

---

## Contact Information

Address: 526 Applied Mathematics, UCB, Boulder, CO 80309-0526, USA

Phone: +1(303)-735-5640

Fax: +1(303)-492-4066

Email: [juanga@colorado.edu](mailto:juanga@colorado.edu)

Webpage: <http://amath.colorado.edu/faculty/juanga>

---

## Professional Appointments

- August 2016 - Present: Associate Professor, Applied Mathematics Department, University of Colorado, Boulder, Colorado, USA.
- August 2008 - July 2016: Assistant Professor, Applied Mathematics Department, University of Colorado, Boulder, Colorado, USA.
- August 2006 - June 2008: Postdoctoral Researcher, Physics Department, Northeastern University, Boston, Massachusetts, USA.
- June 2005 - June 2006: Postdoctoral Researcher, Institute for Research in Electronics and Applied Physics, University of Maryland, College Park, Maryland, USA.
- January 2002 - May 2005: Graduate Research Assistant, Institute for Research in Electronics and Applied Physics, University of Maryland, College Park, Maryland, USA.

---

## Research Interests

- Nonlinear dynamics and chaos.
- Synchronization.
- Dynamics on and structure of complex networks.
- Criticality in functional brain networks.
- Cardiac dynamics.
- Wireless communications networks.

---

## Education

- Ph.D., Applied Mathematics, University of Maryland, College Park, May 2005. Advisors: Edward Ott, Brian R. Hunt.
- M.S., Mathematics, Universidad de los Andes, Colombia, May 2002. Advisor: Sergio Fajardo.
- B.S., Physics, Universidad de los Andes, Colombia, March 1999. Advisors: Victor Tapia, Rolando Roldán.

---

## Ph.D. and M.S. Students

- Kris Tucker, Ph.D., expected May 2019 (co-advised).
- Yogesh Virkar, Ph.D., completed May 2017.
- Andrew B. Cowley, M.S., Fall 2016.
- Warren Lord, M.S., completed May 2014.
- Dane R. Taylor, Ph.D., completed May 2013.

- Per Sebastian Skardal, Ph.D., completed May 2013.
- Marshall Y. Carpenter, M.S., completed May 2012.
- Daniel B. Larremore, Ph.D., completed May 2012.

## Publications

---

### Publications in Peer-Reviewed Journals

1. Kris Tucker, Bihui Zhu, Robert J. Lewis-Swan, Jamir Marino, Felix Jimenez, **Juan G. Restrepo**, and Ana Maria Rey, Shattered Time: Can a Dissipative Time Crystal Survive Many-Body Correlations?, *New Journal of Physics*, 20 123003 (2018). [6 pages]
2. Vidit Agrawal, Andrew B. Cowley, Qusay Alfaori, Daniel B. Larremore, **Juan G. Restrepo**, and Woodrow L. Shew, Robust entropy requires strong and balanced excitatory and inhibitory synapses, *Chaos* 28, 103115 (2018). [8 pages]
3. Dane Taylor, **Juan G. Restrepo**, Francois Meyer, Ensemble-based estimates of eigenvector error for empirical covariance matrices, *Information and Inference: A Journal of the IMA*, 00, 1-24 (2018). [24 pages]
4. Per Sebastian Skardal, **Juan G Restrepo**, Edward Ott, Uncovering low dimensional macroscopic chaotic dynamics of large finite size complex systems, *Chaos*, 27 (8), 083121 (2017) [6 pages].
5. Prasanna Madhusudhanan, **Juan G. Restrepo**, Youjian (Eugene) Liu, and Timothy X. Brown, Analysis of Downlink Connectivity Models in a Heterogeneous Cellular Network via Stochastic Geometry, *IEEE Transactions on Wireless Communications*, 15(6):3895-3907 (2016) [13 pages].
6. Yogesh S. Virkar, Woodrow L. Shew, **Juan G. Restrepo**, and Edward Ott, Feedback control stabilization of critical dynamics via resource transport on multilayer networks: How glia enable learning dynamics in the brain, *Phys. Rev. E* 94(4), 042310 (2016) [8 pages].
7. Yogesh S. Virkar, **Juan G. Restrepo**, and James D. Meiss, Hamiltonian mean field model: Effect of network structure on synchronization dynamics, *Phys. Rev. E* 92, 052802 (2015) [14 pages].
8. Bihui Zhu, Johannes Schachenmayer, Minghui Xu, **Juan G. Restrepo**, Murray J. Holland, and Ana Maria Rey, Synchronization of Interacting Quantum Dipoles, *New Journal of Physics* 17, 083063 [8 pages] (2015).
9. Per Sebastian Skardal, **Juan G. Restrepo**, and Edward Ott, Frequency assortativity can induce chaos in oscillator networks, *Phys. Rev. E* 91, 060902(R) [5 pages] (2015).
10. Per Sebastian Skardal and **Juan G. Restrepo**, Coexisting chaotic and multi-periodic dynamics in a model of cardiac alternans, *Chaos* 24, 043126 [8 pages] (2014).
11. Prasanna Madhusudhanan, **Juan G. Restrepo**, Youjian (Eugene) Liu, Timothy X. Brown, and Kenneth Baker, Downlink Performance Analysis for a Generalized Shotgun Cellular System, *IEEE Transactions on Wireless Communications* 13, 6684 [13 pages] (2014).

12. **Juan G. Restrepo** and Edward Ott, Mean field theory of assortative networks of phase oscillators, *Europhys. Lett.* 107, 60006 [6 pages] (2014).
13. Per Sebastian Skardal, Alain Karma, **Juan G. Restrepo**, Spatiotemporal Dynamics of Calcium-Driven Cardiac Alternans, *Phys. Rev. E* 89, 052707 [24 pages] (2014).
14. **Juan G. Restrepo**, James D. Meiss, Onset of Synchronization in the Disordered Hamiltonian Mean Field Model, *Phys. Rev. E* 89, 052125 [5 pages] (2014).
15. Daniel B. Larremore, Woodrow L. Shew, Edward Ott, Francesco Sorrentino, **Juan G. Restrepo**, Inhibition guarantees ceaseless cortex network dynamics, *Physical Review Letters* 112, 138103 [5 pages] (2014).
16. Per Sebastian Skardal, Dane Taylor, **Juan G. Restrepo**, Complex macroscopic behavior in systems of phase oscillators with adaptive coupling, *Physica D* 267, 27 [9 pages] (2014).
17. Dane Taylor, Elana J. Fertig, and **Juan G. Restrepo**, Dynamics in hybrid complex systems of switches and oscillators, *Chaos* 23, 033142 [12 pages] (2013).
18. Per Sebastian Skardal, Jie Sun, Dane Taylor, and **Juan G. Restrepo**, Effects of Degree-frequency Correlations on Network Synchronization: Universality and Full Phase-locking, *Europhys. Lett.* 101, 20001 [6 pages] (2013).
19. Prasanna Madhusudhanan, **Juan G. Restrepo**, Youjian (Eugene) Liu, Timothy X. Brown, Kenneth R. Baker, Stochastic Ordering based Carrier-to-Interference Ratio Analysis for the Shotgun Cellular Systems, *IEEE Wireless Communications Letters* 1(6), 565 [4 pages] (2012).
20. Daniel B. Larremore, Marshall Y. Carpenter, Edward Ott, and **Juan G. Restrepo**, Statistical Properties of Avalanches in Networks, *Phys. Rev. E* 85, 066131 [11 pages] (2012).
21. Dane Taylor, **Juan G. Restrepo**, Network-specific approach to percolation in networks with bidirectional links, *Europhysics Letters* 98, 16007 [6 pages] (2012).
22. Per Sebastian Skardal, Alain Karma, **Juan G. Restrepo**, Unidirectional Pinning and Hysteresis of Spatially Discordant Alternans in Cardiac Tissue, *Physical Review Letters* 108, 108103 [5 pages] (2012).
23. Per Sebastian Skardal, **Juan G. Restrepo**, Hierarchical Synchrony of Phase Oscillators in Modular Networks, *Phys. Rev. E* 85, 016208 [8 pages] (2012).
24. Per Sebastian Skardal, Edward Ott, **Juan G. Restrepo**, Cluster Synchrony in Systems of Coupled Phase Oscillators with Higher-Order Coupling, *Phys. Rev. E* 84, 036208 [10 pages] (2011).
25. Wai Shing Lee, **Juan G. Restrepo**, Edward Ott, Thomas M. Antonsen, Dynamics and Pattern Formation in Large Systems of Spatially-Coupled Oscillators with Finite Response Times, *Chaos* 21, 023122 [14 pages] (2011).
26. Dane Taylor, **Juan G. Restrepo**, Network connectivity during mergers and growth: Optimizing the addition of a module, *Phys. Rev. E* 83, 066112 [7 pages] (2011).

27. Daniel B. Larremore, Woodrow L. Shew, Edward Ott, and **Juan G. Restrepo**, Effects of network topology, transmission delays, and refractoriness on the response of coupled excitable systems to a stochastic stimulus, *Chaos* **21**, 025117 [10 pages] (2011).
28. Daniel B. Larremore, Woodrow L. Shew, **Juan G. Restrepo**, Predicting criticality and dynamic range in complex networks: effects of topology, *Physical Review Letters* **106**, 058101 [4 pages] (2011).
29. Dane Taylor, Edward Ott, and **Juan G. Restrepo**, Spontaneous synchronization of coupled oscillator systems with frequency adaptation, *Phys. Rev. E* **81**, 046214 [8 pages] (2010).
30. **Juan G. Restrepo** and Alain Karma, Spatiotemporal intracellular calcium dynamics during cardiac alternans, *Chaos* **19**, 037115 [15 pages] (2009).
31. **Juan G. Restrepo** and Alain Karma, Line-defect patterns of unstable spiral waves in cardiac tissue, *Physical Review E* **79**, 030906(R) [4 pages] (2009).
32. **Juan G. Restrepo**, James N. Weiss, and Alain Karma, Calsequestrin Mediated Mechanism for Cellular Calcium Transient Alternans, *Biophysical Journal* **85**, 3767 [23 pages] (2008).
33. Aman Mahajan, Yohannes Shiferaw, Daisuke Sato, Ali Baher, Riccardo Olcese, Lai-Hua Xie, Ming-Jim Yang, Peng-Shen Chen, **Juan G. Restrepo**, Alain Karma, Alan Garfinkel, Zhilin Qu, and James N. Weiss, A rabbit ventricular action potential model replicating cardiac dynamics at rapid heart rates, *Biophysical Journal* **94**, 392 [19 pages] (2008).
34. **Juan G. Restrepo**, Edward Ott, and Brian R. Hunt, Weighted percolation on directed networks, *Physical Review Letters* **100**, 058701 [4 pages] (2008).
35. **Juan G. Restrepo**, Edward Ott, and Brian R. Hunt, Approximating the largest eigenvalue of network adjacency matrices, *Physical Review E* **76**, 056119 [6 pages] (2007).
36. **Juan G. Restrepo**, Edward Ott, and Brian R. Hunt, Emergence of synchronization in complex networks of interacting dynamical systems, *Physica D* **224**, 114 [9 pages] (2006).
37. **Juan G. Restrepo**, Edward Ott, and Brian R. Hunt, Characterizing the dynamical importance of network nodes and links, *Physical Review Letters* **97**, 094102 [4 pages] (2006).
38. **Juan G. Restrepo**, Brian R. Hunt, and Edward Ott, Scaling of branching in arterial and bronchial trees, *Physical Review Letters* **96**, 128101 [4 pages] (2006).
39. **Juan G. Restrepo**, Edward Ott, and Brian R. Hunt, Emergence of coherence in complex networks of heterogeneous dynamical systems, *Physical Review Letters* **96**, 254103 [4 pages] (2006).
40. **Juan G. Restrepo**, Edward Ott, and Brian R. Hunt, Synchronization in large directed networks of coupled phase oscillators, *Chaos* **16**, 015107 [10 pages] (2006).

41. **Juan G. Restrepo**, Edward Ott, and Brian R. Hunt, Onset of synchronization in large networks of coupled oscillators, *Physical Review E* **71**, 036151 [12 pages] (2005).
42. **Juan G. Restrepo**, Edward Ott, and Brian R. Hunt, Desynchronization waves and localized instabilities in oscillator arrays, *Physical Review Letters* **93**, 114101 [4 pages] (2004).
43. **Juan G. Restrepo**, Edward Ott, and Brian R. Hunt, Spatial patterns of desynchronization bursts in networks, *Physical Review E* **69**, 066215 [11 pages] (2004).

### Book Chapters

1. Daniel B. Larremore, Woodrow L. Shew, and **Juan G. Restrepo**, Critical Dynamics in Complex Networks, book chapter in *Criticality in Neural Systems* published by John Wiley & Sons, edited by Dietmar Pleanz and Ernst Niebur [27 pages] (2014).

### Publications in Conference Proceedings

1. Per Sebastian Skardal and **Juan G. Restrepo**. Synchronization of Kuramoto Oscillators in Networks of Networks. Proceedings of the 2012 International Symposium on Nonlinear Theory and its Applications conference proceedings. October 22 - 26, 2012, Palma, Mallorca, Spain. (**Not peer-reviewed.**)
2. Prasanna Madhusudhanan, **Juan G. Restrepo**, Youjian (Eugene) Liu, Timothy X. Brown, Downlink Coverage Analysis in a Heterogeneous Cellular Network, Proc. IEEE Global Telecommunications Conference (Globecom), Anaheim, California, USA, Dec. 2012. (**Peer-reviewed.**)
3. Prasanna Madhusudhanan, **Juan G. Restrepo**, Youjian (Eugene) Liu, and Timothy X. Brown, Multi-Tier Network Performance Analysis Using a Shotgun Cellular System, Proc. IEEE Global Telecommunications Conference (Globecom), Houston, Texas, USA, Dec. 2011. (**Peer-reviewed.**)
4. Prasanna Madhusudhanan, **Juan G. Restrepo**, Youjian (Eugene) Liu, and Timothy X. Brown, Modeling of Interference from Cooperative Cognitive Radios for Low Power Primary Users, Proc. IEEE Global Telecommunications Conference (Globecom), Miami, Florida, USA, Dec. 2010. (**Peer-reviewed.**)
5. Prasanna Madhusudhanan, **Juan G. Restrepo**, Youjian (Eugene) Liu, and Timothy X. Brown, Carrier to Interference Ratio Analysis for the Shotgun Cellular System, Proc. IEEE Global Telecommunications Conference (Globecom), Honolulu, Hawaii, USA, Nov. 2009. (**Peer-reviewed.**)

### Submitted Manuscripts

1. Yogesh S. Virkar, **Juan G. Restrepo**, Woodrow L. Shew, and Ed Ott, Dynamic regulation of resource transport induces criticality in multilayer networks of excitable units, arXiv preprint arXiv:1802.02261.

## Theses

1. “Synchronization in networks of coupled oscillators”, Doctoral Thesis, Applied Mathematics and Scientific Computation, University of Maryland at College Park, 2005.
2. “Representation of measures by hyperfinite games”, Master Thesis, Mathematics, Universidad de los Andes, Bogotá, Colombia, 2002.
3. “The role of flat space-time in the formulation of gravitational theories”, Undergraduate Thesis, Physics, Universidad de los Andes, Bogotá, Colombia, 1999.

## Talks

---

### Invited Conference and Workshop talks

- “Uncovering low-dimensional macroscopic chaotic dynamics of large finite size complex systems”, Analysis and Modeling of Complex Oscillatory Systems Conference, Barcelona, Spain, March 2018.
- “Multilayer network regulation of critical neuronal dynamics” Complex Systems in Neuroscience Conference, University of Pittsburgh, March 2018.
- “Synchronization in Lattices of Interacting Quantum Dipoles”, SIAM Conference on Applications of Dynamical Systems, Snowbird, Utah, May 2017.
- Energy Transport Workshop, University of Colorado at Boulder, December 2015.
- “Mean field theory of assortative networks of phase oscillators”, Dynamics of Coupled Oscillators: 40 years of the Kuramoto Model, workshop held in the Max Planck Institute for Physics of Complex Systems, Dresden, Germany, July 2015.
- “Mean field theory for assortative networks of coupled oscillators”, SIAM Conference on Applications of Dynamical Systems, Snowbird, Utah, May 2015.
- “Effect of network structure on the propagation of avalanches in networks”, Information, Instability and Fragility in Networks: Methods and Applications. Workshop held in Boulder, Colorado, November 2013. (Disclaimer: I co-organized the workshop).
- “Synchronization of Kuramoto oscillators in hierarchical networks”, Workshop on Coupled Networks, Patterns and Complexity, WIAS, Berlin, November 2012.
- “Criticality and dynamic range in network cascading processes”, AIMS Conference on Dynamical Systems, Differential Equations, and Applications, Orlando, Florida, July 2012.
- “Statistics of Avalanches in Heterogeneous Networks”, Criticality in Neural Systems Workshop, NIH, Bethesda, Maryland, April 2012.
- “Pinning and memory of period-2 dynamics in cardiac tissue”, Dynamics Days, Baltimore Maryland, January 2012.
- “Criticality and Statistics of Avalanches in Network Cascading Processes”, NICO Frontier Workshop, Northwestern University, December 2011.
- “Dynamic Range in Networks of Coupled Excitable Systems”, SACNAS Conference, San José, California, October 2011.
- “Intermittent Synchronization in Adaptive Networks of Coupled Oscillators”, SIAM Conference on Applications of Dynamical Systems, Snowbird, Utah, May 2011.
- “The dynamic range in networks of coupled excitable systems”, Nonlinear Dynamics on Networks Workshop, University of Maryland, College Park, April 2010.

- “Local adaptation in oscillator networks”, SIAM Conference on Applications of Dynamical Systems, Snowbird, Utah, May 2009.

### **Invited Colloquia**

- “Multilayer network regulation of critical neuronal dynamics” University of New Mexico, Department of Mechanical Engineering, March 2017.
- “Multilayer network regulation of critical neuronal dynamics”, Santa Fe Institute, March 2017.
- “Criticality and Dynamic Range in Network Cascading Processes”, University of Arizona, Department of Mathematics, April 2013.
- “Criticality and Dynamic Range in Network Cascading Processes”, Arkansas University, Physics Department Colloquium, February 2013.
- “Criticality and Dynamic Range in Network Cascading Processes”, George Mason University, Physics Department Colloquium, February 2012.
- “Synchronization of coupled oscillators: from pedestrians to clocks”, JILA Colloquium, January 2011.
- “Synchronization of oscillators with noisy frequency adaptation”, University of Colorado at Colorado Springs, Mathematics Department Colloquium, November 2009.
- “Synchronization of oscillators with noisy frequency adaptation”, University of Denver, Physics Department Colloquium, November 2009.

### **Recent Seminars and Conference Contributed Talks**

- Math Bio Seminar, University of Utah, November 2018.
- Applied Dynamics Seminar, University of Maryland, September 2017.
- Applied Dynamics Seminar, University of Maryland, April 2016.
- Applied Math Seminar, Colorado State University, October 2015.
- Dynamics Days US 2015, Houston, January 2015.
- Applied Dynamics Seminar, University of Maryland, October 2014.
- Mathematics Seminar, University of Minnesota, April 2014.
- Networks Seminar, University of Houston, February 2014.
- Dynamics Seminar, Applied Math Department, CU-Boulder, October 2013.
- Applied Dynamics Seminar, University of Maryland, College Park, December 2013.
- Frontiers Network Workshop, Northwestern University, December 2013.

### **Grants**

---

#### **Completed, Active or Awarded Grants**

- 2017-2018, NSF, “Conference: Dynamics Days US 2018”. \$16,000.
- 2017-2018, NSF, “Conference: Dynamics Days US 2013”. \$16,000.
- 2012-2013, ARO Proposal No. 62396-MA-CF, “Conference: Dynamics Days 2013”. Sole PI. \$22,440.
- 2012-2013, NSF, “Conference: Dynamics Days US 2013”. \$15,000.
- 2012-2013, ONR, “Conference: Dynamics Days US 2013”. \$19,930.

- 2009-2012, NSF Grant No. DMS-0908221, “Adaptation and Percolation in Complex Networks”. Sole PI. \$248,054.

## Teaching

---

### Courses Developed

- Dynamics on Networks, APPM 7400, Fall 2011. New graduate course.

### Courses Taught

- Differential Equations and Linear Algebra, APPM 2360: Fall 2017 (130 students), Spring 2016 (course coordinator, 150 students) Fall 2008 (75 students), Spring 2009 (96 students), Spring 2012 (142 students).
- Matrix Methods, APPM 3310: Spring 2013 (95 students), Spring 2015 (83 students).
- Intermediate Numerical Analysis II, APPM 4660: Spring 2011 (30 students), Spring 2014 (30 students).
- Methods in Applied Mathematics: Dynamical Systems and Differential Equations, APPM 5460: Spring 2014 (20 students).
- Mathematical Modeling, APPM 4380/5380: Fall 2010 (18 students), Fall 2011 (12 students).
- Dynamics on Networks, APPM 7400: Fall 2011 (6 students).
- Introduction to Nonlinear Dynamics and Chaos, APPM 3010: Fall 2009 (14 students).

## Other Professional Activities

---

- Member of the Advisory Board for the Journal Chaos.
- NSF Applied Mathematics proposal review panel, February 19-21, 2014.
- NSF 2009 CDI preliminary proposal review panel, February 23-24, 2009.
- Peer reviewed manuscripts for the journals Physical Review Letters, SIAM Journal on Applied Mathematics, SIAM Journal on Applied Dynamical Systems, Physical Review E, Physica D, Nonlinearity, Chaos, European Physics Letters.
- Member of the Society of Industrial and Applied Mathematics (SIAM) and the American Physical Society (APS).

## Awards

---

- Magna cum laude B.S. Physics degree, Universidad de los Andes, 1999.
- Best term GPA award, Universidad de los Andes, Spring 1998.
- “Andres Bello” award for the best Bogotá score in the Colombian national school leaving exam, ICFES, 1993.

## Service

---

### Conferences and mini-symposia organized

- Dynamics Days US 2018, Denver, Colorado, January 2018. Chair of the organizing committee.
- Invited session “Applications of synchronization in the micro and macro world”, 2014 APS March Meeting in Denver. Co-organizer with Arkady Pikovsky.
- Information, Instability and Fragility in Networks: Methods and Applications. Workshop held in Boulder, Colorado, November 2013. Co-organizer with Michael Stutzer.
- Dynamics Days US 2013, Denver, Colorado, January 2013. Chair of the organizing committee.
- Mini-symposium on “Criticality and Dynamic Range in Neuronal Networks”, SIAM Conference on Applications of Dynamical Systems, Snowbird, Utah, 2011. Co-organizer with Woodrow Shew.

### Ph.D. Dissertation Committees

- Peter Wills, Applied Mathematics, 2018
- Bihui Zhu, Physics, 2017.
- Andrew Koller, Physics, 2017.
- Yogesh Virkar, Computer Science, 2017.
- Rebecca Mitchell, Applied Mathematics, 2017.
- Ashar Ali, Applied Mathematics, 2016.
- Joshua Weiner, Physics, 2015.
- Adam Kaufman, Physics, 2015.
- Paul V. Anderson, Aerospace Engineering, 2015.
- Nathan D. Monnig, Applied Mathematics, 2015.
- Michael Brutz, Applied Mathematics, 2014.
- Henry Romero, Applied Mathematics, 2014.
- Dustin Keck, Applied Mathematics, 2014.
- Sekson Sirisubtawee, Applied Mathematics, 2014.
- Sebastian Skardal, Applied Mathematics, 2013.
- Dane Taylor, Applied Mathematics, 2013.
- Theodore Galanthay, Applied Mathematics, 2013.
- Adam Fox, Applied Mathematics, 2013.
- Brock Mosovsky, Applied Mathematics, 2012.
- Chester P. Rubbo, Physics, 2012.
- Daniel B. Larremore, Applied Mathematics, 2012.
- Zachary Alexander, Applied Mathematics, 2012.
- Jerrad Hampton, Applied Mathematics, 2012.
- Kye Taylor, Applied Mathematics, 2011.
- Jinyu Li, Applied Mathematics, 2010.

## **Master's Dissertation Committees**

- Ankit Saxena, Electrical, Computer, and Energy Engineering, 2016.
- Amy Le, Applied Mathematics, 2015.
- Thomas Trantow, Applied Mathematics, 2014.
- Juan Ramirez Jr, Electrical, Computer, and Energy Engineering, 2012.
- Jason De Salvo, Applied Mathematics, 2010.
- Naveen Mysore Balasubramanya, Electrical, Computer, and Energy Engineering, 2010.
- Prasanna Madhusudhanan, Electrical, Computer, and Energy Engineering, 2010.
- Jason Boorn, Applied Mathematics, 2009.
- Pradeep Narayan, Electrical and Computer Engineering, 2008.

## **Departmental Committees**

- Graduate Committee, 2010-2011, 2013-2014, 2014-2015, 2015-2016, 2017-2018.
- PDE Preliminary Exam Committee, 2010, 2011, 2014, 2016, 2017, 2019.
- Awards Committee, 2017-2018.
- Faculty Search Committee, 2014.
- Colloquium Chair, 2012-2013.
- Instructor Search Committee, 2011-2012.
- Instructor Search Committee, 2008-2009.

## **Miscellaneous Service**

- Co-organized the CU-Boulder Applied Math Dynamics and Complex Systems Seminar, 2009-2018.
- Served on the admissions committee for the IQ-Bio program at CU Boulder.
- Served on the mentoring committee for the IQ-Bio program at CU Boulder.
- Gave presentations to high school students in the “Colorado Math Circle”.