

# RACHEL ANN KUSKE

Professor and Chair  
School of Mathematics  
Georgia Institute of Technology

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## CONTACT INFORMATION

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## I. EARNED DEGREES

B.S. Mathematics 1987 University of Wisconsin, Green Bay, WI  
Ph.D. Applied Mathematics 1992 Northwestern University, Evanston, IL

Ph.D. Thesis Advisor: Professor B.J. Matkowsky  
Ph.D. Thesis Title: Asymptotic Analysis of Random Wave Equations

## II. EMPLOYMENT HISTORY

2017-present Professor and Chair, School of Mathematics, Georgia Institute of Technology  
2006-2016 Professor, University of British Columbia, Vancouver, BC  
2011-2015 Senior Advisor to the Provost on Women Faculty, University of British Columbia, Vancouver, BC  
2007-2011 Department Head, University of British Columbia, Vancouver, BC  
2002-2006 Associate Professor, University of British Columbia, Vancouver, BC  
2000-2002 Associate Professor, University of Minnesota, Minneapolis, Minnesota  
2001-2002 Associate Director, Minnesota Center for Industrial Math, University of Minnesota, Minneapolis, Minnesota  
1997-2000 Assistant Professor, University of Minnesota, Minneapolis, Minnesota  
1996-1997 Assistant Professor, Tufts University, Medford, Massachusetts  
1994-1996 NSF Postdoc, Stanford University, Stanford, California  
1992-1993 NSF Postdoc, Stanford University, Stanford, California

## III. HONORS AND AWARDS

1. Harold M. Bacon Teaching Award, Stanford University, 1995
2. Sloan Dissertation Fellowship, 1991
3. Tufts University Faculty Research Summer Award, 1996
4. Tufts University Mellon Research Semester Fellowship, 1997
5. McKnight Land Grant Professorship, 1998
6. Canadian Research Chair II, Applied Math, UBC, 2002
7. Krieger-Nelson Prize, CMS, 2011
8. SIAM Fellow, 2015
9. Simons Fellowship, 2016
10. Association for Women in Mathematics Service Award, 2013

#### IV. RESEARCH, SCHOLARSHIP, AND CREATIVE ACTIVITIES

##### A. PUBLISHED BOOKS, BOOK CHAPTERS AND EDITED VOLUMES

- A1. Books No data.
- A2. Refereed Book Chapters No data.
- A3. Edited Volumes No data.

##### B. REFEREED PUBLICATIONS AND SUBMITTED ARTICLES

###### B1. Published and Accepted Journal Articles

1. "Accelerating Sparse Recovery by Reducing Chatter", E. Daskalakis, F. Herrmann, R. Kuske, SIAM Imaging Sciences, SIAM J. Imaging Sci., 13(3), 1211-1239, 2020.
2. "Experimental Observations on Unsafe Zones in Milling Processes", Z. Dombovari, A. Iglesias, T. G. Molnar, G. Habib, J. Munoa, R. Kuske, and G. Stepan, , Phil. Trans. Roy. Soc. A, to appear, DOI 10.1098/rsta.2018.0125
3. L. Serdukova, R. Kuske, D. Yurchenko, Stability and bifurcation analysis of the period-T motion of a vibroimpacting energy generator, *Nonlinear Dynamics*, 98, 1807-1819. 2019.
4. "Uncertainty quantification for inverse problems with weak PDE-constraints", Z. Fang, C. Da Silva, R. Kuske, and F. J. Herrmann, Geophysics 83, R629-R647 (2018).
5. "The influence of parametric and external noise in act-and-wait control with delayed feedback", Jiaying Wang and Rachel Kuske, Chaos 27, 114319, (2017).
6. "Reduced alpha-stable dynamics for multiple time scale systems forced with correlated additive and multiplicative Gaussian white noise", W. F. Thompson, R. Kuske, A. Monahan, Chaos, 27, 111102, (2017).
7. "Patterns and coherence resonance in the stochastic Swift-Hohenberg equation with Pyragas control: the Turing bifurcation case", R. Kuske, C.Y. Lee, V. Rottschäfer, Physica D, to appear.
8. "Chevron folding patterns and heteroclinic orbits", C.J. Budd, A.N. Chakhchoukh, T.J. Dodwell, R. Kuske, Physica D: Nonlinear Phenomena, Volume 330, p. 32-46.
9. "The influence of localized randomness on regular grazing bifurcation with applications to impacting dynamics", DJW Simpson and R. Kuske, J. Vibration and Control. <https://doi.org/10.1177/1077546316642054>
10. "Tipping points near a delayed saddle node bifurcation with periodic forcing", J. Zhu, R. Kuske, T. Erneux, SIAM J. Appl. Dyn. Syst. 14, pp. 2030-2068, 2015.
11. "Stochastic averaging of dynamical systems with multiple time scales forced with  $\alpha$ -stable noise", W.F. Thompson, R. Kuske, A. Monahan, Multiscale Modeling and Simulation (SIAM), Multiscale Model. Simul., 1194-1223, 2015.
12. "Stochastic Perturbations of Periodic Orbits with Sliding", D. J.W. Simpson and R. Kuske, J. Nonl. Sci. 25, 967-1014, 2015.
13. D.J.W. Simpson, R. Kuske, The Positive Occupation Time of Brownian Motion with Two-Valued Drift and Asymptotic Dynamics of Sliding Motion with Noise, Stochastics and Dynamics, 14(4), 2014.
14. "Stochastically Perturbed Sliding Motion in Piecewise-Smooth Systems", D. J.W. Simpson and R. Kuske, DCDS-B, 19 (9), 2889-2913, 2014.
15. N. Yu, Y.-X. Li, R. Kuske, A Computational Study of Spike Time Reliability in Two Cases of Threshold Dynamics, J. Mathematical Neuroscience, 3, 2013. doi:10.1186/2190-8567-3-11.
16. D.J.W. Simpson, S. J. Hogan, R. Kuske, Stochastic Regular Grazing Bifurcations , SIAM Applied Dynamical Systems, 12(2) 533-559,2013.

17. D.J.W. Simpson, R. Kuske, Y-X. Li, Dynamics of Simple Balancing Models with Time-Delayed Switching Feedback Control, *J. Nonlinear Science*, 22(2), 135-167, 2012.
18. W. F. Thompson, R. Kuske, and Y.X. Li, Stochastic phase dynamics of noise driven synchronization of two conditional coherent oscillators, *Discrete and Continuous Dynamical Systems A*, 32, 2012 2971-2995.
19. D.J. W. Simpson, R. Kuske, Mixed-mode oscillations in a stochastic, piecewise-linear system *Physica D* 240, pp. 1189-1198, 2011.
20. J. Chaffee and R. Kuske The Effect of Loss of Immunity on Noise-Induced Sustained Oscillations in Epidemics, *Bull. Math Bio.*, Volume: 73 Issue: 11 Pages: 2552-2574 2011
21. P. Borowski, R. Kuske, Y.X. Li, and J.-L. Cabrera, Characterizing Noisy Mixed Mode Oscillations in Neuronal Models, *Chaos*, 20, 2010, 043117.
22. R. Kuske, Competition of noise sources in systems with delay: the role of multiple time scales, *J. Vibration and Control*, 7, 2010.
23. R. Kuske and P. Borowski, Survival of subthreshold oscillations: the interplay of noise, bifurcation structure, and return mechanism, *Discrete and Continuous Dynamical Systems S*, 2, 873-896, 2009.
24. Y. Cao, R. Kuske, H. Li, Direct Observation of Markovian Behavior of the Mechanical Unfolding of Individual Proteins, *Biophysical Journal*, 95, 782-788, 2008.
25. E. Buckwar, R. Kuske, S. Mohammed, and T. Shardlow, Weak convergence of the Euler Scheme for stochastic differential delay equations, *LMS Journal of Computational Mathematics*, 11, 60-99, 2008.
26. N. Yu, R. Kuske, Y.X. Li, Stochastic Phase Dynamics and Noise-induced Mixed-mode Oscillations in Coupled Oscillators, *Chaos*, 18, 015112, 2008.
27. R. Kuske, P. Greenwood, L. Gordilla, Sustained oscillations via coherence resonance in SIR, *J. Theoretical Biology*, 245 2007, 459-469.
28. S. Mitchell, R. Kuske, and A. Peirce, An asymptotic framework for finite hydraulic fractures including leakoff, *SIAM J. Appl. Math.* 67 364-386, 2007.
29. N. Yu, R. Kuske and Y.X. Li, Stochastic phase dynamics: multiscale behavior and coherence measures, *Physical Review E*, 73 (2006)
30. S. L. Mitchell, R. Kuske, A.P. Peirce, An asymptotic framework for the analysis of hydraulic fractures: the impermeable case, *J. Appl. Mechanics*, 74, 2007 365-372.
31. H. Rotstein and R. Kuske, Localized and asynchronous patterns via canards in coupled calcium oscillators, *Physica D*. 215, 2006 46-61.
32. S. Reinker, Y.X. Li, and R. Kuske, Noise-induced coherence and network oscillations in a reduced bursting model, *Bull. Math. Bio.*, 68, 2006, 1401-1427.
33. R. Kuske, Multiple-scales approximation for a coherence resonance route to chatter, *Computing in Science and Engineering*, 8, 2006, 2-88.
34. E. Buckwar, R. Kuske, B. L'Esperance, and T. Soo, Noise sensitivity in machine tool vibrations, *International Journal of Bifurcation and Chaos*, 16, 2006, 2407-2416.
35. C.J. Budd and R. Kuske, Localized periodic patterns for the non-symmetric generalized Swift-Hohenberg equation away from criticality, *Physica D*, 208 (2005) 73-95.
36. R. Kuske L. Peletier, A singular perturbation problem for patterns in a fourth order differential equation, *Nonlinearity*, Vol 18, no.3 p. 1189-1223, 2005
37. M. Klosek and R. Kuske Multi-scale analysis for stochastic differential delay equations, *SIAM Multiscale modeling and simulation*, 3, 706-729, 2005.
38. R. Kuske and S. Baer, Asymptotic analysis of noise sensitivity in a neuronal burster, *Bull. Math. Bio.*, 64 (2002), 447-481.

40. R. Kuske, Asymptotic analysis of noise-amplified oscillations for subcritical delays, *Differential Equations and Dynamical Systems*, Special issue on neural modeling, Oct. 2001.
41. C.J. Budd, G.W. Hunt, R. Kuske, Asymptotics of cellular buckling close to the Maxwell load, *Proc. R. Soc. Lond.* 457, (2001) 2935-2964.
42. J.D. Evans, R. Kuske, and J.B. Keller, American options on assets with dividends near expiry, *Math. Finance* 12 (2002) 219-237.
43. R. Kuske and J.B. Keller, Rate of convergence to a stable law, *SIAM J. Appl. Math* 61 (2000), 1308-1323.
44. R. Kuske, Gradient particle solutions of Fokker-Planck equations for noisy delay bifurcations, *SIAM J. Sci. Comp.*, 2 (2000), 351-367.
45. R. Kuske, Probability densities for noisy delay bifurcations, *J. Stat. Phys.* 96 (1999), 797-816.
46. R. Kuske and P. Milewski, Modulated two-dimensional patterns in reaction-diffusion systems, *Euro. J. Appl. Math.* 10 (1999), 157-184.
47. R. Kuske and J. B. Keller, Optimal exercise boundary for an American put option, *Applied Mathematical Finance* 5 (1998), 107-116.
48. R. Kuske and G. Papanicolaou, The invariant density of a chaotic dynamical system with small noise, *Physica D* 120 (1998), 255-272.
49. R. Kuske and T. Erneux, Bifurcations of localized oscillations, *Euro. J. Appl. Math* 8 (1997), 389-402.
50. R. Kuske and T. Erneux, Localized synchronization of two coupled solid state lasers, *Optics Communications*, 139 (1997), 125-131.
51. R. Kuske and J.B. Keller, Large deviation theory for stochastic difference equations, *Euro. J. Appl. Math.* 98 (1997), 567-580
52. W. Eckhaus and R. Kuske, Pattern formation in systems with slowly varying geometry, *SIAM J. Appl. Math.* 57(1997), 112-152
53. R. Kuske, Z. Schuss, I. Goldhirsch, S.H. Noskowitz, Schrödinger's equation on a one dimensional lattice with weak disorder, *SIAM J. Appl. Math*, 53 (1993), 1210-1252.
54. R. Kuske and B.J. Matkowsky, On roll, square, and hexagonal cellular flames, *Euro. J. Appl. Math.*, 5 (1994), 65-93.
55. R. Kuske and B.J. Matkowsky, Two dimensional cellular burner-stabilized flames, *Quarterly of Appl. Math.*, 52 (1994), 665-688.
56. A.J. Bernoff, R. Kuske, B.J. Matkowsky, and V. Volpert, Mean field effects for traveling wave solutions of reaction-diffusion equations, *SIAM J. Appl. Math* 55 (1995), 485-519.
57. R. Kuske, Wave localization in a one dimensional random medium, *Random and Computational Dynamics* 1 (1992), 147-196.
58. A. Bayliss, R. Kuske, and B.J. Matkowsky, A two-dimensional adaptive pseudo-spectral method, *Journal of Computational Physics* 91 (1990), 174-196.

**B2. Conference Presentation with Proceedings (Refereed)**

1. E. Daskalakis, F. Herrmann, and R. Kuske, Developments in the direction of solving extremely large problems in geophysics. {em SEG Technical Program Expanded Abstracts} 4375-4378, (2017).
2. Uncertainty quantification for wavefield reconstruction inversion Z. Fang, C.Y. Lee, C. Da Silva, F. Herrmann, R. Kuske, EAGE Conference, extended abstract, June 2015.
3. Noise sensitivity of balance with delayed on-off control (FS09-004) Jiaxing Wang, Rachel

- Kuske, David Simpson, ICTAM 2012, Beijing, Aug 19-24, 2012.
4. R. Kuske, P. Greenwood, L. Gordillo, Autonomous Stochastic Resonance in SIR, Prague Stochastics 2006.
  5. R. Kuske, E. Buckwar, B. L'Esperance, and T. Soo, Coherence resonance in noisy machine tool vibrations, Fifth Euromech Nonlinear Dynamics Conference, 2005, 10 pages.
  6. R. Kuske, Multi-scale dynamics in stochastic delay differential equations with multiplicative noise, Proceedings: Stochastic systems with delay and memory, Stochastics and Dynamics, 5, 2005, Special Issue. 10 pages
  7. Multi-scale analysis of noise-sensitivity near a bifurcation, R. Kuske, in IUTAM Symposium on Nonlinear Stochastic Dynamics, Namachchivaya and Lin, eds, Kluwer, 2003, 10 pages.
  8. T. Erneux, R. Kuske, T. W. Carr, "Mathematical studies of coupled lasers", in Laser Optics'95: Nonlinear Dynamics in Lasers, N.B. Abraham, Y.I. Khanin, eds., Proc. SPIE 2792, 1996, 8 pages.
  9. Product Driven Data Mining, R. Aggarwala, S. Bohun, R. Kuske, G. LaBute, W. Lu, N. Nigam, F. Youbissi, in Proceedings of the Seventh PIMS-IMA Industrial Problem Solving Workshop, S. Bohun, editor, 2004.
  10. IMA-PIMS, Proceedings of 6th Graduate Industrial Math Modeling Camp, R. Kuske, editor, 2004
  11. R. Kuske and T. Erneux, "Localization in systems of non-identical oscillators" in ICIAM95 Proceedings, K. Kirchgaessner, O. Mahrenholtz and R Mennicken, eds., Mathematical Research, Akademie Verlag Berlin, 1996.
  12. A. Doelman, W. Eckhaus, R. Kuske, R. Schielen, "Pattern formation in systems on spatially periodic domains", in {Nonlinear Dynamics and Pattern Formation in the Natural Environment}, A Doelman and A. van Harten, eds., Longman, 1995. ICPF '94 Proceedings.
  13. R. Kuske and T. Erneux, "Localization in systems of non-identical oscillators" in ICIAM95 Proceedings, K. Kirchgaessner, O. Mahrenholtz and R Mennicken, eds., Mathematical Research, Akademie Verlag Berlin, 1996.
  14. R. Kuske, N. Constanzino, B. Rout, C. Anton, C. Popescu, L. Mocofan, A. Apasi, N. Krislock, Z. Xue, "Optimal Policies for Disk Controllers", PIMS Graduate Industrial Math Modeling Camp, (2000).
  15. R. Kuske, D. Lyder, J. Samuel, C. Soteros, D. Wolfe, "VisionSmart: The Egg Candling Problem", Proceedings for PIMS Industrial Workshop, Calgary, Alberta, Canada, 1998.
  16. R. Kuske, B. Bart, M. Titcombe, Y. Lucet, S. Kavousian, S. Jensen, A. Sheshnev, K. El-Yassini, M. Neagu, "Optimal Policies for Queueing Systems", PIMS Graduate Industrial Math Modeling Camp, (1998).
- B3. Other refereed material. No data.
- B4. Submitted Journal Articles (with date of submission). No data.
- E. Daskalakis, F. Herrmann, R. Kuske, Accelerating sparse recovery by reducing chatter, SIAM J. Imaging Science, in revision.
- L. Serdukova, R. Kuske, D. Yurchenko Post-grazing dynamics of a vibro-impacting energy generator, submitted. J. Sound and Vibration.

**C. OTHER PUBLICATIONS AND CREATIVE PRODUCTS (Not Refereed)**

**D. PRESENTATIONS**

1. 1993 UC-Berkeley - Physics Seminar UC-Davis - PDE Seminar University of Utrecht  
– Physics Seminar
2. 1994 University of Utrecht - Mathematics Colloquium
3. 1995 UC-Davis - Applied Mathematics Seminar  
AWM-SIAM Mini-symposium at ICIAM '95  
Northwestern University - Applied Mathematics Seminar  
UW- Milwaukee - Applied Mathematics Seminar  
UW-Madison - Applied Mathematics Seminar  
U of IL- Chicago - Applied Mathematics Seminar  
ICIAM '95, mini-symposium
4. 1996 University of Washington - Applied Mathematics Seminar  
New Jersey Institute of Technology - Applied Mathematics Seminar  
U of Mich. Math Colloquium  
Georgia Tech, Math Colloquium  
MIT, Applied Math Seminar  
U of Arizona, Math Colloquium  
Arizona State Math Colloquium  
U of British Columbia, Math Colloquium  
Tufts Univ. Math Colloquium  
AWM Conference in honor of Julia Robinson
5. 1997 Colorado School of Mines - Mathematics Colloquium  
Dynamical Systems and Their Applications, Snowbird, Utah
6. 1998 Probability Seminar, Math Department, UMN  
Applied Math Seminar, Math Department, University of British Columbia (UBC)  
Probability Seminar, Math Department, UBC  
Critical Points Seminar, Math/Physics Depts, UBC  
Applied Math Seminar, Math Dept, Simon Fraser University  
Applied Math Colloquium, Applied Math Dept, Univ. of Washington,  
Applied Math Seminar, ICIAM, Oxford University, UK  
Industrial and Applied Math Seminar, University of Southampton, UK  
Nonlinear Mechanics Brooke Session , University of Bath,UK  
Physics Seminar, University of Science and Technology, Lille, FR  
Applied Math Seminar, University of Utrecht, NL
7. 1999 Nonlinear Mechanics Brooke Session , University of Bath,UK  
Probability Seminar, University of Warwick, UK  
Applied Math Seminar, University of Bristol, UK  
Applied Math Seminar - University of Wisconsin, Milwaukee  
University of Lincoln - Summer Math Camp  
Inaugural Conference: Centre for Nonlinear Mechanics, University of Bath, UK  
Stochastic Functional Differential Equations Workshop (University of Warwick)  
Memory, Delays, and Instabilities, CRM, University of Montreal
8. 2001 Computational Stochastic Differential Equations (University of Warwick)  
Distinguished Lecturer Series, Arizona State University  
Nonlinear Mechanics Seminar, University of Bath  
Applied Analysis Seminar, University of Leiden  
Nonlinearity Seminar, University of Amsterdam  
Math Colloquium, Southern Illinois University

- Math Colloquium, U. of Pittsburgh  
Applied Math Seminar, U. of Pittsburgh  
Fields Institute, Computational Challenges in Dynamical Systems
9. 2002  
Math Colloquium Rice University  
Applied Math Seminar, University of Houston  
Math Colloquium, UC-Irvine  
Math Colloquium, Southern Illinois University  
Applied Math Seminar, UBC  
Math Colloquium, UBC  
Math Colloquium, McGill University  
Math Colloquium, U. of Connecticut  
Lorentz Center, Nonlinear Phenomena in Science  
Stochastic nonlinear dynamics, IUTAM Symposium
10. 2003  
Simon Fraser University, Applied Math seminar  
U of Washington, Applied Math Colloquium  
SIAM Applied Dynamical Systems, Snowbird: invited minisymposium  
SIAM-CAIMS: invited minisymposium  
NIH, Math Modeling seminar  
BIRS Workshop, Localization Behavior in Reaction-Diffusion Systems and  
Applications to the Natural Sciences  
U of Maryland, Women in Applied Math: Research and Leadership  
Humboldt University, Berlin, Applied Stochastic Processes Seminar
11. 2004  
AMS Meeting: Special Session:  
Mathematical Modeling in Neuroscience, Biomedicine, Genetics and  
Epidemiology  
Stochastic Systems with Delay and Memory (conference), Berlin  
IAM Colloquium, UBC  
University of Leeds, Applied Math Seminar  
Boston University, Centre for Biodynamics Seminar
12. 2005  
AAAS Annual Meeting: Symposium and Speaker  
CRM Workshop: Integrative Multi-scale Modeling  
ENOC 05: Minisymposium  
WHOI Geophysical Fluid Dynamics Seminar  
Arizona State, Math Biology Seminar
13. 2006  
CMS-SMM Joint Meeting, Special Session: Localization and PDE's  
BICS Summer School: Multiscale Modeling
14. 2007  
MSRI Semester on Dynamics (2)  
MBI Opportunities in Math Biology  
CAIMS Minisymposium on Patterns coupled with mean flow  
SIAM Dynamical Systems: Minisymposium on Mixed-Mode Oscillations  
Stanford Applied Math Seminar  
Colloquium: UW Madison Math Department  
Virginia Chatelaine Memorial Lecture
15. 2008  
Foundations of Applied and Computational Math, NJIT  
AIMS Dynamics Meeting: Session on Neuronal Networks  
Canada-France Math Congress  
Math Bio Institute, OSU  
Math Bio Seminar, ASU
16. 2009  
CWI- Amsterdam: Applied and Computational Math Seminar  
Math Institute, Leiden University,

- PNW Conference on Comprehensive Math Modeling in Natural/Eng Sciences  
 Reflections on Nonlinear Mechanics, University of Bath, UK  
 ICMS Workshop: Numerical Analysis of Stochastic PDE's  
 Making it Real Seminar, Engineering Mathematics, Univ of Bristol, UK  
 Oxford Centre for Industrial and Applied Math  
 Mathematics Applications Consortium for Science and Industry, Limerick,  
 Ireland
17. 2010  
 SAMSU Stochastics Theme Year opening workshop  
 BIRS: Noise, Delay and Balance  
 BIRS: Multi-scale cell modeling  
 Foundations of Applied/Comp Math: NJIT  
 CAIMS Annual meeting: Special session on Dynamical Systems  
 McMaster University: Mathematics Colloquium
18. 2011  
 MBI: New Developments in Dynamical Systems Arising from the Biosciences  
 BIRS: Stochastic Multiscale Methods  
 Oberwolfach: Stochastic Dynamics  
 Nanjing: Stochastic Dynamical Systems  
 ICIAM Minisymposium: Network Dynamics, Information and Biology
19. 2012  
 ICMS, Edinburgh: Neurodynamics: heterogeneity, noise, delays, and plasticity in  
 neural systems,  
 ICMS, Edinburgh: Tutorial for Neurodynamics: heterogeneity, noise, delays, and  
 plasticity in neural systems  
 ICMS, Edinburgh: Scale transitions in chemistry and biology  
 ASME-IDETC2012: Conference on Mechanical Vibration and Noise  
 ICAND 2012, Seattle: Theory and applications in Nonlinear Dynamics  
 Washington State University: NSF ADVANCE Distinguished Women in  
 Quantitative Sciences
20. 2013  
 Gordon Research Conference: Stochastic Physics in biology  
 Boeing Distinguished Colloquium: Applied Mathematics, University of  
 Washington  
 SIAM Applied Dynamical Systems: Invited session on delayed oscillations  
 SIAM Annual conference: Minisymposium on tipping points in climate  
 dynamics  
 ICMS, Edinburgh: Advances in Tipping Point Theory  
 Pacific Northwest Numerical Analysis Seminar  
 SFU Biophysics seminar  
 New Zealand Mathematical Society, Annual Meeting (plenary colloquium)
21. 2014  
 Biophysical Annual Meeting, invited chair and session  
 IDEAS, Engineering/Applied Science, Budapest  
 IEEE – Analysis and Applications of Nonsmooth Systems, Como, Italy
22. 2015  
 Brown University, Probability colloquium  
 Brown University, AWM-Chapter Guest Speaker  
 Fields Institute Workshop: Delay Differential Equations in Physical Sciences and  
 Engineering  
 SIAM Applied Dynamical Systems, Featured Minisymposium  
 ICIAM 2015, Minisymposium: Recent Advances in Computational Biology  
 Math Biology Seminar, U Alberta  
 Math Climate Research Network, Colloquium
23. 2016  
 Imperial College, London, Stochastic Analysis Seminar  
 Oxford University, Industrial and Applied Math Seminar  
 Cambridge University, Dept. Applied Math and Theoretical Physics Seminar



- Georgia Tech, Mathematics Colloquium  
 Imperial College London, Mathematics of Planet Earth Seminar  
 University of Utrecht, Mathematics Colloquium  
 Climate Modeling workshop, Adv. Nonsmooth Dynamics, CRM, Barcelona  
 International Conference on Mathematical Neuroscience, Nice
24. 2017 ENOC 2017, Budapest, Mini-symposium on Systems with Time Delay  
 Scientific Computation/Differential Equations Conf., Bath UK,(Plenary)  
 Frontiers of Theory and Applications of Nonlinear PDE's, HKUST (Plenary)  
 Nonlinear Stochastic Dynamics PIMS U Alberta  
 SAMSI: Math in Radiative-convective balance of the Atmosphere  
 Conference on Dynamical Systems (GT-SoM)  
 Research Horizons (GT-SoM)
25. 2018 6th G. J. Butler Int'l Conf. on Differential Equations and  
 Population Biology, U Alberta, (Plenary).  
 Modeling, Stochastic Control, Optimization, IMA, (Plenary).  
 Ohio State Univ., Math Colloquium.  
 Advances in Non-smooth Dynamics, UK, 2018.  
 Stochastics Seminar (SoM),  
 Undergraduate Seminar (SoM)
26. 2019 Workshop on non-smooth dynamics in climate, energy, and sleep  
 Colloquium, Morgan State University  
 Colloquium, IIT Mumbai  
 Mini-symposium on Non-smooth nodes to networks  
 6<sup>th</sup> International Random Dynamical Systems (plenary)  
 Equadiff, Leiden University(plenary)  
 ASME – Minisymposium on nonlinear dynamics in energy
26. 2020 Chris Budd 60: innovation in mathematics  
 2020 Rising Stars in Computational and Data Sciences

## E. GRANTS AND CONTRACTS

### E1. As Principal Investigator

1. PI, *Applied Mathematics*, National Science Foundation, 1997-2000.  
 Funded amount: \$135,000
2. PI, *Applied Mathematics*, National Science Foundation, 2000-2003.  
 Funded amount: \$180,000 (annual)
3. PI, *Applied Mathematics*, McKnight UMN, 1998-2000.  
 Funded amount: \$80,000
4. PI, *Research Experience for Undergraduates*, National Science Foundation, 1999-  
 2003. Funded amount: \$60,000 (6 REUs over 4 years)
5. PI, *AWM Mentor Network*, Office of University Women, 2001.

- Funded amount: 2,000
6. PI, *Applied Mathematics*, NSERC, 2003-2009. Funded amount: 150,000
  7. PI, *Applied Mathematics*, CRC, 2002-2007. Funded amount: \$500,000
  8. PI, *Applied Mathematics*, CRC-CFI, 2003. Funded amount: \$186,355
  9. PI, *Applied Mathematics*, CRC, 2007-2012. Funded amount: \$500,000
  10. PI, *Applied Mathematics*, NSERC, 2009-2015. Funded amount: 150,000
  11. PI, *Distinguished Visiting Professor*, PIMS, 2011. Funded amount: \$2,000
  12. PI, *Discovery Grant*, NSERC, 2015-2020. Funded amount: \$150,000
  13. PI, *Fellowship, Stochastic Modeling and Computation in Biology*, Newton Institute, 2016. Funded amount: \$7,500 GBP
  14. PI, *Accelerator*, NSERC, 2016-2019. Funded amount: \$120,000
  15. PI, *Newton Institute Semester on Stochastics in Biology*, 2016. Funded amount: \$2,400 GBP
  16. PI, *NSF*, 2020-23. *STOCHASTIC NON-SMOOTH ANALYSES FOR NONLINEAR DYNAMICS IN ENERGY*, \$300K

**E2. As Co-Principal Investigator**

1. Co-PI, *Mathematics Modeling Workshop*, NSA, 2000. Funded amount: \$20,000
2. Co-PI, *Mathematics Finance*, MITACS, 2003-2007. Funded amount: \$5,000
3. Co-PI, *Mathematics Finance*, Humboldt Foundation Trans-Coop, 2005-2007. Funded amount: \$85,000 plus MITACS matching
4. Co-PI, *Collaborative Research Group in Modeling and Computation in Biology*, PIMS, 2006-2009. Funded amount: \$300,000
5. Co-PI, *CWSEI-Math Education Initiative*, Carl Weiman Science Education Initiative, 2009-2014. Funded amount: \$375,000
6. Co-PI, *Support for SWSEI-Math and CWSEI-CS programs*, External Donor, 2010-2015. Funded amount: \$400,000
7. Co-PI, *International Visiting Research Scholar*, PWIAS, 2013. Funded amount: \$10,000
8. Co-PI, *Women in Math Summer School*, PIMS, 2016. Funded amount: \$20,000
9. Co-PI, *Distinguished Visiting Professor (UBC-SFU)*, PIMS, 2015. Funded amount: \$5,000
10. Georgia Tech Climate Fellows \$20,000

**E3. As Senior Personnel or Contributor.** No data.

**E4. Pending Proposals.**

NIH-NIGMS Proposal (co-PI)

**E5. Proposals Submitted But not funded**

- NSF Convergence white paper (2018)
- NSF TRIPODS Phase II (co-PI) (2020)
- NSF Math Institute Proposal (2019)
- NSF Applied Math (2018)

## **F. Other Scholarly and Creative Accomplishments**

### **Conferences and Seminars Organized**

- 2017 Co-organizer & Data-Driven Methods for Reduced-Order Modeling and Stochastic PDE's, Banff International Research Station  
Nonlinear Stochastic Dynamics PIMS, U Alberta  
Random Dynamical Systems, ENOC 2017
- 2016 Co-organizer: PIMS Summer School, Two Weeks in Vancouver for Women in Math
- 2015 Co-organizer: Stochastic Dynamics, Chinese Academy of Sciences
- 2013 Co-organizer, JBK90, Stanford University
- 2012 Co-organizer: American Institute of Mathematics, Stochastic dynamics of small networks of neurons
- 2009 Conference Co-Chair: Mathematical Challenges in Climate Science
- 2007 Graduate Summer School: Stochastic Modeling in Infectious Disease  
Synchrony in the Brain, UBC  
Diversity in Math/Science, BIRS
- 2006 CAIMS-MITACS: Stochastic Modeling in Industry  
BIRS Women in Math workshop
- 2005 Canadian Women in Math Conference (BIRS), organizing committee  
Hydraulic Fracturing Summit V, co-organizer
- 2003 Canadian Women in Math Conference (Edmonton), co-organizer  
PIMS Graduate Industrial Math Modeling Camp  
PIMS Industrial Problems Solving Workshop  
SIAM Applied Dynamical systems: Minisymposium on Localization and Synchronization  
SIAM/CAIMS: Minisymposium on Applications of Stochastic Dynamics
- 2002 IMA Graduate Math Modeling Workshop
- 2000 IMA Graduate Math Modeling Workshop

## **G. Societal and Policy Impacts**

### **H. Other Professional Activities**

- 1999 Visiting Scholar, University of Bath
- 2009 Visiting professor, University of Leiden
- 2016 Fellow, Isaac Newton Institute
- 2016 Visiting Scholar, Imperial College
- 2016-18 Visiting Professor, Budapest University of Technology and Economics

## **V. Education**

### **A. Courses Taught at Georgia Tech (No data)**

### **B. Individual Student Guidance**

#### **B1. Ph.D. Students**

1. Na Yu (2003-2009), Appl. Math
2. Jennifer Chafee (2005-2007), Appl. Math
3. Jielin Zhu (2010-2015)

4. William Thompson (2011-2015)
5. Sarah Sundius (2019- )

**B2. M.S. Students**

1. Natasha Kerbel (1998-2001), Ind. Math
2. Miriam Freedman (2000-2002), Ind. Math
3. Yongwu Shao (2001) Summer Intern
4. Florica Coman (2003-2005) Applied Math
5. Hui-hua Wang (2004-2006)
6. Bruno L'Esperance (2005-2007) Applied Math
7. Cecilia Wang (2007-2009)
8. William Thompson (2008-2010)
9. Jiaying Wang (2012-2014)
10. Mendgi Hua (2012-2014)
11. Yifan Feng (2012-2013) (co-supervisor)
12. Eamon Kavanagh (2012-2013) (co-supervisor)
13. Ziming Yin (2016 – 2018)
14. Cody Griffith (2016-2018)

**B3. Undergraduate Students**

1. Sarah Thompson (Spring 2000), Senior Research project
2. Summer 2000 Research Experience for Undergraduates
  - Nick Stadtmiller: Barrier Options
  - Laura Chasman: Bursting in Neurons
  - Andrew Quigg: Free boundary Problems in Math Finance (unofficial)
3. Kristine Arneson (Spring 2001) Stochastic Differential-Delay Equations  
Independent Study
4. Summer 2001 Research Experience for Undergraduates
  - Michael Hsieh: Option Pricing
  - Justin Douglas: Localized Buckling
  - Jessica Myers: Bursting in Coupled Neurons
5. Summer 2002 Research Experience for Undergraduates
  - Jessica Striker Bursting in Morris-Lecar models
  - Justin Douglas Bursting in Morris-Lecar models
  - Costas Constantinides Pricing options for assets with delays
  - Michael Walrath Pricing options for assets with delays
6. Terry Soo (Summer 2004), USRA SFU  
Bruno L' Esperance (Summer 2004), U Montreal, Stochastic resonance in  
machine tool vibrations
7. Laura Dunwoody (Summer 2006) UBC Math/Physics  
Tyler Dodds (Summer 2006) UBC Math/Physics
8. Mark Cembrowski, (Summer 2007)
9. Jiaying Wang (Summer 2011) Globalink Summer ugrad researcher
10. REUs 2019: Trevor Ridley, Emily Zhang, Janice Lee, Rachel Walker, Charanpreet  
Singh, Mil-Yonta Williams
11. REU's 2020: Sam Dulin, Ariba Khan, Kailee Lin, Yihua Xu

**B4. Thesis or Dissertation Committees**

- |      |  |
|------|--|
| 1997 | Jinghua Qian, Dept. of Math, Tufts University            |
| 1998 | High School Workshop: Project GAMMA Workshop, ITCEP, UMN |

1999 Xiangdong Tong, Civil Engineering, UMN  
Diane Miller, Chemical Engineering, UMN

2000 Christopher Tyler, Chem. Eng., UMN  
Kristantinos Apostolou, Chem Eng., UMN  
Jose Adachi, Civil Eng., UMN  
Alexei Savitskii, Civil Eng, UMN  
Andrew Cady, Physics, UMN  
Won Jae Chang, Math, UMN  
Luis Roman, Math, UMN

2001 Xiangdong Tong, Civil Engineering, UMN  
Pavan K Vitthaladevuni, ECE,UMN  
Marie-Nathalie Contou-Carrere, Chemical Engineering, UMN  
Shantanu Rane, Electrical Engineering, UMN  
Jianlin Wang, Geolog. Eng., UMN  
Won Jae Chang, Math, UMN  
Jose Adachi, Civ. Eng. UMN  
Tamara Naeh-Galor, Tel Aviv Univeristy

2002 Pornchai Phukpattaranont, EE, UMN  
Ziomara Gerdzten Chem Eng., UMN  
Soumendra Basu, Chem Eng., UMN  
Kevin Collins, Math, UMN

2003 Ph. D. committee: Pichmony Anhaouy, UBC

2004 Theodore Kolokolnikov, UBC, Ph. D. in IAM

2005 Chair Ph.D Defense, Jason Kalirai, Ph D. Physics

2006 University Examiner, Maggie Wang, Ph D. Mech Eng

2008 University Examiner, Doruk Merdol, Ph. D., Mech Eng

2009 University Examiner, Wan Chan  
Universtity Examiner, Alex Wang  
PhD Defense Chair, Hsien-Hang Shieh  
Committee, Alberto Molina

2011 PhD Defense chair, Jason Donald Thompson

2012 PhD Defense chair, Shubo Wang, Sauder  
PhD Defense chair, Mark Anthony Crowley, CS

2013 PhD Committee, Bernhard Konrad, IAM  
Proposal exam, Jia Gou, IAM

2015 PhD Defence, Chair, Essex Edwards  
PhD Committee, Zhilong Fang (EOAS)

2016 University Examiner, Alex McAvoy (Math)

2019- QBioS – Andreea Magalie

#### **B5 Mentorship of postdoctoral fellows or visiting scholars**

IMA Postdoc: 1999-2000 Ralf Wittenberg,  
2000-2001 Dmitri Kirill

UBC : 2003-2006 Sarah Mitchell (now lecturer, University of Limerick, IE)  
2007-2010 Peter Borowski 10/07- 3/10 (private sector research position, Munich)  
2009-2012 David Simpson 8/09-8/12 (now lecturer Massey University, NZ)  
2013-2015 Chia Ying Lee, 8/13- (research at AIR worldwide consulting)  
2014-2016 Anna Barry, 8/14 -1/2016 (now lecturer Auckland University, NZ)  
2016-2018 Emmanouil Daskalakis, 9/16- (jointly supervised with F. Herrmann)

Georgia Tech:2017-2020 Larissa Serdukova, 8/17 -  
2018-2020 Andre Wibisono (main supervisor, Jake Abernathy, CS)

### C. Educational Innovations and Other Contributions

## VI. Service

### A. Professional Contributions

### B. Public and Community Service

- (a) *Memberships on scholarly societies, including offices held and dates*
  - Society for Industrial and Applied Math (SIAM) 1992-present
  - Association for Women in Math (AWM) 1996-present
  - CMS 2003-2013
  - CAIMS 2005-present
- (b) *Memberships on other societies, including offices held and dates*
- (c) *Memberships on scholarly committees, including offices held and dates*
  - 2002 NSF Panel, Division of Mathematical Sciences
  - 2005 SIAM-AWM Sonja Kovalesky Prize Committee
  - 2005 Chair: SIAM-AWM Sonja Kovalesky Prize Committee
  - 2005-08 NSERC Grant Selection Committee: Pure/Applied Math B (Chair: 2006-08)
  - 2005-08 BIRS Scientific Advisory Board
  - 2008, 2010, 2012 NSF Panel, Division of Mathematical Sciences
  - 2009 Chair: NSF Review of IPAM (NSF funded Math Institute)
  - 2010 Chair: SIAM J.D. Crawford Prize Committee
  - 2010-12 Long Range Planning Committee: Math-Stats-NSERC
  - 2012-18 SIAM Council
  - 2011- 2015 Fields Institute Scientific Advisory Panel: 2011-present
  - 2013 Chair: NSF Review of ICERM (NSF funded Math Institute)
  - 2017 External review, Mathematics, University of Illinois, Chicago
  - 2017-2020 ICERM Scientific Advisory Board
  - 2019 External review, Applied Mathematics, Northwestern University
  - 2019- present National Academies Board on Math Sciences & Analytics
  - 2020 External review, chair, U Victoria, BC, Canada
- (d) *Memberships on other committees, including offices held and dates*
  - 2004– 2009 CMS Women in Math Committee
  - 2005 BIRS Site Visit Committee
  - 2004- 2011 ICIAM 2011 Steering Committee
  - 2008- 2011 NSERC-MATH-STATS Liaison Committee
- (e) *Editorships (list journal and dates)*
  - 2020-present: Physica D
  - 2017-present: Transactions of Mathematics and its Applications
  - 2015- 2018 Editorial Board, SIAM Book Series on Modeling and Computation
  - 2012-2017 Editorial Board, Discrete and Continuous Dynamical Systems – B
  - 2011-present Mathematics in Industry Case Studies
  - 2008-present Editorial Board, European J. of Applied Math
  - 2007–present Editorial board, IMA journal on applied math
  - 2005-2017 Editorial Board, SIAM J. Appl. Math
  - 2006-2012 Editorial Board, SIAM Review

2006-2011 Editorial Board, Computing in Science and Engineering (IEEE/AIP)  
2005-06 Guest Editor, Computing in Science and Engineering (IEEE/AIP)  
Special Issue : Interactions of Noise and Signal in Complex Systems

- (f) *External examiner (indicate universities and dates)*  
External Examiner, Ph. D. , U of Waterloo, Applied Math 4/04  
External Examiner, Ph. D. , McGill, Physics, 2011  
External Examiner, Habilitation, Vienna, 2016  
External Examiner, PhD, U Auckland, Mathematics, 2016  
External Examiner, PhD, Budapest University of Tech/Econ, Applied Mechanics, 2018
- (g) *Reviewer (journal, agency, etc. including dates)*  
1995 SIAM Journal on Applied Mathematics(2)  
1996 SIAM Journal on Applied Mathematics(2)  
1997 Physics Letters A  
Journal of Mathematical Analysis and Applications  
1998 SIAM Journal of Applied Mathematics  
Journal of Theoretical Biology  
Journal of Mathematical Analysis and Applications  
1999 SIAM J. Appl. Math  
Appl. Math. Letters  
NSF Proposal/Applied Math  
2000 SIAM Review  
NSF Proposal/Physics  
European Journal of Applied Math (2)  
Applied Mathematical Finance  
NSF Proposal/International Opportunities  
Fraction Calculus and Applied Analysis  
SIAM Journal on Applied Math  
2001 Physics Letters A  
SIAM Journal on Applied Math  
International Journal of Mathematics and Mathematical Sciences  
NSF Proposal- Applied Math  
Math Modeling text, Oxford University Press  
2002 NSF Panel  
Princeton University Press, book proposal(2)  
SIAM J. Applied Math  
Journal of Math Finance  
2003 IUTAM Symposium  
Journal of Nonlinear Science  
Phys. Letters A  
European Journal of Applied Math  
NSERC Discovery Grant proposal  
Mathematical Finance  
Journal of Mathematical Analysis and Applications  
SIAM J. Applied Math  
2004 Applied Math Letters  
Applied Math Finance  
European J. Appl. Math  
Math and Computer Modeling  
Physica D

2005 NSERC proposal  
SIAM J. Appl. Math (3)  
Computers and Mathematics with Applications  
Book Review, SIAM News  
Book Proposal Review, Academic Press  
J. Comp. Math and Optimization

2006 SIAM Multiscale modeling  
SIAM Review, book review  
J Differential Equations and Dyn. Sys

2007 Physica D  
Chaos

2008 Journal of Mathematical biology  
2 NSERC proposals

2009 3 NSERC proposals

2010 3 NSERC proposals  
J. Math Bio

2011 1 NSERC proposal  
J. Differential Equations

2012 NSERC Proposal

2013 Journal of Mathematical Neuroscience  
Journal of Theoretical Biology

2014 1 NSERC proposal

2015 CRC 1 Renewal  
Proceedings of the Royal Society – A  
SIAM Applied Dynamical Systems  
NSERC Discovery Grant  
SIAM Review  
Proc. American Math Society

2016 International Journal of Bifurcation and Chaos  
Physica D  
E. Journal of Qualitative Theory of Differential Equations  
J. Stat Phys (2, 1 joint review)

2017 Chaos (2)

2018 SIAM Multi-Scale Modeling  
Nonlinear Dynamics  
SIAM Applied Dynamical Systems  
Springer Book review  
AMS Book review

2019 Science China

(h) *External examiner (indicate universities and dates)*  
External Examiner, Ph. D. , U of Waterloo, Applied Math 4/04  
External Examiner, Ph. D. , McGill, Physics, 2011  
External Examiner, Habilitation, Vienna, 2016  
External Examiner, PhD, U Auckland, Mathematics, 2016  
External Examiner, PhD, National Univ. Ireland, Galway, 2019

(i) *Consultant (indicate organization and dates)*  
2004 Council of Ontario Universities,



Wilfred Laurier University, New M.Sc. Program review  
 2007 Review of Department of Applied Mathematics, University of Washington  
 2008 Grad program review, Queen's University, Math/Stat  
 2009 School of Mathematical Sciences review, Chair, Arizona State University  
 2015- Strategic Board, Statistical Applied Mathematics at Bath (SAMBa) Centre for  
 Doctoral Training, University of Bath

(j)

*Other service to the community*  
 2013 *speaker for NSF Advance conference call*  
 2012 *Speaker at Whatcomm Comm. College*  
 2012 *Opening speaker for Women in Science and Engineering event*  
 2011 *AWM-ICIAM Panel on Women in Leadership*  
 2010-present Advisor: AWM Mentor Network  
 2010 *Srivastava Workshops Panel*  
 2009 Women in Math in Mexico  
 2008 Canada-France Congress: Women in Math Panel  
 2006-2007 American Institute of Mathematics, Associate Director for Program  
 Diversity  
 2006-2008 Co-leader, PIMS Collaborative Research Group on Modeling/computation  
 in Biology  
 2003 Canadian Women in Mathematics, Panel: "Careers in Mathematics"  
 Women in Applied Math: Research and Leadership, Panel: "The tenure  
 process"  
 AWM Panel: "Careers in Mathematics", AMS Meeting, Phoenix  
 2001-2009 AWM Mentor Network Coordinator 2001-2009  
 2000 University of Nebraska, High School Summer Math Camp  
 2015 AWM Panel on "Launching your Career in Mathematics", AMS Meeting,  
 Baltimore, SIAM Annual Meeting/Association for Women in Mathematics  
 Workshop (Mentor)

### C. Institute Contributions

GT: 2017- TRIAD (NSF TRIPODS) Management Committee  
 2017-18 ML@GT Internal Advisory Council  
 2018-19 Honorary Degree & Commencement Speaker Committee