

Anastasia Bizyaeva

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Positions Held

Cornell University <i>Assistant Professor, Sibley School of Mechanical and Aerospace Engineering</i>	July 2024 - pres.
Howard Hughes Medical Institute, Janelia Research Campus <i>Visiting Scientist</i>	Jan. 2026 - Dec. 2026
University of Washington <i>Affiliate Assistant Professor, Department of Mechanical Engineering</i>	Sep. 2024 - Aug. 2026
University of Washington <i>Postdoctoral Scholar, AI Institute in Dynamic Systems</i>	Oct. 2022 - June 2024

Education

Princeton University <i>Doctor of Philosophy in Mechanical and Aerospace Engineering</i>	Sep. 2017 - Sep. 2022
University of California, Berkeley <i>Bachelor of Arts in Physics with a Minor in Mechanical Engineering</i>	Sep. 2012 - Dec. 2016

Research Interests

My research program explores mathematical connections between intelligent behavior in biological and social systems and the design of autonomy, with a special interest in collective intelligence and neuromorphic decision-making. Active thrusts include

1. Biologically, neuromorphically, and socio-cognitively inspired control for embodied autonomy and distributed coordination in dynamic, uncertain, and communication-limited environments;
2. Mathematics of collective behavior in networks of social agents and in biological swarms;
3. Development and analysis of computational methods for data-driven modeling and control of complex dynamical systems, with a special interest in incorporating domain knowledge including physics, network structure, stochasticity, hidden variables, and constraints characteristic of biological swarms.




Selected Honors and Awards

2025, IEEE Control Systems Society George S. Axelby Outstanding Paper Award
 2021, Princeton School of Engineering and Applied Science Award for Excellence
 2019, Larrisse Rosentweig Klein Memorial Prize, Princeton University
 2019, National Science Foundation Graduate Research Fellowship
 2019, Ford Foundation Predoctoral Fellowship Competition Honorable Mention
 2018, Howard Crathorne Phillips Fellowship in Mechanical Engineering, Princeton University
 2017, Gordon Y.S. Wu Fellowship in Engineering, Princeton University
 2017, Student Service Award, UC Berkeley Physics

Publications

Names of students advised or hosted as visiting students at Cornell are underlined.

Preprints and Under Review

- [P5] V. Thota and A. **Bizyaeva**, “[Constraint-induced redistribution of social influence in nonlinear opinion dynamics](#) ,” 2026
- [P4] N. Kaplan, A. Padoan, and A. **Bizyaeva**, “[On dominant manifolds in reservoir computing networks](#) ,” 2026
- [P3] Y. Xing, A. **Bizyaeva**, and K. H. Johansson, “Behavior of nonlinear opinion dynamics over large networks,” 2026
- [P2] C. Wang, E. Sebastian, A. Prorok, and A. **Bizyaeva**, “[From vision to decision: neuromorphic control for autonomous navigation and tracking](#) ,” 2025

- [P1] T. Paine, A. **Bizyaeva**, and M. R. Benjamin, “Census-Based Population Autonomy for Distributed Robotic Teaming [↗](#),” 2025

Journal papers

- [J11] A. **Bizyaeva**, A. Franci, and N. E. Leonard, “Multi-topic belief formation through bifurcations over signed social networks [↗](#),” *IEEE Transactions on Automatic Control*, 2025
- [J10] G. Amorim, A. **Bizyaeva**, A. Franci, and N. E. Leonard, “Spatially-invariant opinion dynamics on the circle [↗](#),” *IEEE Control Systems Letters*, vol. 8, pp. 3231–3236, 2024
- [J9] R. Moreno-Morton, A. **Bizyaeva**, N. E. Leonard, and A. Franci, “Fast-and-flexible decision-making with modulatory interactions [↗](#),” *IEEE Control Systems Letters*, vol. 8, pp. 3333–3338, 2024
- [J8] N. E. Leonard, A. **Bizyaeva**, and A. Franci, “Fast and flexible multiagent decision-making [↗](#),” *Annual Review of Control, Robotics, and Autonomous Systems*, vol. 7, no. Volume 7, 2024, pp. 19–45, 2024
- [J7] S. Musslick and A. **Bizyaeva**, “Examining cognitive flexibility and stability through the lens of dynamical systems [↗](#),” *Current Opinion in Behavioral Sciences*, vol. 57, p. 101375, 2024
- [J6] A. **Bizyaeva**, A. Franci, and N. E. Leonard, “Nonlinear opinion dynamics with tunable sensitivity [↗](#),” *IEEE Transactions on Automatic Control*, vol. 68, no. 3, pp. 1415–1430, 2023
- [J5] A. Franci, M. Golubitsky, I. Stewart, A. **Bizyaeva**, and N. E. Leonard, “Breaking indecision in multiagent, multioption dynamics [↗](#),” *SIAM Journal on Applied Dynamical Systems*, vol. 22, no. 3, pp. 1780–1817, 2023
- [J4] A. **Bizyaeva**, G. Amorim, M. Santos, A. Franci, and N. E. Leonard, “Switching transformations for decentralized control of opinion patterns in signed networks: application to dynamic task allocation [↗](#),” *IEEE Control Systems Letters*, vol. 6, pp. 3463–3468, 2022
- [J3] S. Park, A. **Bizyaeva**, M. Kawakatsu, A. Franci, and N. E. Leonard, “Tuning cooperative behavior in games with nonlinear opinion dynamics [↗](#),” *IEEE Control Systems Letters*, vol. 6, pp. 2030–2035, 2022
- [J2] N. E. Leonard*, K. Lipsitz*, A. **Bizyaeva**, A. Franci, and Y. Lelkes, “The nonlinear feedback dynamics of asymmetric political polarization [↗](#),” *Proceedings of the National Academy of Sciences*, vol. 118, no. 50, 2021
- [J1] A. Franci, A. **Bizyaeva**, S. Park, and N. E. Leonard, “Analysis and control of agreement and disagreement opinion cascades [↗](#),” *Swarm Intelligence*, vol. 15, no. 1, pp. 47–82, 2021

Peer-reviewed conference papers

- [C15] Z. Chen, U. Fasel, and A. **Bizyaeva**, “Fourier Weak SINDy: spectral test function selection for robust model identification [↗](#),” in *Accepted for 8th Annual Learning for Dynamics and Control Conference (L4DC)*, 2026
- [C14] P. Gupta, R. Banavar, and A. **Bizyaeva**, “Bounds of validity for bifurcations of equilibria in a class of networked dynamical systems [↗](#),” in *Accepted for American Control Conference*, 2026
- [C13] A. Couthuere, A. **Bizyaeva**, V. S. Varma, A. Franci, and I. C. Morarescu, “Bifurcation analysis of an opinion dynamics model coupled with an environmental dynamics [↗](#),” in *IEEE Conference on Decision and Control*, 2025
- [C12] A. Valentine, D. M. Gordon, and A. **Bizyaeva**, “Mixed-feedback oscillations in trail population density of arboreal turtle ants [↗](#),” in *IEEE Conference on Decision and Control*, pp. 3806–3811, 2025
- [C11] D. Tretiak, A. **Bizyaeva**, S. L. Brunton, and J. N. Kutz, “Physics-enforced reservoir computing for forecasting of spatiotemporal systems [↗](#),” in *7th Annual Learning for Dynamics and Control Conference (L4DC)*, 2025
- [C10] Y. Xing, A. **Bizyaeva**, and K. H. Johansson, “Learning communities from equilibria of nonlinear opinion dynamics [↗](#),” in *IEEE Conference on Decision and Control*, pp. 2325–2330, 2024
- [C9] T. Paine, A. **Bizyaeva**, and M. R. Benjamin, “Adaptive bias for dissensus in nonlinear opinion dynamics with application to evolutionary division of labor games [↗](#),” in *IEEE Conference on Decision and Control*, pp. 2443–2450, 2024
- [C8] P. Gupta, A. **Bizyaeva**, and R. Banavar, “Estimates on the domain of validity for Lyapunov-Schmidt reduction [↗](#),” in *IEEE Conference on Decision and Control*, pp. 4393–4398, 2024

* indicates equal contribution by the authors

- [C7] A. Brondetta, A. Bizyaeva, M. Lucas, G. Petri, and S. Musslick, “On the benefits of heterogeneity in cognitive stability and flexibility for collaborative task switching [↗](#),” in *Proceedings of the Annual Meeting of the Cognitive Science Society*, vol. 46, 2024
- [C6] A. Bizyaeva*, M. O. Arango*, Y. Zhou, S. Levin, and N. E. Leonard, “Active risk aversion in SIS epidemics on networks [↗](#),” in *American Control Conference*, pp. 4428–4433, IEEE, 2024
- [C5] A. Bizyaeva, A. Franci, and N. E. Leonard, “Sustained oscillations in multi-topic belief dynamics over signed networks [↗](#),” in *American Control Conference*, pp. 4296–4301, 2023
- [C4] A. Bizyaeva, T. Sorochkin, A. Franci, and N. E. Leonard, “Control of agreement and disagreement cascades with distributed inputs [↗](#),” in *IEEE Conference on Decision and Control*, pp. 4994–4999, 2021
- [C3] A. Bizyaeva, A. Matthews, A. Franci, and N. E. Leonard, “Patterns of nonlinear opinion formation on networks [↗](#),” in *American Control Conference*, pp. 2739–2744, 2021
- [C2] L. Rosendahl, A. Bizyaeva, and J. Cohen, “A novel quantum approach to the dynamics of decision making [↗](#),” in *Proceedings of the 42nd annual meeting of the Cognitive Science Society*, 2020
- [C1] S. Musslick, A. Bizyaeva, S. Agaron, N. E. Leonard, and J. D. Cohen, “Stability-flexibility dilemma in cognitive control: a dynamical system perspective [↗](#),” in *Proceedings of the 41st annual meeting of the Cognitive Science Society*, 2019

Extended conference abstracts

- [A3] N. Kaplan, A. Padoan, and A. Bizyaeva, “On the emergence of dominant manifolds in reservoir computing neural networks,” in *International Symposium on Mathematical Theory of Networks and Systems (MTNS)*, 2026
- [A2] C. Wang, E. Sebastian, and A. Bizyaeva, “Neuromorphic control for autonomous vision-guided flight,” in *Northeast Robotics Colloquium*, 2025
- [A1] C. Cathcart, S. Park, A. Bizyaeva, and N. E. Leonard, “Robot navigation around oncoming movers using bio-inspired opinion dynamics,” in *International Conference on Intelligent Robots and Systems, workshop on robotics-inspired biology*, 2020

Selected Professional Service

Reviewer

Journals: IEEE Transactions on Automatic Control, IEEE Transactions on Control of Network Systems, IEEE Control Systems Letters, Automatica, IEEE Transactions on Robotics, SIAM Journal on Applied Dynamical Systems, Proceedings of the National Academy of Sciences of the USA, IEEE Transactions on Signal Processing, Journal of the Royal Society Interface, Systems and Control Letters, Nature Scientific Reports, Nature Communications

Conference and workshop proceedings: IEEE Conference on Decision and Control, American Control Conference, IEEE International Symposium on Multi-Robot and Multi-Agent Systems, IEEE International Conference on Robotics and Automation, IFAC Workshop on Lagrangian and Hamiltonian Methods for Nonlinear Control, IFAC Workshop on Cyber-Physical & Human-Systems, Annual Learning for Dynamics and Control (L4DC) Conference

Grant Review Panels

External Reviewer - European Research Council (ERC) Starting Grant “Environmental Biology, Ecology and Evolution” 2026

External Examiner for PhD Dissertations

2025: Omar Juárez-Álvarez, Mathematics, Universidad Nacional Autónoma de México. PhD Advisor: Alessio Franci

Professional Society Service

IEEE Control Systems Society New and Early career researchers, eXaminers, and invesTigators (NEXT) Committee [↗](#)

- founding member; steering committee chair (2026-pres.); general committee co-chair (2025-2026); conference activities chair (2024-2025),
- Organized special sessions for early career researchers at annual European Control Conference, American Control Conference, IEEE Conference on Decision and Control, and virtual IEEE Control Systems Society Day

IEEE Control Systems Society Technical Committee on Network Systems

- Committee member (2025-pres.)
- Outstanding Student Paper Prize committee member (2026)

Conference, Workshop, and Summer School Organization

<i>Vice Chair, Student Affairs</i> , 2028 American Control Conference, San Francisco, California	2028
<i>Co-organizer</i> , 2-Day Workshop on “Embodied Intelligence, Flexible Cognition, and Control Theory”, National Autonomous University of Mexico (UNAM), Mexico City, Mexico	2026
<i>Course co-organizer and lecturer</i> , one-week course on “Fast and Flexible Multi-agent Decision Making” at the European Embedded Control Institute International Graduate School on Control (EECI-IGSC) ↗ , Liège, Belgium	2025
<i>Co-organizer</i> , full-day workshop on “Leveraging bifurcations for control of intelligent and collective behaviors” ↗ at IEEE Conference on Decision and Control, Milan, Italy	2024
<i>Organizing Committee Member</i> , 2-day workshop “Creative Convergence: at the Crossroads of Dance, Ecology, Neuroscience, and Control Engineering” ↗ at Princeton University	2023

Conference, Workshop, and Summer School Service

<i>Program Committee Member</i> , 2026 Conference on Complex Systems ↗ , Binghamton, NY	2026
<i>Invited Lecturer</i> , 4th Konstanz School of Collective Behavior ↗ , Konstanz, Germany	2026
<i>Program Committee Member</i> , 15th International Conference on Swarm Intelligence ↗ , Darmstadt, Germany	2026
<i>Program Committee Member</i> , 2026 American Control Conference ↗ , New Orleans, Louisiana	2026
<i>Area Chair</i> , 8th Annual Learning for Dynamics & Control Conference (L4DC) ↗ , Los Angeles, California	2026
<i>Session co-chair</i> , session on “Spreading Processes in Complex Systems: Analysis, Control, and Estimation” at American Control Conference, Denver, Colorado	2025
<i>Session co-chair</i> , session on “Analysis and Control of Complex Systems in the Social and Life Sciences” at IEEE Conference on Decision and Control, Rio de Janeiro, Brazil	2025
<i>Program Committee Member</i> , 7th Annual Learning for Dynamics & Control Conference (L4DC) ↗ , Ann Arbor, Michigan	2025
<i>Session co-chair</i> , session on “Nonlinear Systems III” at IEEE Conference on Decision and Control, Milan, Italy	2024

Invited Conference Session Organization

Invited session on “Systems and Control for Optimization and Learning Algorithms” at IEEE Conference on Decision and Control, Honolulu, HI	2026
Minisymposium on “Data-driven modeling for complex systems: structure, robustness, and cross-disciplinary applications” at SIAM Conference on Applications of Dynamical Systems, Denver, CO	2025
Minisymposium on “Collective decisions and entropy in data-driven optimization landscapes” at SIAM Conference on Optimization, Seattle, WA	2023
Invited session on “Dynamics of social networks” at IEEE Conference on Decision and Control, virtual	2021
Minisymposium on “Collective behaviour in biological and biologically inspired systems” at SIAM Conference on Applications of Dynamical Systems, virtual	2021

Presentations & Tutorials

Invited Seminars and Keynotes

<i>Upcoming</i> : Physics Seminar, University of Göttingen, Germany	Dec. 2026
<i>Upcoming</i> : Keynote at BioInspired Sensing Computing and Control with International Teams (SOAR/BISCCITs) Workshop funded by AFOSR, Wageningen, Netherlands	Jun. 2026

<i>Upcoming:</i> Duke University MEMS “Emerging Ideas in ME” Invited Seminar	May 2026
Mechanical and Aerospace Engineering Department Seminar, Syracuse University	Apr. 2026
Invited Seminar, National Autonomous University of Mexico (UNAM) - Instituto de Fisiología Celular, Mexico City, Mexico	Jan. 2026
Physics Department Colloquium, Cornell University	Nov. 2025
Invited Plenary [†] , “Fellowship of the Ring” Workshop, Max Planck Institute of Animal Behavior, Center for the Advanced Study of Collective Behaviour, Konstanz, Germany	Nov. 2025
Scientific Computing and Numerics (SCAN) Seminar, Cornell University	Nov. 2025
Autonomy Talks [†] , Laboratory for Information and Decision Systems, Massachusetts Institute of Technology	Nov. 2025
Center of Complex Systems Seminar, SUNY Binghamton	Oct. 2025
Soft Matter Seminar, Cornell University	Oct. 2025
General Robotics, Automation, Sensing and Perception (GRASP) Student Faculty Industry (SFI) Seminar, University of Pennsylvania	Apr. 2025
Ezra Systems Seminar, Cornell University	Mar. 2025
Scientific Computing and Numerics (SCAN) Seminar, Cornell University	Nov. 2024
Center for Applied Mathematics Colloquium short talk, Cornell University	Oct. 2024
Semiautonomous Seminar [†] , Electrical Engineering and Computer Science, UC Berkeley	Oct. 2024
Women in Network Science (WiNS) Seminar [†] , Dartmouth College	Sep. 2024
Dept. of Mechanical Engineering, University of Washington	Apr. 2024
Ann and H.J. Smead Dept. of Aerospace Engineering Sciences, CU Boulder	Apr. 2024
BioMath Seminar [†] , Virginia Commonwealth University	Mar. 2024
Santa Fe Institute Seminar, Santa Fe, New Mexico	Mar. 2024
Sibley School of Mechanical and Aerospace Engineering, Cornell University	Mar. 2024
Elmore Family School of Electrical and Computer Engineering, Purdue University	Mar. 2024
Dept. of Electrical and Computer Engineering, University of Illinois Urbana-Champaign	Feb. 2024
Dept. of Mechanical Engineering [†] , Columbia University	Jan. 2024
Applied Math Seminar, Montana State University	Nov. 2023
Network Dynamics and Control Seminar Series, Linköping University, Sweden	Sep. 2023
KTH Royal Institute of Technology, Stockholm, Sweden	Sep. 2023
Control Seminar, Uppsala University, Uppsala, Sweden	Sep. 2023
MathBio Seminar [†] , University of Iowa	Dec. 2023
ControlX Seminar, University of Washington	Feb. 2023

Conference, Workshop, and Working Group Presentations

<i>Upcoming:</i> Allerton Conference [‡] , Urbana-Champaign, IL	Sep. 2026
<i>Upcoming:</i> American Control Conference, Workshop “Toward Safe and Scalable Multi-Agent Systems: Bridging Control, RL, and Generative AI” [‡] , New Orleans, LA	May 2026
Workshop on “Embodied Intelligence, Flexible Cognition, and Control Theory” [‡] , National Autonomous University of Mexico (UNAM), Mexico City, Mexico	Jan. 2026
Working group on “Navigating the Space of Collective Transitions in Biology and Society” [‡] , Santa Fe Institute, Santa Fe, NM	Jan. 2026
IEEE Conference on Decision and Control, Workshop on control of complex social systems [‡] , Rio de Janeiro, Brazil	Dec. 2025
Allerton Conference [‡] , Urbana-Champaign, IL	Sep. 2025
SIAM Conference on Applications of Dynamical Systems [‡] , Denver, Colorado	May 2025
Working group on adaptive networks [‡] , Santa Fe Institute, Santa Fe, NM	May 2025
Workshop on Spreading on Social Networks – Theory and Applications [‡] , Center for Discrete Mathematics and Theoretical Computer Science, Rutgers University	Oct. 2024
SIAM Conference on the Life Sciences [‡] , Portland, Oregon	June 2024
APS March Meeting [‡] , Minneapolis, MN	June 2024
Workshop on Geometrically Guided Analysis and Design in Optimization and Control [†] , Nanyang Technological University, Singapore	Dec. 2023
Dynamical Systems in the Life Sciences Satellite Workshop, Columbus, Ohio	July 2023
Santa Fe Institute Collective Intelligence Symposium ^{††} , Santa Fe, New Mexico	June 2023
American Control Conference, San Diego, California	June 2023
SIAM Conference on Applications of Dynamical Systems [‡] , Portland, Oregon	May 2023
“From individual to group decision making: experiments and theory” Workshop [‡] at the Weizmann Institute of Science, Israel	May 2023
IEEE Conference on Decision and Control, Cancún, Mexico	Dec. 2022

3rd Workshop on Mental Effort [‡] , Carney Institute for Brain Science, Brown University	Nov. 2022
IEEE Conference on Decision and Control ^{†‡}	Dec. 2021
2nd Workshop on Mental Effort ^{†‡}	Sep. 2021
American Control Conference [†]	May 2021
SIAM Conference on Applications of Dynamical Systems ^{†‡}	May 2021
UCLA IPAM, Mathematical Challenges and Opportunities for Autonomous Vehicles Program, Workshop IV: Social Dynamics beyond Vehicle Autonomy ^{‡,††}	Nov. 2020
SIAM Conference on the Life Sciences ^{†‡}	July 2020
52nd Annual Meeting of the Society for Mathematical Psychology ^{††} , Montreal, Canada	July 2019
SIAM Conference on Applications of Dynamical Systems [‡] , Snowbird, Utah	May 2019

† virtual; ‡ invited; †† poster

Teaching

Instructor, Cornell University

MAE 4180/5180 Autonomous Mobile Robots (Spring 2025, Spring 2026)
MAE 6870 Engineering Collective Intelligence: Methods in Multi-Agent Coordination (Fall 2025)

Co-Instructor, University of Washington

ME 565 Mechanical Engineering Analysis (Spring 2023)

Assistant in Instruction, Princeton University

MAE 541/APC571 Applied Dynamical Systems (Spring 2022)
MAE 434 Modern Control (Spring 2020)
MAE 501 Mathematical Methods of Engineering Analysis (Fall 2019, Fall 2020)

Instructor, Princeton Prison Teaching Initiative

MATH 015 Basic Mathematics (Fall 2018, Spring 2020, Fall 2021)
MATH 020 Basic Algebra (Fall 2019)
MATH 030 Intermediate Algebra (Spring 2019)