

ZAHRA AMINZARE

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EMPLOYMENT

- Assistant Professor, Department of Mathematics, University of Iowa, starting Fall 2018
- Postdoctoral Research Associate, Applied and Computational Mathematics, Princeton University, May 2015 - July 2018
- Lecturer, Department of Mathematics, Princeton University, Fall 2017
- Lecturer, Department of Mechanical and Aerospace Engineering, Princeton University, 2016

EDUCATION

- Ph.D. Mathematics, Rutgers University, 2009 – 2015
 - Thesis title: On Synchronous Behavior in Complex Nonlinear Dynamical Systems
 - Thesis advisor: Professor **Eduardo D. Sontag**
- B.Sc. Mathematics, Sharif University of Technology, Tehran, Iran, 2002 – 2007

RESEARCH INTERESTS

Applied Dynamical Systems, Mathematical Neuroscience, Applied Analysis and Partial Differential Equations

PUBLICATIONS

Articles in Journal or Book Chapters

1. **Z. Aminzare** and P. Holmes. Heterogeneous inputs to central pattern generators can shape insect gaits. *SIAM J. on Applied Dynamical Systems*, 18(2), 1037–1059, 2019.
2. E. N. Davison, **Z. Aminzare**, B. Dey, and N. Ehrich Leonard. Mixed mode oscillations and phase locking in coupled FitzHugh-Nagumo model neurons. *Chaos: An Interdisciplinary Journal of Nonlinear Science*, 29(3): 033105, 2019.
3. **Z. Aminzare**, B. Dey, E. N. Davison, and N. Ehrich Leonard. Cluster synchronization of diffusively coupled nonlinear systems: A contraction based approach. *J. of Nonlinear Science*, 1–23, 2018.
4. **Z. Aminzare**, V. Srivastava, and P. Holmes. Gait transitions in a phase oscillator model of insect central pattern generators. *SIAM J. on Applied Dynamical Systems*, 17(1): 626–671, 2018.
5. F. Menolascina, R. Rusconi, V. I. Fernandez, S. P. Smriga, **Z. Aminzare**, E. D. Sontag, and R. Stocker. Logarithmic sensing in *Bacillus subtilis* aerotaxis. *Nature Systems Biology and Applications*, 3:16036-, 2017.
6. **Z. Aminzare** and E. D. Sontag. Some remarks on spatial uniformity of solutions of reaction-diffusion PDEs. *Nonlinear Analysis: Theory, Methods and Applications*, 147:125–144, 2016.
7. J. L. Gevertz, **Z. Aminzare**, Kerri-Ann Norton, J. Pérez-Velázquez, A. Volkening, K. A. Rejniak. Emergence of Anti-Cancer Drug Resistance: Exploring the Importance of the Microenvironmental Niche via a Spatial Model. In A. Radunskaya and T. Jackson, editors, *Applications of Dynamical Systems in Biology and Medicine, IMA Volumes in Mathematics and its Applications*. 158:1–34. Springer-Verlag, 2015.

8. **Z. Aminzare** and E. D. Sontag. Synchronization of diffusively-connected nonlinear systems: results based on contractions with respect to general norms. *IEEE Transactions on Network Science and Engineering*, 1(2):91–106, 2014.
9. **Z. Aminzare**, Y. Shafi, M. Arcak, and E. D. Sontag. Guaranteeing spatial uniformity in reaction-diffusion systems using weighted L^2 norm contractions. In V. Kulkarni, K. Raman, and G.-B. Stan, editors, *A Systems Theoretic Approach to Systems and Synthetic Biology I: Models and System Characterizations*, pages 73–101. Springer-Verlag, 2014.
10. **Z. Aminzare** and E. D. Sontag. Logarithmic Lipschitz norms and diffusion-induced instability. *Nonlinear Analysis: Theory, Methods and Applications*, 83:31–49, 2013.

Conference Articles

1. **Z. Aminzare**, P. Holmes, and V. Srivastava. Phase reduction and second order phase response curves for noisy oscillators. In *Proc. IEEE Conf. on Decision and Control, Nice, France, December 2019*. *To appear*.
2. **Z. Aminzare** and E.D. Sontag. Contraction methods for nonlinear systems: A brief introduction and some open problems. In *Proc. IEEE Conf. Decision and Control, Los Angeles, Dec. 2014*, pages 3835–3847, 2014.
3. **Z. Aminzare** and E.D. Sontag. Remarks on diffusive-link synchronization using non-Hilbert logarithmic norms. In *Proc. IEEE Conf. Decision and Control, Los Angeles, Dec. 2014*, pages 6086–6091, 2014.
4. Y. Shafi, **Z. Aminzare**, M. Arcak, and E.D. Sontag. Spatial uniformity in diffusively-coupled systems using weighted L^2 norm contractions. In *Proc. American Control Conference*, pages 5639–5644, 2013.

AWARDS AND FELLOWSHIPS

- 2019 NSF-AWM Travel Grant for SIAM Dynamical Systems Conference
- 2019 Old Gold Summer Fellowship, University of Iowa
- 2018 Postdoc Travel Award, Dynamics Days, Denver, Colorado
- 2014 Student Travel Award, Conference on Decision and Control
- 2014 – 2015 Research Assistantship, Rutgers University
- 2013 – 2014 University and Louis Bevier Dissertation Fellowship, Rutgers University
- 2013 Student Travel Award, American Control Conference
- 2011 Weill Fellowship, Rutgers University
- 2009 – 2013 Teaching/Research Assistantship, Rutgers University

TEACHING AND MENTORING EXPERIENCE

- University of Iowa
 - Nonlinear Dynamics with Numerical Methods, Fall 2019
 - Ordinary Differential Equations I, Fall 2019
 - Reading Research, Summer 2019
 - * Jeungeun Park, Post Graduated, Collective behavior of bacteria in response to two stimuli: advection-diffusion approximation and simulations.

- Calculus III, Spring 2019
- Calculus II, Fall 2018
- Princeton University
 - Technical Guidance with Prof. Naomi Ehrich Leonard
 - * Elizabeth N. Davison, Ph.D. candidate, Heterogeneity and Synchronization of Coupled Neuronal Oscillator Networks, Fall 2016 – Spring 2018
 - Undergraduate Advisor
 - * Cathy Chen, Decision Making in Networks of Heterogeneous Drift-Diffusion Processes, 2017-2018
 - Topics in Mathematical Modeling - Mathematical Neuroscience, Instructor, Fall 2017 (Undergraduate Level)
 - Applied Dynamical Systems, Co-instructor (with C. Rowley), Fall 2016 (Graduate Level)
 - Nonlinear System Theory, Instructor, Spring 2016 (Graduate Level)
- Rutgers University (Teaching Assistant, Undergraduate Level)
 - Calculus I for the Mathematical and Physical Sciences , Fall 2012
 - Calculus II for the Mathematical and Physical Sciences, Fall 2011
 - Calculus I, Spring 2011
 - Calculus I for the Mathematical and Physical Sciences, Fall 2010
 - Dynamical Models in Biology, Fall 2010
 - Deterministic Modeling of Chemical Reactions, Interdisciplinary Boot Camp in Quantitative Biology, Guest Lecturer, January 2014

SELECTED PRESENTATIONS

Talk Presentations

- SIAM Conference on Applications of Dynamical Systems, Snowbird, Utah, May 2019
- Dynamics Days 2019, Northwestern University, Evanston, IL, January 2019
- Department of Mathematical Sciences, New Jersey Institute of Technology, April 2018
- Department of Mathematical and Statistical Sciences, University of Alberta, January 2018
- Department of Mathematics, Brandeis University, January 2018
- Department of Mathematics and Statistics, Boston University, January 2018
- Department of Mathematics, Iowa State University, January 2018
- Department of Mathematics, University of Iowa, January 2018
- Department of Mathematics, Bucknell University, January 2018
- “Virtual” Network Frontier Workshop, December 2017
- Sensori-Motor Control of Animal and Robots, MBI, Ohio, November 2017
- Society for Mathematical Biology Annual Meeting, Utah, July 2017
- Department of Mathematics & Statistics, UMass Amherst, December 2016

- SIAM Life Science, Boston, July 2016
- Janelia Neurotheory Workshop, Janelia Research Campus, November 2015
- Conference of Decision and Control, Los Angeles, December 2014
- Dynamical Systems and Nonlinear Science Seminar, Princeton University, December 2014
- SIAM Life Science, North Carolina, August 2014
- American Control Conference, Washington, DC, June 2013

Poster Presentations

- Dynamics Days 2018, Denver, Colorado, January 2018
- Workshop on Brain Dynamics and Neurocontrol Engineering, Washington University in St. Louis, St Louis, June 2017
- NSF-CRCNS Conference, Brown University, Providence, June 2017
- 6th annual Winter Workshop on Neuromechanics and Dynamics of Locomotion, Tulane University, New Orleans, January 2017

PROFESSIONAL ACTIVITY

- Member: SIAM
 - Reviewer: Automatica, IEEE Transactions on Automatic Control, IEEE Conference on Decision and Control, IEEE Transactions on Control of Network Systems, IEEE Transactions on Networks Science and Engineering, iScience, SIADS, Chaos
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September 4, 2019