowan's 50 Year Celebration / A one day conference to celebrate Jack's 50 years at the University of Chicago (Chicago, Ill., May 11, 2018). *Embodied Neural Dynamics: Putting the Brain Back Into the Body.*

- 2017. International Conference on Mathematical Neuroscience (Boulder, Colo., May 30-June 2) *Defining the "Phase" of a Stochastic Oscillator.*

10.2 Regular Talks and Poster Presentations

- 2023. **Peter J. Thomas**, Zhuojun Yu, Max Kreider, Jeffrey P. Gill, Hillel J. Chiel, Yangyang Wang, Robert A. McDougal, Chris Fietkiewicz, David Corrales Marco, and Jonathan Rubin. "Principles of sensory feedback for control of rhythmic movements," poster (in person), Computational Neuroscience annual meeting. July 16, 2023. Leipzig, Germany.

- 2023. Alberto Pérez-Cervera, Boris Gutkin, **Peter J. Thomas**, and Benjamin Lindner. "Phase-Amplitude Reduction for Stochastic Oscillators," talk (in person), Society for Industrial and Applied Mathematics Conference on Applications of Dynamical Systems, Portland Oregon, May 16, 2023.

- 2022. Tyler Barker, Massimiliano Pierobon, and **Peter J. Thomas**. "Subjective Information and Survival in a Simulated Biological System," talk (in person), Banff International Research Station workshop 22w5155 (Mathematical Models in Biology: from Information Theory to Thermodynamics), August 9, 2022. Co-presented by PJT and MP. Video recording: `https://www.birs.ca/events/2022/5-day-workshops/22w5155/videos/watch/202208091104-Thomas.html`

- 2022. John Shackleton, Mick Follows, **Peter J. Thomas**, and Anne Willem Omta, "The Mid-Pleistocene Transition: A delayed response to an increasing positive feedback?" EGU General Assembly 2022, section NP2.4 Tipping Points in the Earth System. May 23, 2022.

- 2022. Frontiers in Applied & Computational Mathematics Conference. May 20, 2022. Invited talk (in person): *Isochrons and Isostables for Stochastic Oscillators.* `https://sites.google.com/njit.edu/facm2022/home`

- 2021. UNC Greensboro PDE Conference. July 25, 2021. Talk (remote): *A partial differential equation for the mean–return-time phase of planar stochastic oscillators.* `https://mathstats.uncg.edu/pde-conference/conference-program/`

- 2021. SIAM Conference on Applications of Dynamical Systems. May 24, 2021. Talk (remote): *When can a linear vector field lead to limit cycle dynamics?* As part of MS56, Pattern Formation in Reaction Networks. `https://meetings.siam.org/sess/dsp_talk.cfm?p=116498`

- 2021. V. Webster-Wood (presenting author), J. Gill, P. Thomas, H. Chiel, "Real-time prediction of multifunctionality in *Aplysia californica* feeding using a Boolean model framework". Computational and Systems Neuroscience (Cosyne) 2021. Online. February 23 - 26, 2021.

- 2020. Dynamics Days (Digital). Aug. 26, 2020. Talk (remote): *A Partial Differential Equation for the Mean–Return-Time Phase of Planar Stochastic Oscillators.*

- 2020. SIAM Life Sciences Meeting. June 24, 2020. Talk (remote): *Phase Reduction for Linear Stochastic Ornstein-Uhlenbeck Processes.*

- 2019. Miami University Mathematics Conference. Sept. 21, 2019. Talk: *Two Approaches to Phase Reduction for Stochastic Oscillators.*

- 2018. Banff International Research Station Workshop 18w5042: Mathematical Approaches to Cell-Cell Communication and Collective Behaviours. July 9-13, 2018. Talk: *On the channel capacity of channel rhodopsin and other intensity-driven signal transduction receptors.*

- 2018. Deutsche Physikalische Gesellschaft. Talk: *PDE for the "first-passage-time phase" of a stochastic oscillator.* Benjamin Lindner, Alexander Cao, and Peter J. Thomas (presented by B. Lindner). Berlin, Germany.

- 2017. Mathematical Biosciences Institute, Workshop on Control of Disease: Personalized Medicine Across Heterogeneous Populations (Oct. 29-Nov. 3, Columbus Ohio, https://mbi.osu.edu/event/?id=1064) Talk: *Open Versus Closed Loop Control in a Respiratory Model.*

- 2017. SIAM Conference on Control and its Applications (Pittsburgh, Penna). Talk: *Open Versus Closed Loop Control in a Respiratory Model.*

- 2017. SIAM Annual Meeting (Pittsburgh, Penna). Talk: *Phase Response Curves for Limit Cycles in Filippov Systems* (talk presented by Youngmin Park).

- 2017. SIAM Conference on Applied Dynamical Systems (Snowbird, Utah). Talk: *Defining the "Phase" of a Stochastic Oscillator.*

- 2017. Cleveland Applied Math Fest. April 6, 2017. Talk: *Eupnea, Tachypnea, and Autoresuscitation in Open-Loop and Closed-Loop Respiratory Control Models.*

- 2017. Banff International Research Station Workshop 17w5036: Brain Dynamics and Statistics: Simulation versus Data. Feb. 26-March 3, 2017. Talk: *Noise in the Brain: Statistical and Dynamical Perspectives.*

- 2016. Mathematical Biosciences Institute (Columbus, Ohio October 17-21). Workshop on Dynamical Systems and Data Analysis in Neuroscience: Bridging the Gap. Talk: *Parameter estimation for stochastic single neuron conductance based models.*

- 2016. Max Planck Institute for the Physics of Complex Systems (Dresden, August 29-31). Bionav16 workshop. Talk: *Information Theory and Signal Transduction in Biological Systems.*

- 2016 SIAM Life Sciences Meeting (Boston, July 10-16). Poster: *Asymptotic Phase for Stochastic Oscillators.*

- 2016 Mathematical Biosciences Institute (Columbus, Ohio, February 21-26). Workshop on The interplay of stochastic and deterministic dynamics in networks. Talk: *Simplified Representation of Populations on Graphs via the Stochastic Shielding Heuristic.*

- 2015. Society for Neuroscience (Chicago, October 17-21). Poster: *Robustness, flexibility and sensitivity in a multifunctional motor pattern generator* D. N. Lyttle, J. P. Gill, K. M. Shaw, P. J. Thomas, H. J. Chiel (Presented by D. N. Lyttle).

- 2015. SAMSI Workshop on Challenges in Linking Statistical and Mathematical Neuroscience (Boston, October 14-15). Led working group discussions on 1. Quantifying phase resetting in stochastic neural oscillators, 2. Quantifying and interpreting structured variability in pattern generating circuits & systems, 3. Parameter estimation for conductance based models – aka "data assimilation".

- 2015. Computational Neuroscience Meeting (Prague, Czech Republic, July 18-23). Poster: *Fast and Accurate Representations of Stochastic Ion Channel Fluctuations.* Talk (in the Workshop on Stochastic Neural Dynamics): *Asymptotic Phase for Stochastic Oscillators.*

- 2015. Humboldt University & Bernstein Center for Computational Neuroscience: Neurophysics Group Retreat (Göhren-Lebbin, Germany, June 10-12, 2015). Talk: *Interspike Interval Variability in Purkinje neurons.*

- 2015. Bernstein Sparks Workshop "Beyond Mean-Field Theory in the Neurosciences" (Göttingen, Germany, June 2-5, 2015). Talk: *Moving Beyond the Mean Field via Stochastic Shielding.*

- 2014. SIAM Life Sciences Meeting (August 4-7, 2014, Charlotte North Carolina). Talk: *Dynamical Architectures for Control of Rhythmic Behavior.*

- 2014. Banff International Research Station Workshop 14w5138: Stochastic Network Models of Neocortex (a Festschrift for Jack Cowan). July 13-18, 2014. Talk: *On the Asymptotic Phase of Stochastic Oscillators.*

- 2014. Humboldt University & Bernstein Center for Computational Neuroscience: Neurophysics Group Retreat (Prora/Rügen, March 26-28, 2014). Talk: *Channel Capacity and Signal Transduction.*

- 2013. Bernstein Conference on Computational Neuroscience, 2013 & Workshop on Neural computation in the face of noise (Tübingen, Germany, September 24-27). Talk: *Jump Markov Process Ion Channel Models.* Poster: *A Dynamical Architecture for Responding to Unpredictable Mechanical Loads During Rhythmic Behavior.*
- 2013. CRCNS-PI Meeting, Boston, Mass. Talk: *A Dynamical Architecture for Responding to Unpredictable Mechanical Loads During Rhythmic Behavior.* Joint talk with H. Chiel.
- 2013. Institute for Mathematics and its Applications, Workshop on Stochastic Modeling of Biological Processes. Talk: *Markov Jump Process Ion Channel Models.*
- April 8-12, 2013. Mathematical Biosciences Institute, Workshop on Cellular and Subcellular Process in Neuroscience. Talk: *Decomposition and Control of Physiological Limit Cycles.*
- 2012. Tenth International Congress of Neuroethology. *Investigating localized sensitivity in the feeding patterns of Aplysia californica.* Kendrick M. Shaw, Miranda J. Cullins, Hui Lu, Jeffrey M. McManus, Peter J. Thomas, Hillel J. Chiel. Poster presented by K.M. Shaw.
- October 1-5, 2012. Mathematical Biosciences Institute Workshop on Mathematical Challenges in Neural Networks, Columbus, Ohio. Talk: *Stochastic Limit Cycles for Conductance-Based Neural Models: A Master Equation Approach.*
- 2012 SIAM Life Sciences Meeting, San Diego, Calif. Talk: *Stochastic Limit Cycles for Conductance-Based Neural Models: A Master Equation Approach.*
- 2012 New Jersey Institute of Technology's Frontiers in Applied and Computational Mathematics conference, Newark, New Jersey. Talk: *Phase Resetting in an Asymptotically Phaseless System: On the Phase Response of Limit Cycles Verging on a Heteroclinic Orbit.*
- 2011 Mathematical Biosciences Institute Workshop on Stochastic Processes in Cell and Population Biology, Columbus, Ohio. Poster: *Pursuit of Food versus Pursuit of Information in Markov Chain Models of a Perception-Action Loop.*
- 2011 CRCNS PI Meeting, Princeton, NJ. Poster: *Evidence for a heteroclinic network underlying feeding patterns in Aplysia californica.*
- 2011 Mathematical Biosciences Institute Workshop on New Directions in Probability Theory Inspired by Biology, Columbus, Ohio. Poster: *Effects of Fluctuations in a 2D Model of Gradient Sensing.*
- 2011 Mathematical Biosciences Institute Young Researcher's Workshop, Columbus, Ohio. Poster: *Evidence for a heteroclinic network underlying feeding patterns in Aplysia californica.*

- 2011 SIAM Dynamical Systems Meeting. Talk: *Phase Resetting in Phaseless Systems.*
- 2011 Gordon Research Conference on Stochastic Physics and Biology, Ventura, Calif. Poster: *Eukaryotic Gradient Sensing as a Statistical Estimation Problem.*
- 2011 American Mathematical Society Annual Meeting, New Orleans, La. Talk: *Synchronization of periodically forced Ornstein Uhlenbeck processes with reset.*
- 2010 Society for Neuroscience Annual Meeting, San Diego, Calif. Poster: *Evidence for a Stable Heteroclinic Channel Underlying a Central Pattern Generator*, with K. Shaw, H.J. Chiel, and others.
- 2010 MAA (Mathematical Association of America) Mathfest, Pittsburgh, Penna. Talk: *Synchronization of Noisy Integrate and Fire Neurons.*
- 2010 Society for Industrial and Applied Mathematics, Life Sciences Meeting, Pittsburgh, Penna.; Minisymposium on Stochastic Phenomena in Neural Dynamics. Talk: *Synchronization of Periodically Driven Noisy Integrate and Fire Neurons.*
- 2010 American Mathematical Society, Central Section Meeting, Notre Dame, In.; Special Session on Applications of Stochastic Processes in Cell Biology. Talk: *Gradient Sensing as a Statistical Estimation Problem: Comparison with Experimental Data.*
- 2010 Society for Industrial and Applied Mathematics, Great Lakes Regional Meeting, Dearborn, Mi. Talk: *Effects of Fluctuations in a 2D Model of Gradient Sensing.*
- 2010 COSYNE (**Co**mputational and **Sy**stems **Ne**uroscience) Meeting, Salt Lake City, Utah. Poster: *Evidence for a central pattern generator built on a heteroclinic channel instead of a limit cycle*, with K. Shaw, H. Chiel and others. Poster: *Multiple spike time patterns occur at bifurcation points of membrane potential dynamics*, with V. Toups, J-M Fellous, T. Sejnowski and P. Tiesinga.
- 2009 American Institute of Chemical Engineers Annual Meeting, Nashville, Tenn. *Accuracy of chemotactic response to transient gradient signals studied in silico.* With H. Baskaran (presenting), S. Chuechote and others.
- 2009 American Mathematical Society Eastern Regional Meeting, State College, Penna. *The periodically forced Ornstein Uhlenbeck process with reset: Preliminary Report.*
- 2009 Society for Neuroscience Annual Meeting, Chicago, Ill. Posters: *A Dynamical Model of Feeding Neuromechanics in Aplysia californica* (with K. Shaw, H. Chiel and others). *On the relative contributions of nodal currents to conduction block of the mammalian axon using high frequency alternating currents* (with D.M. Ackerman and N. Bhadra).

- 2009 Society for Mathematical Biology Annual Meeting, Vancouver, BC. Session Chair, Systems Biology Session. Talk: *On the Information Capacity of Diffusion Mediated Signal Transduction*. Posters: *Food for Thought: When Infomax Fails to Optimize Utility* (with E.K. Agarwala); *Effects of Fluctuations in a 2D Model of Gradient Sensing* (with S. Chuechote); *Accuracy of Gradient Sensing Based on Maximum Likelihood* (with S.J. Fleming, H.F. McGinnis and H. Baskaran); *Precision of burst timing in conditional pacemakers of the pre-Botzinger complex studied in silico* (with W. Smith and others).

- 2009 American Academy of Neurology Seattle, Washington. *Using Category Fluency Data to Create Phylogenetic Trees of Cognitive Phenotypes*, A. Lerner, J. Messer, T. Singh, J. Leverenz, C. Zabetian, P.J. Thomas, W.A.Woyczynski. (Platform presentation, given by A. Lerner.)

- 2008 12th International Conference on Miniaturized Systems for Chemistry and Life Sciences (MicroTAS) San Diego, Calif. *PCM-Programmable Arbitrary Gradient Generator for Cell Chemotaxis*, Y.Xie, S. Sarkar, F. Azizi, P.J.Thomas, H. Baskaran and C.H. Mastrangelo. (Platform presentation, given by Y. Xie and C.H. Mastrangelo.)

- 2008 Society for Neuroscience Annual Meeting, Washington, DC. *Simulation of geometric hallucinations on the visual cortex*, A. Boxerbaum, S. Skentzos, P. J. Thomas. (Poster, presented by A. Boxerbaum.)

- 2008 Aspen Center for Physics Workshop on Decision Making in Single Cells (Aspen, Colo.): *Information Processing in Eukaryotic Chemotaxis.*

- 2007 Joint Okinawa – Salk Institute Neuroscience Workshop. *Information, Timing and Perception in Chemotaxis.*

- 2007 Society for Neuroscience Annual Meeting: P.J. Thomas and H. J. Chiel, *Noise Facilitated Transitions in a Model Central Pattern Generator Network* (poster).

- 2007 Society for Mathematical Biology and Japanese Society of Mathematical Biology joint meeting: *Information Theoretic Analysis of Eukaryotic Gradient Sensing.*

- 2007 Midwest Regional Meeting of the American Mathematical Society (Chicago, Ill.) Special Session on Networks. *Preliminary Report: Noise-induced limit cycle transitions in a coupled oscillator network.*

- 2007 Society for Industrial and Applied Mathematics (SIAM) and the International Council for Industrial and Applied Mathematics (ICIAM) joint meeting: *Information Theoretic Analysis of Eukaryotic Gradient Sensing.*

- 2007 Gordon Research Conference on Gradient Sensing and Directed Cell Migration: J.M.Kimmel, R.M.Salter, P.J.Thomas. *An Information Theoretic Framework for Eukaryotic Gradient Sensing* (poster).

- 2006 Society for Neuroscience Annual Meeting: J.V. Toups, J. Fellous, P.J. Thomas, P. Tiesinga and T.J. Sejnowski. *Stability of in vitro spike patterns under variation of stimulus amplitude.* Program No. 237.18.

- 2005 American Society for Cell Biology Meeting: A. Bartholomew, R. Ganetzky, E. Miraldi, P.J. Thomas and L. Romberg. *Creation of a Computational Model to Study Cooperativity in Single-stranded Polymers* (poster).

- 2005 Society for Neuroscience Meeting: P. B. Kruskal,J. J. Stanis, B.L. McNaughton and P.J. Thomas. *A binless correlation measure reduces the variability of memory reactivation estimates* (poster).

- 2003 Fields Institute Workshop on Patterns in Physics: *Pattern Formation in the Development of Primary Visual Cortex* (talk).

- 2003 Society for Neuroscience Meeting: *Experimental Characterization of Spike-Time Patterns*, and *Information Capacity of a Single Ligand-Receptor Signal-Transduction Relay* (poster).

- 2003 Banff International Research Station Conference on Symmetry and Bifurcation in Biology: *Symmetry-Induced Coupling of Cortical Feature Maps* (talk).

- 2003 American Physical Society March Meeting: *Spike-Time Attractors in Cortical Neurons* (talk).

- 2002 Gordon Research Conference on Theoretical Biology and Biomathematics: *Fast Directional Sensing Using a Rapidly Diffusing Inhibitor* (poster).

11 Invited Talks

- March 23, 2023: Distinguished Speaker, ICAL Distinguished Speaker Series, School of Computing, York University, Toronto, Canada. *On the Relationship between Information Processing and Fitness in Biology.* In-person seminar.

- March 3, 2023: University of Colorado at Boulder, Applied Mathematics Colloquium. *A Universal Description of Stochastic Oscillators.* In-person seminar.

- September 22, 2022: University of Nebraska at Lincoln, School of Computing Colloquium. *On the Relationship between Information Processing and Fitness in Biology.* In-person seminar.
- September 22, 2022: University of Nebraska at Lincoln, Mathematical Biology Seminar. *Isochrons and Isostables for Stochastic Oscillators.* In-person seminar.
- April 14, 2022: University at Buffalo (SUNY Buffalo), Department of Mathematics, Mathematics Colloquium. *Phase and Phase-Amplitude Reduction for Stochastic Oscillators.* In-person seminar.
- March 9, 2022: Kansas University, Department of Mathematics, Computational and Applied Mathematics Seminar (Lawrence, Kansas). *Phase and Phase-Amplitude Reduction for Stochastic Oscillators.* In-person seminar.
- December 6, 2021: Berlin / Humboldt University & Bernstein Center for Computational Neuroscience, Seminar für Neurophysik (Berlin, Germany). *Shape and Timing: Using Variational Analysis to Dissect Mechanisms of Robustness in a Simple Motor Control System.*
- July 26, 2021: The Cold Place Mathematical Biology Seminar (University of Minnesota). Talk (remote): *Extinction in Stochastic May-Leonard Systems.*
- Apr. 26, 2021: Northwestern University, Applied Mathematics Colloquium. Talk (remote): *Phase reduction for stochastic oscillators.*
- Jan. 25, 2021: University of Iowa, Mathematical Biology Seminar. Talk (remote): *Neural circuitry for multilayered motor control.*
- Jan. 14 & Jan. 21, 2021: Institute for Neural Computation at the University of California, San Diego, chalk-talk (remote, two-part series): *Neural circuitry for multilayered motor control.*
- Oct. 7, 2020: Brandeis University Mathematical Biology Seminar. Talk (remote): *Phase Reduction for Stochastic Oscillators.*
- Oct. 23, 2019: Case Western Reserve University Applied Math Seminar. Talk: *Two Approaches to Phase Reduction for Stochastic Oscillators.*
- July 2, 2019: Berlin / Humboldt University Department of Physics / Seminar über nichtlineare Physik (Berlin, Germany). *Efficient Langevin Models of Conductance-Based Neurons.*
- November 6, 2018: Berlin / Humboldt University & Bernstein Center for Computational Neuroscience, Seminar für Neurophysik (Berlin, Germany). *Stochastic shielding and the variance of interspike intervals.*

- November 30, 2017: Berlin / Humboldt University Department of Physics / Nichtlineare Seminare (Berlin, Germany). *Stochastic Shielding and Dimension Reduction for Hybrid Markov Processes.*

- November 27, 2017: Berlin / Humboldt University & Bernstein Center for Computational Neuroscience, Seminar für Neurophysik (Berlin, Germany). *Phase Reduction for Stochastic Oscillators.*

- June 13, 2017: Canadian Workshop on Information Theory (Quebec City, Quebec, Canada). *On the channel capacity of channel rhodopsin (and other biological signal transduction pathways).*

- February 3, 2017: Cleveland State University (Cleveland, Ohio) Mathematics Colloquium. *Advances in phase reduction: discontinuous, stochastic, and singular oscillators.*

- July 11, 2016: MIT (Boston, Mass.) Lab meeting of D. del Vecchio's group. *Simplified Representation of Populations on Graphs via the Stochastic Shielding Heuristic.*

- May 26, 2016: Case Western Reserve University, School of Medicine, Respiratory Neurophysiology research group meeting (Cleveland, Ohio). *Eupnea, Tachypnea, and Autoresuscitation in a Closed-Loop Respiratory Control Model.*

- March 29, 2016: Ohio University (Athens, Ohio) Department of Mathematics, Dynamics in Biology Seminar. *Asymptotic phase for stochastic limit cycles.*

- February 19, 2016: University of Pittsburgh, Department of Mathematics, Applied Mathematics Seminar. *Asymptotic phase for stochastic limit cycles.*

- July 3, 2015: University of Potsdam Physics Colloquium (Potsdam, Germany). *Dynamical Architectures for Control of Rhythmic Behavior.*

- July 1, 2015: Bernstein Center for Computational Neuroscience Berlin Lecture Series (Berlin, Germany). *Neurobiology of Motor Control: a Dynamical Systems Perspective.*

- June 18, 2015: Humboldt University Physics Department Seminar (Berlin, Germany). *Dynamical Architectures for Control of Rhythmic Behavior.*

- April 23, 2015: Ohio State University Applied Math Seminar (Columbus, Ohio). *New approaches to dimension reduction for stochastic conductance based neural models.*

- April 3, 2015: MAMS Colloquium (CWRU, Cleveland, Ohio). *Channel capacity of biological signal transduction systems.*

- Nov. 17, 2014: Physiology and Biophysics Seminar (CWRU, Cleveland, Ohio). *Measuring edge importance: a quantitative analysis of the stochastic shielding approximation for random processes on graphs.*
- Nov. 18, 2014: Electrical Engineering and Computer Science Department Colloquium (CWRU, Cleveland, Ohio). *Control of Rhythmic Motions in Biological Systems.*
- August 26, 2014: Mathematical Biosciences Institute (Ohio State University, Columbus, Ohio), Workshop for Young Researchers in Mathematical Biology. *Dimension reduction for stochastic conductance based neural models.*
- July 23, 2014: University of Washington NetComp Seminar (Seattle, Washington). *Dynamical Architectures for Control of Rhythmic Behavior.*
- July 22, 2014: Allen Institute for Brain Science (Seattle, Washington). *Dimension reduction for stochastic conductance based neural models.*
- June 11, 2014: Ludwig Maximilian Universität München (Munich, Germany). *Dynamical Architectures for Control of Rhythmic Behavior.*
- June 11, 2014: Technische Universität München (Munich, Germany). *On the Asymptotic Phase of Stochastic Oscillators.*
- June 3, 2014: Universität Freiburg & Bernstein Center Freiburg (Freiburg, Germany). *Measuring edge importance: a quantitative analysis of the stochastic shielding approximation for random processes on graphs..*
- May 26, 2014: Max Planck Institute für Physik komplexer Systeme, (Dresden, Germany). *On the Asymptotic Phase of Stochastic Oscillators.*
- May 1, 2014: University of Edinburgh, School of Informatics (Edinburgh, United Kingdom). *Measuring edge importance: a quantitative analysis of the stochastic shielding approximation for random processes on graphs.*
- May 1, 2014: University of Edinburgh, Synthetic and Systems Biology group (Edinburgh, United Kingdom). *Information Theory in Biology.*
- April 30, 2014: Manchester University (Manchester, United Kingdom). *On the Asymptotic Phase of Stochastic Oscillators.*
- April 29, 2014: Nottingham University (Nottingham, United Kingdom). *On the Asymptotic Phase of Stochastic Oscillators.*
- April 7, 2014: Neuroscience Seminar (University of Cologne, Köln, Germay). *Dynamical Architectures for Control of Rhythmic Behavior.*

- February 28, 2014: Berlin Center for Studies of Complex Chemical Systems Seminar (Fritz Haber Institute, Berlin, Germany). *Measuring edge importance: a quantitative analysis of the stochastic shielding approximation for random processes on graphs.*

- February 12, 2014: Helsinki University, Mathematical Biology Seminar (Helsinki, Finland). *On the Asymptotic Phase of Stochastic Oscillators.*

- February 11, 2014: Helsinki University, Biomath Group Meeting (Helsinki, Finland). *Pursuit of food versus pursuit of information in a Markovian perception–action loop model of foraging.*

- February 3, 2014: Uppsala University, Visiting Scientist Seminar, Department of Information Technology (Uppsala, Sweden). *On the Asymptotic Phase of Stochastic Oscillators.*

- January 30, 2014: Humboldt University, Institut für Physik (Adlershof Campus, Berlin, Germany). *On the Asymptotic Phase of Stochastic Oscillators.*

- December 11, 2013: Wroclaw Polytechnic Institute and Hugo Steinhaus Center (Wroclaw, Poland). *On the Asymptotic Phase of Stochastic Oscillators.*

- December 10, 2013: Adam Mickiewicz University, Discrete Math and Combinatorics Seminar (Poznan, Poland). *Measuring edge importance: A quantitative analysis of the stochastic shielding approximation for random processes on graphs.*

- November 25, 2013: University of Potsdam, Department of Physics (Potsdam, Germany). *On the Asymptotic Phase of Stochastic Oscillators.*

- November 19, 2013: Universität Göttingen and Max Planck Institut für Dynamik und Selbstorganisation (Göttingen, Germany). *On the Asymptotic Phase of Stochastic Oscillators.*

- November 8, 2013: Bernstein Center for Computational Neuroscience Seminar, Humboldt University (Berlin, Germany). *On the Asymptotic Phase of Stochastic Oscillators.*

- October 30, 2013: Complexity and Neurophysics Group Meeting, Humboldt University (Berlin, Germany). *Precise Spike Timing as First Passage to a Rough Threshold.*

- October 8, 2013: Mathematical Biology Seminar, Department of Mathematical Sciences, New Jersey Institute of Technology (Newark, NJ). *Analysis and Simulation of Hybrid Jump Markov Process Ion Channel Models*

- February 21, 2013: Electrical Engineering and Computer Science Seminar, EECS Department, Case Western Reserve University (Cleveland, OH). *Open Problems in the Capacity of Biological Signal Transduction Channels.*

- February 19, 2013: Mathematical Biology Seminar, Department of Mathematical Sciences, New Jersey Institute of Technology (Newark, NJ). *Noise and the Single Neuron.*

- January 9, 2013: Kristan Laboratory Meeting, Division of Biology, University of California, San Diego (La Jolla, Calif.). *Robust Control of a Feeding Pattern Generator.* Joint talk with H. Chiel.

- January 8, 2013: Computational Neurobiology Laboratory Meeting, The Salk Institute for Biological Studies (La Jolla, Calif.). *Pursuit of food versus pursuit of information in a Markovian perceptionaction loop model of foraging.*

- June 5, 2012: Principal Investigators' meeting, National Science Foundation's Collaborative Research in Computational Neuroscience (CRCNS) program (St. Louis, Missouri). *Grand Challenges.* Joint talk with H. Chiel.

- December 2, 2011: University of Wisconsin, Applied and Computational Mathematics Seminar (Madison, Wisc.). *Phase Resetting in an Asymptotically Phaseless System: On the Phase Response of Limit Cycles Verging on a Heteroclinic Orbit.*

- November 30, 2011: Guest lecture for Prof. Dawes (Ohio State University), Molecular Genetics 660: Integrated Molecular and Cellular Biology for Non-biologists I (Columbus, Ohio). *Information Theory and Signal Transduction.*

- October 18, 2011: Ohio State University RUMBA (Undergraduate Mathematical Biology Research) Seminar (Columbus, Ohio). *Applications of Dynamical Systems Theory in Neuroscience: Insights into Robust Control of Central Pattern Generators.*

- October 3, 2011: Boston University Dynamical Systems Seminar (Boston, Mass.). *Phase resetting in an asymptotically phaseless system: on the phase response of limit cycles verging on a heteroclinic orbit.*

- September 21, 2011: Oberlin College Neuroscience Seminar (Oberlin, Ohio). *Applications of Dynamical Systems Theory in Neuroscience: Insights into Robust Control of Central Pattern Generators.*

- May 22, 2010: University of Notre Dame Center for Biocomplexity Colloquium (South Bend, Indiana). *Fluctuation Effects in 2D Models of Gradient Sensing.*

- May 14, 2009: Ohio Supercomputer Center Statewide User's Group meeting, keynote address (Columbus, Ohio). *Two Perspectives on Computational Biology.*

- April 28, 2009: New Jersey Institute of Technology (New Brunswick, NJ). *Stochastic Phenomena in Chemotaxis.*

- April 21, 2009: Baldwin Wallace College speakers series on Careers in Mathematics (Berea, Ohio). *Mathematics and Biology.* This was a public outreach talk for an audience of 70 junior high, high school and college students.
- October 15, 2008: Mathematical Biosciences Institute (Columbus, Ohio). *Stochastic Phenomena in Chemotaxis.*
- December 3, 2007: Okinawa Institute of Science and Technology Seminar Series (Okinawa, Japan). *The Mathematical Biology of Hallucination.*
- November 29, 2007: Okinawa Institute of Science and Technology Seminar Series (Okinawa, Japan). *An Information Theoretic Framework for Eukaryotic Gradient Sensing.*
- October 29, 2007: Mathematical Biosciences Institute (Ohio State University). *Noise-induced limit cycle transitions in coupled oscillator networks.*
- May 8, 2007: The University of Chicago Center for Integrative Neuroscience and Neuroengineering Research Seminar Series (hosts: Committee on Computational Neuroscience). *Spike Time Patterns.*