Zachary P. Kilpatrick http://www.colorado.edu/amath/zpkilpat
University of Colorado Boulder, Associate Professor, Applied Mathematics (zpkilpat@colorado.edu)

Education

2007 – 2010 **University of Utah**: PhD in Mathematics
2005 – 2007 **University of Utah**: M.S. in Mathematics
2001 – 2005 **Rice University**: B.A. in Computational and Applied Mathematics; B.A. in History

Academic Appointments

2020 – **University of Colorado Boulder**, Associate Professor, Applied Mathematics
2023 – **University of Colorado Boulder**, Affiliate Faculty, Computer Science
2018 – **University of Colorado Boulder**, Affiliate Faculty, Institute for Cognitive Science
2016 – **University of Colorado School of Medicine**, Affiliate Faculty, Physiology & Biophysics
2022 – 2023 **University of Vermont**, Visiting Scholar, Mathematics
2016 – 2020 **University of Colorado Boulder**, Assistant Professor, Applied Mathematics
2016 – 2019 **University of Houston**, Research Assistant Professor, Mathematics
2012 – 2016 **University of Houston**, Assistant Professor, Mathematics
2010 – 2012 **University of Pittsburgh**, NSF Mathematical Sciences Postdoctoral Research Fellow

Current Research Grants

amount to Kilpatrick in **bold**

2022 – 2025 NSF: Collaborative Research in Computational Neuroscience
(co-PI with J. Gold, L. Ding, & K. Josić: **$242,421**; NSF-2207700)
CRCNS: Adaptive decision rules in dynamic environments

2020 – 2024 BRAIN Initiative: Theories, Models, & Methods for Analysis of Complex Data from the Brain
NIH: Nat'l Inst. of Mental Health/Nat'l Instit. of Biomedical Imaging and Bioengineering
(sole PI: **$772,372**; R01-EB029847)
Connecting neural circuit architecture and experience-driven probabilistic computations

Completed Research Grants

amount to Kilpatrick in **bold**

2019 – 2022 NSF DMS: Mathematical Biology (sole PI: **$249,999**; NSF-DMS-1853630)
Spatiotemporal neural dynamics of visual decisions

2017 – 2021 NSF/NIH: Collaborative Research in Computational Neuroscience
Nat'l Inst. of Mental Health (co-PI with J. Gold & K. Josić: **$532,732**; R01-MH115557)
CRCNS: Decision making in changing environments

2016 – 2019 NSF DMS: Mathematical Biology (sole PI: **$234,000**; NSF-DMS-1615737)
Robust spatiotemporal dynamics in multi-layer neuronal networks

2015 – 2019 NSF DMS: Mathematical Biology (co-PI with K. Josić: **$164,722**; NSF-DMS-1517629)
The ever-changing network: How changes in architecture shape neural computations

2013 – 2017 NSF DMS: Mathematical Biology (sole PI: **$184,937**; NSF-DMS-1311755)
Architecture for robust spatiotemporal dynamics in neuronal networks

2010 – 2012 NSF DMS: Postdoctoral Research Fellowship (sole PI: **$135,000**)

Pending Grants

amount requested to Kilpatrick in **bold**

2024 – 2027 BRAIN Initiative: Theories, Models, & Methods for Analysis of Complex Data from the Brain
(sole PI: **$912,588**), *Inferring neural representations of estimate uncertainty*

Conference Grants and Internal Grants

2016 – 2017 NSF DMS – Conference Proposal (PI with J. Gjorgjieva & R. Rosenbaum: **$20,000**)
2016 – 2017 Burroughs Wellcome Fund – Conference Proposal (co-PI with J. Gjorgjieva: **$5,000**)
2016 – 2017 SIAM – Conference Proposal (PI with J. Gjorgjieva & R. Rosenbaum: **$5,000**)
2016 – 2017 CU Boulder Faculty Conference Award: **$3,000**
International Conference on Mathematical Neuroscience

2013 – 2014 University of Houston, GEAR (co-PI with K. Josić: **$30,000**)
Forecasting in biological networks: How organisms see the future

2013 University of Houston, New Faculty Research Grant (sole PI: **$6,000**)
Robust neural field models for decision making with multiple alternatives

Graduate Students Supervised

3 current & 5 past PhD; 3 past masters

- Noah Parks, **PhD** (CU Boulder), 2nd year
  Project: *Nonlinear dynamics of neural circuit models of visual motion illusions*
- Sage Shaw, **PhD** (CU Boulder), 5th year
  Project: *Numerical and asymptotic methods for neural field models of visual perception*
- Heather Cihak, **PhD** (CU Boulder), May 2024: **NSF GRF Honorable Mention**
  Project: *The impact of synaptic dynamics on working memory in neural field equations*
  Upcoming Position: Postdoc at U Minnesota, Mathematics
- Nicholas Barendregt, **PhD** (CU Boulder), May 2023: **CU Boulder Dissertation Fellowship**
  Dissertation: *Adaptive decision making in dynamic environments using sequential Bayesian inference*
  Now: Postdoc at CU Boulder, Biofrontiers Institute and Computer Science
- Subekshya Bidari, **PhD** (CU Boulder), May 2022
  American Association of University Women Dissertation Fellowship
  German Academic Exchange Service Scholarship
  Dissertation: *Dynamical models of foraging decisions in social animal groups*
  Now: Postdoc at Columbia University, Epidemiology
- Kate Nguyen, **PhD (coadvisor)** (U Houston), August 2020: **NSF Graduate Research Fellow**
  Dissertation: *How trial correlations and feedback shape sequential decision-making*
  Now: Postdoc at Max Planck Institute for Dynamics & Self-Organization/German Primate Center
- Adrian Radillo, **PhD (coadvisor)** (U Houston), August 2018
  Dissertation: *Optimal decision-making models in changing environments*
  Now: AI Data Scientist at Chubb; Previously: Postdoc at U Penn, Neuroscience
- Daniel Poll, **PhD** (U Houston), May 2017
  Dissertation: *Stochastic dynamics in bump attractor models of spatial working memory*;
  Now: Assistant Professor of Mathematics, College of Charleston

- Emily Webb, **M.S.** (CU Boulder), May 2021
  Thesis: *Bayesian inference of Markov transition rates*
  Now: Applied Research Mathematician in the National Security Agency
- Timothy Thorn, **M.S.** (CU Boulder), December 2020
  Thesis: *Learning algorithms for biologically plausible recurrent neural networks*
  Now: Associate Actuary at Centene Corporation
- Nikhil Krishnan, **M.S.** (CU Boulder), May 2019
  Thesis: *Foraging in stochastic environments*
  Now: PhD Student at Princeton University, Operations Research & Financial Engineering

Postdoctoral Fellows Supervised

- Tahra Eissa (CU Boulder), 2018–
  K99/R00 BRAIN Initiative Advanced Postdoctoral Career Transition Award ($1,010,710)
  Four Refereed Publications (PLoS Comput. Biol. (2); Curr. Op. Neurobiol.; SIAM J Appl. Dyn. Syst.), Three Refereed Conference Abstracts (2 CoSyNe Posters and a SfN Talk)
- Alan Veliz-Cuba (coadvisor) (UH), 2013–15; Four Refereed Publications (SIAM Rev.; J. Comput. Neurosci.; Neural Comput.; Neurons, Behavior, Data Analysis, and Theory)
  Faculty Position: Associate Professor of Mathematics, University of Dayton

Manuscripts under Review

undergrad*; grad student‡; postdoc†; co-first$^{\oplus}$; co-last$^{\text{◕}}$

1. S. Linn, S.D. Lawley, B.R. Karamched, Z.P. Kilpatrick, & K. Josić, *Fast decisions reflect bias, slow decisions do not*, **Phys. Rev. Lett.** (2023) in review.
   arXiv: `https://arxiv.org/abs/2401.00306`
2. S. Shaw & Z.P. Kilpatrick, *Representing stimulus motion with waves in adaptive neural fields*, **J Comput. Neurosci.** (2023) in review.
   arXiv: `https://arxiv.org/abs/2312.06100`

Refereed Journal Publications [link]

undergrad*; grad student‡; postdoc†; co-first$^{\oplus}$; co-last$^{\text{◕}}$

1. H.L. Cihak‡ & Z.P. Kilpatrick, *Multiscale motion and deformation of bumps in stochastic neural fields with dynamic connectivity*, **Multiscale Model. Simul.** 22 (2024) 178-203.
2. T.L. Eissa† & Z.P. Kilpatrick, *Learning efficient representations of heterogeneity in attractors for working memory*, **PLoS Comput. Biol.** 19 (2023) e1011622.
3. A. Ly, A. Barker, E.D. Prevost, D.J. McGovern, Z.P. Kilpatrick, & D.H. Root, *Bed Nucleus of the Stria Terminalis GABA neurons are necessary for changes in foraging behavior following an innate threat*, **Eur. J Neurosci.** 58 (2023) pp. 3630-3649.
4. M. Stickler, W. Ott, Z.P. Kilpatrick$^{\text{◕}}$, K. Josić$^{\text{◕}}$, & B. Karamched$^{\text{◕}}$, *Impact of correlated information on pioneering decisions*, **Phys. Rev. Research** 5 (2023) 033020.
5. N.W. Barendregt‡, E.G. Webb*, & Z.P. Kilpatrick, *Adaptive Bayesian inference of Markov transition rates*, **Proc. R Soc. A** 479 (2023) 20220453.
6. J.I. Gilmer, M.A. Farries, Z.P. Kilpatrick, I. Delis, & A.L. Person, *An emergent temporal basis set robustly supports cerebellar time-series learning*, **J Neurophysiol.** 129 (2023) pp. 159-176.
7. N.W. Barendregt‡, J.I. Gold$^{\text{◕}}$, K. Josić$^{\text{◕}}$, & Z.P. Kilpatrick$^{\text{◕}}$, *Normative decision rules in changing environments*, **eLife** 11 (2022) e79824.
8. H.L. Cihak‡, T.L. Eissa†, & Z.P. Kilpatrick, *Distinct excitatory and inhibitory bump wandering in a stochastic neural field*, **SIAM J Appl. Dyn. Syst.** 21 (2022) pp. 2579-2609.
9. T.L. Eissa†, J.I. Gold$^{\text{◕}}$, K. Josić$^{\text{◕}}$, & Z.P. Kilpatrick$^{\text{◕}}$, *Suboptimal human inference inverts the bias-variance trade-off for decisions with asymmetric evidence*, **PLoS Comput. Biol.** 18 (2022) e1010323.
10. S. Bidari‡, A. El Hady, J.D. Davidson, & Z.P. Kilpatrick, *Stochastic dynamics of social patch foraging decisions*, **Phys. Rev. Research** 4 (2022) 033128.
11. K Schapiro, K. Josić, Z.P. Kilpatrick, & J.I. Gold, *Strategy-dependent effects of working-memory limitations on human perceptual decision-making*, **eLife** 11 (2022) e73610.
12. S. Bidari‡ & Z.P. Kilpatrick, *Hive geometry shapes the recruitment rate of honeybee colonies*, **J Math. Biol.** 83 (2021) 20.

13. Z.P. Kilpatrick, J.D. Davidson, & A. El Hady, *Uncertainty drives strategy deviations of patch leaving decisions in foraging*, **J R Soc. Interface** 18 (2021) 20210337.

14. B. Karamched[†], M. Stickler[‡], W. Ott, B. Lindner, Z.P. Kilpatrick[◕], & K. Josić[◕], *Heterogeneity improves speed and accuracy in social networks*, **Phys. Rev. Lett.** 125 (2020) 218302. [**Highlight**] and [**Editors' Suggestion**]

15. B. Karamched[†,⊕], S. Stolarczyk[‡,⊕], Z.P. Kilpatrick[◕], & K. Josić[◕], *Bayesian evidence accumulation on social networks*, **SIAM J Appl. Dyn. Syst.** 19 (2020) pp. 1884-1919.

16. Y. Wang, Z.P. Kilpatrick[◕], & K. Josić[◕], *A hierarchical model of perceptual multistability involving interocular grouping*, **J Comput. Neurosci.** 48 (2020) pp. 177-192.

17. S. Bidari[‡], O. Peleg, & Z.P. Kilpatrick, *Social inhibition maintains adaptivity and consensus of foraging honey bees in dynamic environments*, **R. Soc. Open Sci.** 6 (2019) 191681.

18. N.W. Barendregt[‡], K. Josić[◕], & Z.P. Kilpatrick[◕], *Analyzing dynamic decision-making models using Chapman-Kolmogorov equations*, **J Comput. Neurosci.** 47 (2019) pp. 205-222.

19. A.E. Radillo[‡,⊕], A. Veliz-Cuba[⊕], K. Josić[◕], & Z.P. Kilpatrick[◕], *Performance of normative and approximate evidence accumulation on the dynamic clicks task*, **Neurons, Behavior, Data Analysis, & Theory** (2019) 10226.

20. Z.P. Kilpatrick, W.R. Holmes, T.L. Eissa[†], & K. Josić, *Optimal models of decision-making in dynamic environments*, **Curr. Opin. Neurobiol.** 58 (2019) pp. 54-60.

21. K.P. Nguyen[‡], K. Josić[◕], & Z.P. Kilpatrick[◕], *Optimizing sequential decisions in the drift-diffusion model*, **J Math. Psychol.** 88 (2019) pp. 32-47.

22. N. Krishnan* & Z.P. Kilpatrick, *Optimizing a jump-diffusion model of a starving forager*, **Phys. Rev. E** 98 (2018) 052406.

23. G. Faye & Z.P. Kilpatrick, *Threshold of front propagation in neural fields: An interface dynamics approach*, **SIAM J Appl. Math.** 78 (2018), pp. 2575-2596.

24. Z.P. Kilpatrick, *Synaptic mechanisms of interference in working memory*, **Sci. Rep.** 8 (2018) 7879.

25. N. Krishnan*, D.B. Poll[‡], & Z.P. Kilpatrick, *Synaptic efficacy shapes resource limitations in working memory*, **J. Comput. Neurosci.** 44 (2018), pp. 273-295.

26. Z.P. Kilpatrick & D.B. Poll[‡], *Neural field model of memory-guided search*, **Phys. Rev. E** 96 (2017), 062411.

27. D.B. Poll[‡] & Z.P. Kilpatrick, *Velocity integration in a multilayer neural field model of spatial working memory*, **SIAM J Appl. Dyn. Syst.** 16 (2017), pp. 1197-1234.

28. A.E. Radillo[‡], A. Veliz-Cuba, K. Josić[◕], & Z.P. Kilpatrick[◕], *Evidence accumulation and change rate inference in dynamic environments*, **Neural Comput.** 29 (2017), pp. 1561-1610.

29. A. Jacot-Guillarmod[◕], Y. Wang[◕], C. Pedroza, H. Öğmen, Z.P. Kilpatrick[◕], & K. Josić[◕], *Extending Levelt's Propositions to perceptual multistability involving interocular grouping*, **Vision Res.** 133 (2017), pp. 37-46.

30. Z.P. Kilpatrick, *Ghosts of bump attractors in stochastic neural fields: Bottlenecks and extinction*, **Discrete Contin. Dynam. Syst. Ser. B** 21 (2016), pp. 2211-2231.

31. Z.T. McCleney* & Z.P. Kilpatrick, *Entrainment in up and down states of neural populations: non-smooth and stochastic models*, **J. Math. Biol.** 73 (2016), pp. 1131-1160..

32. D.B. Poll[‡] & Z.P. Kilpatrick, *Persistent search in confined domains: a velocity-jump process model*, **J. Stat. Mech.** (2016), 053201.

33. D.B. Poll[‡], K. Nguyen*, & Z.P. Kilpatrick, *Sensory feedback in a bump attractor model of path integration*, **J. Comput. Neurosci.** 40 (2016), pp. 137-155.

34. A. Veliz-Cuba[†], Z.P. Kilpatrick[◕], & K. Josić[◕], *Stochastic models of evidence accumulation in changing environments*, **SIAM Rev.** 58 (2016), pp. 264-289.

35. A. Veliz-Cuba[†], H.Z. Shouval, K. Josić[◕], & Z.P. Kilpatrick[◕], *Networks that learn the precise timing of event sequences*, **J Comput. Neurosci.** 39 (2015), pp. 235-254.

36. D.B. Poll[‡] & Z.P. Kilpatrick, *Stochastic motion of bumps in planar neural fields*, **SIAM J Appl. Math.** 75 (2015) pp. 1553-1577.

37. Z.P. Kilpatrick, *Stochastic synchronization of neural activity waves*, **Phys. Rev. E** 91 (2015), 040701(R).

38. P.C. Bressloff & Z.P. Kilpatrick, *Nonlinear Langevin equations for wandering patterns in stochastic neural fields*, **SIAM J Appl. Dyn. Syst.** 14 (2015), pp. 305-334.

39. Z.P. Kilpatrick, *Delay stabilizes stochastic motion of bumps in layered neural fields*, **Physica D** 295 (2015), pp. 30-45.

40. Z.P. Kilpatrick & G. Faye, *Pulse bifurcations in stochastic neural fields*, **SIAM J Appl. Dyn. Syst.** 13 (2014), pp. 830-860.

41. J.K. Kim[†], Z.P. Kilpatrick, M.R. Bennett, & K. Josić, *Molecular mechanisms that regulate the coupled period of the mammalian circadian clock*, **Biophys. J** 106 (2014), pp. 2071-2081.

42. Z.P. Kilpatrick, *Coupling layers regularizes wave propagation in stochastic neural fields*, **Phys. Rev. E** 89 (2014), 022706.

43. S. Carroll*, K. Josić, & Z.P. Kilpatrick, *Encoding certainty in bump attractors*, **J Comput. Neurosci.** 37 (2014), pp. 29-48.

44. Z.P. Kilpatrick, B. Ermentrout, & B. Doiron, *Optimizing working memory with heterogeneity of recurrent cortical excitation*, **J Neurosci.** 33 (2013), pp. 18999-19011.

45. Z.P. Kilpatrick, *Interareal coupling reduces encoding variability in multi-area models of spatial working memory*, **Front. Comput. Neurosci.** 7 (2013), 82.

46. Z.P. Kilpatrick & B. Ermentrout, *Wandering bumps in stochastic neural fields*, **SIAM J Appl. Dyn. Syst.** 12 (2013), pp. 61-94.

47. Z.P. Kilpatrick, *Short term synaptic depression improves information transfer in perceptual multistability*, **Front. Comput. Neurosci.** 7 (2013), 85.

48. S.M. Jayasuriya* & Z.P. Kilpatrick, *Effects of time-dependent stimuli on a competitive neural network model of perceptual rivalry*, **Bull. Math. Biol.** 6 (2012), pp. 1396-1426.

49. Z.P. Kilpatrick & B. Ermentrout, *Response of traveling waves to transient inputs in neural fields*, **Phys. Rev. E** 85 (2012), 021910.

50. Z.P. Kilpatrick & G.B. Ermentrout, *Hallucinogen persisting perception disorder in neuronal networks with adaptation*, **J Comput. Neurosci.** 32 (2012), pp. 25-53.

51. Z.P. Kilpatrick & G.B. Ermentrout, *Sparse gamma rhythms arising through clustering in adapting neuronal networks*, **PLoS Comput. Biol.** 7 (2011), e1002281.

52. P.C. Bressloff & Z.P. Kilpatrick, *Two–dimensional bumps in piecewise smooth neural fields with synaptic depression*, **SIAM J Appl. Math.** 71 (2011), pp. 379-408.

53. Z.P. Kilpatrick & P.C. Bressloff, *Binocular rivalry in a competitive neural network model with synaptic depression*, **SIAM J Appl. Dyn. Syst.** 9 (2010), pp. 1303-1347.

54. Z.P. Kilpatrick & P.C. Bressloff, *Stability of bumps in piecewise smooth neural networks with nonlinear adaptation*, **Physica D** 239 (2010), pp. 1048-1060.

55. Z.P. Kilpatrick & P.C. Bressloff, *Spatially structured oscillations in a two-dimensional excitatory neuronal network with synaptic depression*, **J Comput. Neurosci.** 28 (2010), pp. 193-209.

56. Z.P. Kilpatrick & P.C. Bressloff, *Effects of synaptic depression and adaptation on spatiotemporal dynamics of an excitatory neuronal network*, **Physica D** 239 (2010), pp. 547-560.

57. P.C. Bressloff & Z.P. Kilpatrick, *Nonlocal Ginzburg-Landau equation for cortical pattern formation*, **Phys. Rev. E** 78 (2008), 041916.

58. Z.P. Kilpatrick, S.E. Folias, & P.C. Bressloff, *Traveling pulses and wave propagation failure in inhomogeneous neural media*, **SIAM J Appl. Dyn. Syst.** 7 (2008), pp. 161-185.

Editorials, Book Chapters, and Book Reviews (All Refereed)

B1. Z.P. Kilpatrick, *Book Review: Neurodynamics: An Applied Mathematics Perspective (Kyle Wedgwood and Stephen Coombes)*, **SIAM Rev.** (2024) forthcoming.

B2. Z.P. Kilpatrick, J Gjorgjieva, & R. Rosenbaum, *Special Issue from the 2017 International Conference on Mathematical Neuroscience*, **J. Math. Neurosci.** 9 (2019) 1.

B3. Z.P. Kilpatrick, *Book Review: Methods and Models in Mathematical Biology (Johannes Muller and Christina Kuttler)*, **SIAM Rev.** 59 (2017) pp. 211-214.

B4. Z.P. Kilpatrick, *Wilson-Cowan model*, **Encyclopedia of Computational Neuroscience** (2014), Ed. D. Jaeger and R. Jung, Springer Verlag.

B5. G.B. Ermentrout, S.E. Folias, & Z.P. Kilpatrick, *Spatiotemporal pattern formation in neural fields with linear adaptation*, **Neural Field Theory** (2014), Ed. S. Coombes, P. beim Graben, R. Potthast and J.J. Wright, Springer Verlag.

Press

P1. Denver 7 News, Meghan Lopez, *Colorado mathematician explains the data behind decision-making for voters*, June 14, 2022

P2. Physics Today, Heather M Hill, *Diverse groups make better decisions*, December 23, 2020

P3. Physics, Richard A Blythe, *How laggards help decision-making*, November 16, 2020

P4. Denver 7 News, Meghan Lopez, *Roughly 240,000 Colorado voters changed their party affiliations since 2014: A look at party changes, voter decisions*, October 29, 2020

P5. CU Boulder Today, Daniel Strain, *Election Day math: New study probes how people make decisions*, October 29, 2020

P6. APS, Physics Buzz, Leah Poffenberger, *Peer Pressure: How our social networks can change our choices*, July 9, 2020

P7. CU Boulder Today, Daniel Strain, *Study sheds light on how people make Super Tuesday or other tough choices*, March 2, 2020

P8. AAAS, Abigail Eisenstadt, *On eve of Super Tuesday, study sheds light on how people make choices*, March 2, 2020

P9. SIAM News, Lina Sorg, *Collective decision-making and optimal foraging techniques in honeybees*, August 8, 2018

Teaching Experience

21 undergraduate courses; 7 graduate courses

University of Colorado Boulder	**Term**	**Units**	**Undergrads**	**Grads**	**Rating**
APPM 7400: Introduction to Research Seminar	S24	1	0	10	X.XX/5.00
APPM 4370/5370: Computational Neuroscience	F23	3	10	11	4.70/5.00
APPM 4370/5370: Computational Neuroscience	F21	3	9	18	4.81/5.00
APPM 3010: Intro to Nonlinear Dynamics & Chaos	F21	3	18	–	—

APPM 5480: Approximation Methods	S21	3	1	7	4.91/5.00
APPM 5470: Partial Differential and Integral Equations	F20	3	–	12	4.81/5.00
APPM 4370/5370: Computational Neuroscience	S20	3	9	10	4.71/5.00
APPM 5470: Partial Differential and Integral Equations	F19	3	–	15	5.57/6.00
APPM 8400: Mathematical Biology Seminar	F19	1	–	8	5.50/6.00
APPM 2360: Differential Equations w/ Linear Algebra	S19	4	143	–	4.83/6.00
(Also Course Coordinator: 8 sections $\approx$ 625 students)					
APPM 5470: Partial Differential and Integral Equations	F18	3	1	10	5.64/6.00
APPM 3570: Applied Probability	S18	3	15	–	5.18/6.00
APPM 3570: Applied Probability	S18	3	19	–	5.47/6.00
APPM 8400: Mathematical Biology Seminar	S17	1	–	10	5.90/6.00
APPM 3570: Applied Probability	S17	3	59	–	5.06/6.00
APPM 4350: Fourier Series & Boundary Value Problems	F16	3	26	2	5.54/6.00
University of Houston					
MATH/BIOL 4309: Mathematical Biology	S16	3	37	–	–
MATH 4377: Advanced Linear Algebra	F15	3	60	–	–
MATH 3321: Honors Engineering Mathematics	F15	3	72	–	–
MATH/BIOL 4309: Mathematical Biology	S15	3	22	–	4.1/5.0
MATH/BIOL 4309: Mathematical Biology	S14	3	25	–	4.67/5.00
MATH 4377: Advanced Linear Algebra	F13	3	51	6	4.2/5.0
MATH/BIOL 4309: Mathematical Biology	S13	3	21	–	4.0/5.0
MATH 3321: Honors Engineering Mathematics	F12	3	24	–	4.6/5.0
University of Pittsburgh					
MATH 230: Analytic Geometry & Calculus II	S11	3	94	–	4.02/5.00
MATH 220: Analytic Geometry & Calculus I	F10	3	83	–	3.27/5.00
University of Utah					
MATH 1180: Calculus for Biologists II	S08	3	29	–	–
MATH 1170: Calculus for Biologists I	F07	3	46	–	–

Invited Conference Plenary Talks

1. "Asymmetries and heterogeneities in individual and group decisions from noisy information" at **Topics on Neuroscience, Collective Migration and Parameter Estimation: Mathematical Institute at the University of Oxford**, Oxford, United Kingdom, 7/2023
2. "Diversity improves collective decision making" at **The Dynamics of Social Interactions: Aspen Center for Physics**, Aspen, Colorado, 4/2022
3. "Accumulating evidence across multiple timescales" at **Collaborative Research in Computational Neuroscience Principal Investigators Meeting**, Austin, Texas, 9/2019.
4. "Evidence accumulation within and across trials" at **Neuroethology of Movement and Motor Control: Banff International Research Station Workshop**, Banff, Alberta, Canada, 5/2019.
5. "Synaptic mechanisms of repetition bias in working memory" at **International Neural Coding Workshop**, Torino, Italy, 9/2018
6. "Wave initiation thresholds in neural fields: An interface dynamics approach" at **International Conference on Mathematical Neuroscience**, Juan-les-Pins, France, 6/2018
7. "Interacting activity patterns in neural field models of working memory" at **Winter School on Stochastic Models in Neuroscience**, Toulouse, France, 12/2017

8. "Evidence accumulation in dynamic environments: Neurons, organisms, and groups" at **Undergradaute Capstone Conference at the Mathematical Biosciences Institute**, Columbus, Ohio, 8/2017
9. "Maintenance of spatial working memory across time: bump models" at **Brain Dynamics and Statistics: Simulation and Data: Banff International Research Station Workshop**, Banff, Alberta, Canada, 2/2017
10. "Networks that learn the change-rate of a dynamic environment" at **Bernstein Sparks Workshop on Recurrent Network Theory**, Göttingen, Germany, 5/2016
11. "Learning the volatility of a dynamic environment" at **Connecting Network Architecture and Computation: Banff International Research Station Workshop**, Banff, Alberta, Canada, 12/2015
12. "Evidence accumulation in changing enviroments" at **University of Texas Conference on Learning and Memory**, Austin, Texas, 4/2015
13. "Getting the most out of bumps" at **Conference on Nonlinear Dynamics and Stochastic Methods**, Pittsburgh, Pennsylvania, 3/2014
14. "Networks that learn the precise timing of sequences" at **Gulf Coast Consortium Conference on Theoretical and Computational Neuroscience**, Houston, Texas, 1/2014
15. "Spatial architecture that reduces error of spatial working memory in neural field models" at **Stochastic Modeling of Biological Processes: Institute of Mathematics and its Applications Workshop**, Minneapolis, Minnesota, 5/2013
16. "Optimizing memory using synaptic heterogeneity" at **Conference on Progress in Neural Field Theory**, Reading, United Kingdom, 4/2012
17. "Stimulus-induced transitions of traveling waves in neural fields" at **Conference on the Spatio-temporal Evolution Equations and Neural Fields: Centre International de Rencontres Mathématiques**, Luminy, France, 10/2011

Departmental Colloquia and Seminar Talks

1. "Stochastic dynamics of wandering bumps in neural fields: Mechanisms for stabilizing parametric working memory" in **Boston University, Dynamics Seminar**, Boston, Massachusetts, 10/2023
2. "Correlations and bias reduce the accuracy of pioneering deciders" in **Indiana University Purdue University Indianapolis, Math Biology REU Seminar**, virtual, 6/2023
3. "Stochastic dynamics of evidence accumulation underlying foraging and other social decisions" in **University of Pennsylvania, Center for Mathematical Biology**, Philadelphia PA, 4/2023
4. "Stochastic dynamics of decision-making: From individuals to groups" in **Dartmouth College, Applied Mathematics Seminar**, Hanover NH, 9/2022
5. "The dynamics of collective decisions in diverse groups" in **Indiana University Purdue University Indianapolis, Math Biology REU Seminar**, virtual, 6/2022
6. "Stochastic dynamics of individual and collective decisions" in **New Jersey Institute of Technology, Mathematics Colloquium**, Newark, New Jersey, 4/2022
7. "How correlations and heterogeneity impact collective decision efficiency" in **University of Vermont, Complex Systems & Data Science Seminar**, Burlington, Vermont, 4/2022
8. "Impact of heterogeneity on collective decisions" in **Colorado School of Mines, Applied Mathematics Colloquium**, Golden, Colorado, 12/2021
9. "Heterogeneity improves speed and accuracy in social networks" in **University of Exeter, Dynamics Seminar**, virtual, 9/2021

10. "How social interactions shape collective decisions: Some mathematical models" in **University of Houston, Political Science Seminar**, virtual, 5/2021
11. "Collective decisions in heterogeneous, dynamic, and spatial environments" in **University of Iowa, Mathematical Biology Seminar**, virtual, 2/2021
12. "Heterogeneity improves speed and accuracy in social networks" in **Northwestern University, Engineering Sciences & Applied Mathematics Colloquium**, virtual, 11/2020
13. "Patch leaving decisions as a first exit time problem" in **Brandeis University, Mathematical Biology Seminar**, virtual, 6/2020
14. "Normative theory of patch foraging decisions" in **Baylor College of Medicine/Rice University, Theoretical Neuroscience Seminar**, virtual, 5/2020
15. "Analyzing decision making in dynamic environments with Chapman-Kolmogorov equations" at **Colorado State University, Applied Mathematics Seminar**, Fort Collins Colorado, 2/2019
16. "Tuning evidence-integration across multiple timescales" at **Princeton Neuroscience Institute Seminar**, Princeton, New Jersey, 10/2018
17. "Optimizing and identifying evidence-integration across multiple timescales" at **Computational Neuroscience Seminar at Institut d'Investigacions Biomèdiques August Pi i Sunyer**, Barcelona, Spain, 6/2018
18. "Neural field models of working memory: Laminar structure and delays" at **Partial Differential Equations Seminar at Institut de Mathèmatiques de Toulouse**, Toulouse, France, 12/2017
19. "Neuromechanics of working memory errors: a neural field approach" at **Institut national de recherche en informatique et en automatique, MathNeuro Seminar**, Sophia Antipolis, France, 11/2017
20. "Evidence accumulation in dynamic environments: The price of optimality" at **Ecole Normale Supèrieure, Neural Theory Seminar**, Paris, France, 11/2017
21. "Synaptic mechanisms of interference in working memory" at **University of Pennsylvania, Computational Neuroscience Seminar**, Philadelphia, Pennsylvania, 10/2017
22. "Evidence accumulation in dynamic environments: Neurons, organisms, and groups" at **Colorado School of Mines, Applied Mathematics Colloquium**, Golden, Colorado, 8/2017
23. "Evidence accumulation in dynamic environments" at **University of Colorado School of Medicine, Physiology and Biophysics Colloquium**, Aurora, Colorado, 11/2016
24. "Stochastic neural dynamics of working memory" at **Colorado State University, Applied Mathematics Seminar**, Fort Collins, Colorado, 9/2016
25. "Evidence accumulation in dynamic environments" at **University of Colorado, Applied Mathematics Colloquium**, Boulder, Colorado, 9/2016
26. "Stochastic neural dynamics of working memory" at **University of Arkansas, Physics Colloquium**, Fayetteville, Arkansas, 3/2016
27. "Perceptual switching in changing and static environments" at **Louisiana State University School of Medicine, Cell Biology and Anatomy Colloquium**, New Orleans, Louisiana, 9/2015
28. "Stochastic dynamics of nonlinear waves in neuronal networks" at **University of Colorado, Applied Mathematics Colloquium**, Boulder, Colorado, 11/2014
29. "Stochastic motion of activity patterns in multistable neuronal networks" at **University of Minnesota, Mathematical Biology Seminar**, Minneapolis, Minnesota, 11/2013
30. "Waves, transients, and wandering in continuum neural field equations" at **University of Houston, Mathematics Colloquium**, Houston, Texas, 2/2012

31. "Processing of inputs by neural fields" at **Hungarian Academy of Sciences, Neural Computing Seminar**, Budapest, Hungary, 11/2011
32. "Waves and oscillations in neural field models of visual cortex" at **Rice University, Computational and Applied Mathematics Colloquium**, Houston, Texas, 1/2011
33. "Dynamics in a spatially extended neuronal network with synaptic depression" at **University of Nottingham, Mathematical Neuroscience Seminar**, Nottingham, United Kingdom, 11/2009
34. "Spatiotemporal dynamics in a neuronal network with synaptic depression" at **Institut national de recherche en informatique et en automatique, NeuroMathComp Seminar**, Sophia Antipolis, France, 10/2009
35. "Short term synaptic plasticity in spatially extended neuronal networks" at **National Institutes of Health – National Institute for Diabetes and Diseases of the Kidney, Laboratory of Biological Modeling Seminar**, Bethesda, Maryland, 9/2009
36. "Short term synaptic plasticity in spatially extended neuronal networks" at **University of Pittsburgh, Mathematical Biology Seminar**, Pittsburgh, Pennsylvania, 9/2009

Outreach, Tutorial, and Press Talks

1. "Bayesian evidence accumulation in decision making and foraging" at **Konstanz School of Collective Behaviour: Tutorial Talks (4)**, Konstanz, Germany, 7/2024
2. "Dynamics of decisions and short term memory" at **New Zealand Mathematical Research Institute Workshop on Mathematical Neuroscience: Tutorial Talks (4)**, Auckland, New Zealand, 1/2024
3. "Keeping up with the Jones's opinions: Bayesian evidence accumulation on social networks" at **American Physical Society March Meeting (online)**, Denver, Colorado, 3/2020
4. "Stochastic and dynamical models of evidence integration and storage" at **International Conference on Mathematical Neuroscience: Tutorial Talks (2)**, Copenhagen, Denmark, 6/2019
5. "Dynamical models of decision making and working memory" at **Colorado School of Mines, Tutorial at Math Biology Summer School**, Golden, Colorado, 5/2018
6. "Now you see it, Now you don't: The mathematics of perception" at **Houston Museum of Natural Science: Public Science Outreach Talk**, Sugar Land, Texas, 10/2014

Invited Minisymposium and Small Workshop Talks

1. "Inference and mechanics of working memory: Stochastic neural dynamics of delayed estimation" at **MURI Research Forum, Cognitive Fatigue, University of Michigan**, Ann Arbor, Michigan, 12/2022
2. "Stochastic dynamics and collective behavior in groups of interacting decision makers" at **AMS Western Sectional Meeting Special Session: Mathematical Modeling of Biological and Social Systems**, Salt Lake City, Utah, 10/2022
3. "Excitatory/inhibitory balance shapes wandering of bump solutions in a stochastic neural field" at **SIAM Conference on the Analysis of Partial Differential Equations (Minisymposium): Nonlinear dynamics of PDE in biology**, Berlin, Germany, 3/2022
4. "Excitation/inhibition balance strongly shapes the stochastic dynamics of wandering bumps" at **Joint Mathematics Meetings (Minisymposium): AMS Special Session on Stochastic Models in Studying Biological Systems**, virtual, 3/2022
5. "Heterogeneity improves speed and accuracy in social networks" at **Society for Mathematical Biology (Minisymposium): Stochasticity and heterogeneity in network synchronization**, virtual, 7/2021

6. "A hierarchical model of perceptual multistability involving interocular grouping" at **SIAM Applications of Dynamical Systems (Minisymposium): Neural dynamics of sensory systems**, virtual, 5/2021
7. "Normative theory of urgency in environments with dynamic context" at **Bernstein Computational Neuroscience Conference: Workshop on dynamic probabilistic inference in the brain**, virtual, 9/2020
8. "Neural and synaptic mechanisms of interference in working memory" at **SIAM Pacific Sectional Meeting: Special Session on Theoretical Neuroscience**, Seattle, Washington, 10/2019
9. "Training vs. designing continuous attractors in recurrent neural networks" at **Organization for Computational Neuroscience (Workshop): How does learning reshape the dimensionality of collective network activity?**, Seattle, Washington, 7/2018
10. "Neural field model of memory guided search" at **SIAM Central States Sectional Conference (Minisymposium): Applied Dynamical Systems**, Fort Collins, Colorado, 9/2017
11. "Evidence accumulation in dynamic environments" at **SIAM Applications of Dynamical Systems (Minisymposium): Excitability, Feedback, and Collective Decision-Making Dynamics**, Snowbird, Utah, 5/2017
12. "Maintaining spatial working memory across time in bump attractor models" at **AMS Sectional Meeting: Special Session on Mathematical Neuroscience and Physiology**, Pullman, Washington, 4/2017
13. "Phase dynamics of multilayer neural networks" at **SIAM Life Sciences (Minisymposium): PRCs and Phase Models in Neuroscience**, Boston, Massachusetts, 7/2016
14. "Stochastic effects in neural activity waves: synchrony and stabilization via delays" at **AMS Sectional Meeting: Special Session on Nonlinear Waves of Differential Equations**, New Brunswick, New Jersey, 11/2015
15. "Pulse bifurcations in stochastic neural fields" at **SIAM Applications of Dynamical Systems (Minisymposium): Analysis of Network Dynamical Systems**, Snowbird, Utah, 5/2015
16. "Stochastic synchronization of neural activity waves" at **IMACS International Conference on Nonlinear Evolution Equations and Waves: Special Session on Mechanisms for Computations in Neuronal Networks**, Athens, Georgia, 4/2015
17. "Networks That Learn the Timing of Event Sequences" at **SIAM Life Sciences (Minisymposium): Dynamics of Multistable Perception and Decision Making**, Charlotte, North Carolina, 8/2014
18. "Pulse bifurcations in stochastic neural fields" **AIMS Conference on Dynamical Systems: Special Session on Random Dynamical Systems in the Life Sciences**, Madrid, Spain, 7/2014
19. "Networks that learn to precisely encode the timing of sequences" **AIMS Conference on Dynamical Systems: Special Session on Modeling and Dynamic Analysis of Complex Patterns in Biological Systems and Data**, Madrid, Spain, 7/2014
20. "Slowing bump diffusion with network heterogeneity in stochastic neural fields" at **Conference on Frontiers in Applied and Computational Mathematics**, Newark, New Jersey, 6/2013
21. "Noise-induced phenomena in continuum neural field equations" at **IMACS International Conference on Nonlinear Evolution Equations and Waves: Special Session on Dynamics of Neuronal Networks**, Athens Georgia, 3/2013
22. "Stochastic and adaptive switching in competitive neural network models of perceptual rivalry" at **SIAM Life Sciences (Minisymposium): Perceptual Rivalry and Mathematical Modeling**, San Diego, California, 8/2012

23. "Wandering and transitions of pulses in stochastic neural fields" at **Canadian Applied and Industrial Mathematical Society Meeting (Minisymposium): Applied Analysis (with Dynamical Systems)**, Toronto, Ontario, Canada 6/2012

Conference Organization

- **Dynamics Days**, Organizing Committee (XX speakers; XXX attendees), Denver, Colorado, 1/2025
- **Math + Neuroscience: Strengthening the interplay between theory and mathematics**, (co-organizer; main organizers: Carina Curto and Katie Morrison) Semester-Long Program at the Institute for Computational and Experimental Research in Mathematics (≈200 participants), Brown University, Providence, Rhode Island, Fall 2023
  - **Workshop: Mathematical challenges in neuronal network dynamics.** (9/2023; ≈50 people)
  - **Workshop: Neural coding and combinatorics.** (11/2023; ≈100 people)
- **Dynamics of decisions and behavior in social systems**, (with Krešimir Josić and Bhargav Karamched) Minisymposium at SIAM Dynamical Systems (8 speakers), Portland, Oregon, 5/2023
- **Dynamical principles of biological and artificial neural networks**, (with Sue Ann Campbell, Alona Fyshe, and Joel Zylberberg) Five Day Workshop at the Banff International Research Station (≈ 55 participants), Banff, Alberta, Canada, 1/2022 [hybrid]
- **International Conference on Mathematical Neuroscience**,
  Scientific Committee (XX speakers; XXX attendees), Dublin, Ireland, 6/2024
  Advisory Committee (41 speakers; 178 attendees), Virtual (Hosted on Zoom/Youtube), 6/2022
  Advisory Committee (43 speakers; 233 attendees), Virtual (Hosted on Zoom/Youtube), 6/2021
  Advisory Committee (34 invited; 970 attendees), Virtual (Hosted on Zoom/Youtube), 6/2020
  Advisory Committee (5 invited/47 contributed talks; 112 attendees), Copenhagen, Denmark, 6/2019
  Advisory Committee (14 invited/34 contributed talks; 107 attendees), Juan-les-Pins, France, 6/2018
  Conference Chair (11 invited/45 contributed talks; 131 attendees), Boulder, Colorado, 6/2017
  Conference Co-Chair (12 invited/39 contributed talks; 124 attendees), Juan-les-Pins, France, 6/2016
- **Phase-amplitude reduction: Koopman and control**, (with Peter Thomas) Minisymposium at the International Conference on Mathematical Neuroscience (4 speakers), virtual, 6/2021
- **The dynamics and limitations of working memory**, (with Albert Compte) Workshop at Annual Conference on Computational Neuroscience (11 speakers), Barcelona, Spain, 7/2019
- **Dynamical models of individual and collective decision-making**, (with Krešimir Josić and Bhargav Karamched) Minisymposium at SIAM Life Sciences (8 speakers), Minneapolis, Minnesota, 8/2018
- **Gulf Coast Consortium Annual Conference on Theoretical and Computational Neuroscience**, (co-organizer), (7 invited speakers), Rice University, Houston, Texas, 2/2015
- **Nonlinear and stochastic dynamics in large neuronal networks**, (with Jonathan Touboul) Minisymposium at SIAM Applications of Dynamical Systems (8 speakers), Snowbird Utah, 5/2015
- **Neural mechanisms of working memory limits**, (with Albert Compte)
  Workshop at Annual Conference on Computational Neuroscience (13 speakers), Paris FR, 7/2013
- **Stochasticity in large networks of the brain**, (with Jonathan Touboul)
  Minisymposium at SIAM Applications of Dynamical Systems (8 speakers), Snowbird, Utah, 5/2013
- **Spatiotemporal dynamics in networks of the brain**, (with Stefanos Folias)
  Minisymposium at SIAM Life Sciences (8 speakers), San Diego, California, 8/2012
- **Criticality, threshold phenomena, and network dynamics**, (co-organizer)
  Conference at Complex Biological Systems Group Theme Days (6 speakers), University of Pittsburgh, Pittsburgh, Pennsylvania, 5/2012

- **SIAM/MAA Mid-Atlantic Regional Applied Mathematics**, (co-organizer), Student Conference at Shippensburg University (3 invited/43 contributed talks; 77 attendees), Shippensburg, Pennsylvania, 4/2012
- **Sensorimotor processes reflected in spatiotemporal dynamics of neuronal activity**, (with Jian-Young Wu) Workshop at Computational Systems Neuroscience (Cosyne) Conference (9 speakers), Snowbird, Utah, 2/2012
- **The role of adaptation and depression in neuronal network dynamics** (with Rodica Curtu), Minisymposium at SIAM Life Sciences (8 speakers), Pittsburgh, Pennsylvania, 7/2010
- **Cortical network dynamics** (with Steve Coombes), Minisymposium at SIAM Life Sciences (4 speakers), Montreal, Quebec, Canada, 8/2008
- **IGERT Annual Student Workshop** (co-organizer), Workshop at University of Utah (5 lectures by invited speaker Bard Ermentrout), Salt Lake City, Utah, 5/2008

Other Trainees Supervised

- James Miles, **ugrad** APPM, 2024
- William Magrogan, **grad rotation** APPM, 2023
- Brian Tan, **ugrad** APPM/CS, 2023
- Josh Seabaugh, **grad rotation** (IQ Bio Program), 2020
- Lyanna Kessler, **grad rotation** (IQ Bio Program), 2020
- Emily Webb, **ugrad** APPM, 2019–2020
- Patrick Talley, **MSAM** APPM, 2019–2020
- Nikhil Krishnan, **ugrad** APPM, 2017–2018
- Elliott Saslow, **ugrad** MCDS, 2017
- Matthew Hansen, **ugrad** APPM, 2016–2017
- Jacob Parelman, **postbac** Psych, 2017
- Courtney Van Den Elzen, **grad rotation** (IQ Bio Program), 2017
- Nicholas Troutman, **ugrad** Math (U Houston), 2015
- Zachary McCleney, **ugrad** Math (U Houston), 2014–2015
- Sam Carroll, **ugrad** Math (U Houston), 2013
- Stephanie Willoughby, **ugrad** (Ohio St. U – Math. Bio. Inst. Summer), 2013
- Shawn Gu, **ugrad** (Ohio St. U – Math. Bio. Inst. Summer), 2013
- Kate Nguyen, **ugrad** (U Houston), 2013–2014 **(2014 Goldwater Scholar)**
- Mahjub Hammond, **ugrad** (U Pittsburgh), 2012
- Suren Jayasuriya, **ugrad** (U Pittsburgh), 2010–2012

Dissertation Committees

- Nicholas Garcia, Computational Biosciences (CU School of Medicine), exp 2025
- Annie Ly, Behavioral Neuroscience (CU Boulder), exp 2025
- Colin Korbisch, Mechanical Engineering (CU Boulder), exp 2025
- Corbit Sampson, Applied Mathematics (CU Boulder), exp 2024
- Sabina Adhikari, Applied Mathematics (CU Boulder), exp 2024
- Jamie Voros, Aerospace Engineering (CU Boulder), 2023
- Amanda Hampton, Applied Mathematics (CU Boulder), 2023
- Megan Stickler, Mathematics (U Houston), 2022
- Nicholas Landry, Applied Mathematics (CU Boulder), 2022
- Samuel Ryskamp, Applied Mathematics (CU Boulder), 2022
- Lyndsey Wong, Applied Mathematics (CU Boulder), 2022

- Erin Ellefsen, Applied Mathematics (CU Boulder), 2022
- Sabina Altus, Applied Mathematics (CU Boulder), 2021
- Shelly Jones, Neuroscience (CU School of Medicine), 2020
- Harry Dudley, Applied Mathematics (CU Boulder), 2020
- Jaqueline Wentz, Applied Mathematics (CU Boulder), 2020
- Elijah Christensen, Neuroscience (CU School of Medicine), 2020
- Joshua Aurand, Applied Mathematics (CU Boulder), 2020
- Callie Federer, Computational Biosciences (CU School of Medicine), 2019
- Sama Shretha, Applied Mathematics (CU Boulder) 2019
- Jay Stotsky, Applied Mathematics (CU Boulder), 2018
- John Nardini, Applied Mathematics (CU Boulder), 2018
- Wei-Ting Li, Biology (UH), 2017
- Inomzhon Mirzaev, Applied Mathematics (CU Boulder), 2017
- Changan Liu, Mathematics (UH), 2017
- Jose Manuel Lopez, Mathematics (UH), 2014

Masters Thesis Committees

- Rachel Rise, Aerospace Engineering (CU Boulder), 2021
- David Stearns, Applied Mathematics (CU Boulder), 2021
- Jamie Voros, Aerospace Engineering (CU Boulder), 2020
- Kadambari Suri, Aerospace Engineering (CU Boulder), 2019

Reviewing and Editing

- **Editor:** *Mathematical Neuroscience and Applications (2021–)*, *SIAM Dynamical Systems Web Magazine (2022–2023)*, *Journal of Mathematical Neuroscience (2017–2019)*
- **Grant Reviewer:** *BRAIN Initiative: Theories, Models and Methods for Analysis of Complex Data from the Brain*, *NSF Mathematical Sciences Postdoctoral Research Fellowship*, *NSF/NIH Collaborative Research in Computational Neuroscience (2018, 2019, 2020)*, *Agence Nationale de la Recherche (France)*, *Wellcome Trust Fellowships (UK)*, *NSF – MathBioSys*, *NSF CAREER*, and *NSF DMS – Math Biology (2019, 2023)*
- **Book Reviewer:** *SIAM* and *Taylor & Francis*
- **Conference Abstract Reviewer:** *Cosyne (2014, 2017–)* and *International Conference on Mathematical Neuroscience (2016–)*
- **Journal Referee:** *Biological Cybernetics*; *Chaos*; *Discrete and Continuous Dynamical Systems Series B*; *eLife*; *European Journal of Applied Mathematics*; *Frontiers in Computational Neuroscience*; *Frontiers in Systems Neuroscience*; *Journal of Computational Neuroscience*; *Journal of Mathematical Biology*; *Journal of Mathematical Neuroscience*; *Journal of Neurophysiology*; *Journal of Neuroscience*; *Nature Communications*; *Nature Reviews Neuroscience*, *Neural Computation*; *Neural Networks*; *Neurocomputing*; *Nonlinearity*; *Physica D*; *Physical Review E*; *Physical Review Letters*; *PLoS Computational Biology*; *PLoS One*; *Scientific Reports*; *SIAM Journal of Applied Dynamical Systems*; *SIAM Journal of Applied Mathematics*; and *SIAM Journal on Mathematical Analysis*; *SIAM Review*

Affiliations and Memberships

- **Affiliate Faculty, BioFrontiers Institute, University of Colorado Boulder**
- **Affiliate Faculty, Center for Neuroscience, University of Colorado Boulder**
- **Member, Society for Industrial and Applied Mathematics**

Other Committee Work

- **Graduate Program Chair**, CU Boulder, Department of Applied Mathematics, 2023–2026
- **College of Arts & Sciences Faculty Senate, Budget Committee**, CU Boulder, 2020–2026
- **Affiliated Faculty Committee**, CU Boulder, Department of Applied Mathematics, 2023–
- **Chair's Executive Committee**, CU Boulder, Department of Applied Mathematics, 2021–
- **PUEC Promotion & Tenure Committee**, CU Boulder, Department of Applied Mathematics, 2021, 2023
- **Tech Frontiers Program**, CU Boulder, Department of Computer Science, 2021–
- **Graduate Partial Differential Equations Exam Committee**, CU Boulder: 7 times
- **SIAM Dynamical Systems Group**, Secretary, 2022–2023
- **Multi-year Advisory Hiring Committee**, CU Boulder, Department of Applied Mathematics, 2021–2022
- **IQ Biology Academic Advising Committee**, CU Boulder, BioFrontiers Institute, 2018–2022
- **Joint APPM/CSCI Hiring Committee**, CU Boulder, Department of Applied Mathematics, 2021
- **Graduate Committee**, CU Boulder, Department of Applied Mathematics, 2017–2021
- **PUEC Reappointment Committee**, CU Boulder, Department of Applied Mathematics, 2020
- **APPM 30th Anniversary Celebration Committee**, CU Boulder, 2019
- **College of Engineering/Applied Mathematics Partnership Committee**, CU Boulder, 2017–2018
- **Colloquium Chair**, CU Boulder, Department of Applied Mathematics, 2017–2018
- **Awards Committee**, CU Boulder, Department of Applied Mathematics, 2016–2017
- **Graduate Committee**, UH, Department of Mathematics, 2014–2015
- **Gulf Coast Consortium for Theoretical and Computational Neuroscience**, UH/Rice University/Texas Medical Center, 2012–2016
- **Colloquium Committee**, UH, Department of Mathematics, 2012-2016
- **NETWORKS Seminar Committee**, UH, 2012–2016

Outreach

- **SIAM Dynamical Systems Group Mentoring Program**, panelist, 2021
- **National Alliance for Doctoral Studies in the Mathematical Sciences**, mentor, 2014–
- **Association for Women in Math**, U Utah, alumnus mentor, 2016–2017
- **Summer Undergraduate Research Fellowship**, UH, professional development panelist, 2015
- **SIAM/AMS Student Chapter**, UH, professional development panelist, 2013–2016
- **Cougar and Houston Area Mathematics Program (CHAMP)**, UH, facilitating high school mathematics outreach program, 2013–2016

Consulting Activities

2020–2022	Data Science Instructor and Consultant, **Data Society**, Washington DC
2020	Consultant Scientist, **Allen Institute: Mindscope Program**, Seattle WA
2018	Scientific & Technical Consultant, **FullContact**, Denver CO