SPRING MELODY BERMAN

Curriculum Vitae (Updated October 2024)

School for Engineering of Matter, Transport and Energy
Ira A. Fulton Schools of Engineering, Arizona State University
ERC, Room 375; 501 E. Tyler Mall, ECG 301, Tempe, AZ 85287-6106, USA
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EDUCATION

Ph.D. **University of Pennsylvania**, Philadelphia, PA; May 2010
Vijay Kumar (chair), Ali Jadbabaie, Mark Yim, Eric Klavins
• Ph.D. thesis: "Abstractions, Analysis Techniques, and Synthesis of Scalable Control Strategies for Robot Swarms"
• Mechanical Engineering and Applied Mechanics
• GPA: 4.0/4.0

M.S.E. **University of Pennsylvania**, Philadelphia, PA; May 2008
• Mechanical Engineering and Applied Mechanics

B.S.E. **Princeton University**, Princeton, NJ; May 2005
• Senior thesis: "Estimation of Ocean Field Decorrelation Scales for the Design of Underwater Glider Sampling Trajectories" *(Advisor: Naomi Leonard)*
• Mechanical and Aerospace Engineering
• Certificate in Robotics and Intelligent Systems
• GPA: 3.86/4.0 (Summa Cum Laude)

PROFESSIONAL / RESEARCH EXPERIENCE

Arizona State University, Tempe, AZ:

2018–Present **Associate Professor**, Mechanical and Aerospace Engineering
Associate Director, Center for Human, Artificial Intelligence, and Robotic Teaming (CHART) within the Global Security Initiative

2017–Present Adjunct Faculty, Sandra Day O'Connor College of Law
Graduate Faculty, Exploration Systems Design

2014–Present Honors Faculty, Barrett, the Honors College

2012–Present Graduate Faculty, Computer Science
Founder and Director, Autonomous Collective Systems (ACS) Laboratory

2012–2018 Assistant Professor, Mechanical and Aerospace Engineering

2010–2012 Postdoctoral Fellow, Computer Science, **Harvard University**, Cambridge, MA
Advisor: Radhika Nagpal

2005–2010	Ph.D. Candidate, Mechanical Engineering and Applied Mechanics Department, **University of Pennsylvania**, Philadelphia, PA; *Advisor: Vijay Kumar*
2004	Summer Undergraduate Research Fellow, Control and Dynamical Systems Dept., **California Institute of Technology**, Pasadena, CA; *Advisor: Jerrold Marsden*
2002–2005	Undergraduate Research Assistant, Mechanical and Aerospace Engineering Dept., **Princeton University**, Princeton, NJ; *Advisor: Naomi Leonard*

SELECTED HONORS & AWARDS

Apr. 2022, May 2021, Apr. 2017	**Ira A. Fulton Schools of Engineering Top 5% Teaching Award** Recognizes faculty across the six ASU Fulton Schools of Engineering who are in the top 5 percent for teaching excellence
May 2016	**Fulton Outstanding Assistant Professor** Awarded for contributing at a high level in teaching, research and service in the ASU Fulton Schools of Engineering
Mar. 2016	**Office of Naval Research (ONR) Young Investigator Award**
Aug. 2014	**Defense Advanced Research Projects Agency (DARPA) Young Faculty Award**
2007–2010	**National Science Foundation (NSF) Graduate Research Fellowship**
2005–2007	**National Defense Science and Engineering Graduate Fellowship**

SELECTED PUBLICATIONS AND PRESENTATIONS

Legend:

(*) Corresponding Author
Bold Font: ASU Ph.D. Student, advised by Prof. Berman
(∞): ASU Master's Student, advised by Prof. Berman
(#) ASU Undergraduate Student, advised by Prof. Berman
(‡) ASU Research Staff, advised by Prof. Berman
(∼) Visiting Ph.D. Student, advised by Prof. Berman
(×) High School Student, advised by Prof. Berman
(×) ASU Postdoctoral Researcher

Book Chapters From ASU (Published, In Press, and/or Accepted)

4. Chiao-Yueh Lo, Yusen Zhao, Yanfei Ma, Shuwang Wu, Yousif Alsaid, Matthew M. Peet, Rebecca E. Fisher, Hamidreza Marvi, Daniel M. Aukes, Spring Berman, and Ximin He*. "Bioinspired Sensors and Actuators Based on Stimuli-Responsive Hydrogels for Underwater Soft Robotics," in *Bioinspired Sensing, Actuation, and Control in Underwater Soft Robotic Systems*, ed. Derek A. Paley and Norman M. Wereley, Springer, Cham, pp. 99–115, 2021.

3. Hosain Bagheri, Spring Berman, Matthew M. Peet, Daniel M. Aukes, Ximin He, Stephen C. Pratt, Rebecca E. Fisher, and Hamidreza Marvi*. "Control and Functionality of Octopus Arms and Suckers," in *Bioinspired Sensing, Actuation, and Control in Underwater Soft Robotic Systems*, ed. Derek A. Paley and Norman M. Wereley, Springer, Cham, pp. 189–212, 2021.

2. Sachin Shivakumar, Daniel M. Aukes, Spring Berman, Ximin He, Rebecca E. Fisher, Hamidreza Marvi, and Matthew M. Peet*. "Decentralized Estimation and Control of a Soft Robotic Arm," in *Bioinspired Sensing, Actuation, and Control in Underwater Soft Robotic Systems*, ed. Derek A. Paley and Norman M. Wereley, Springer, Cham, pp. 229–246, 2021.

1. Lixiao Huang*, Nancy Cooke, Robert Gutzwiller, Spring Berman, Erin Chiou, Mustafa Demir, and Wenlong Zhang. "Distributed Dynamic Team Trust in Human, Artificial Intelligence, and Robot Teaming," in *Trust in Human-Robot Interaction: Research and Applications*, ed. Chang Soo Nam and Joseph B. Lyons, Academic Press, pp. 301–319, 2021.

Book Chapters Prior to ASU (Published, In Press, and/or Accepted)

1. Spring Berman*, Ádám Halász, and M. Ani Hsieh. "Ant-Inspired Allocation: Top-Down Controller Design for Distributing a Robot Swarm among Multiple Tasks," in *Bio-Inspired Computing and Networking*, ed. Yang Xiao, CRC Press, New York, 2011.

Co-Editor for Thematic Journal Issues

1. "Distributed Robots: From Fundamentals to Applications," special issue of *Autonomous Robots*, ed. Roderich Gross, Spring Berman, Emilio Frazzoli, Andreas Kolling, Alcherio Martinoli, and Fumitoshi Matsuno. Editor-in-Chief: Gaurav Sukhatme. Springer, vol. 42, issue 8, Dec. 2018.

Journal Publications From ASU (Published, In Press, and/or Accepted)

29. **Karthik Elamvazhuthi** and Spring Berman*. "Density Stabilization Strategies for Nonholonomic Agents on Compact Manifolds." *IEEE Transactions on Automatic Control*, vol. 69, no. 3, pp. 1448-1463, March 2024.

28. **Hamed Farivarnejad**, **Amir Salimi Lafmejani**, and Spring Berman*. "Local Navigation-Like Functions for Safe Robot Navigation in Bounded Domains with Unknown Convex Obstacles." *Automatica*, vol. 161, p. 111452, March 2024.

27. **Hamed Farivarnejad** and Spring Berman*. "Multirobot Control Strategies for Collective Transport." *Annual Review of Control, Robotics, and Autonomous Systems*, vol. 5, pp. 205–219, May 2022.

26. **Aniket Shirsat**, Shatadal Mishra, Wenlong Zhang and Spring Berman*. "Probabilistic Consensus on Feature Distribution for Multi-Robot Systems With Markovian Exploration Dynamics." *IEEE Robotics and Automation Letters (RA-L)*, vol. 7, no. 3, pp. 6407–6414, July 2022.

25. **Shiba Biswal**, **Karthik Elamvazhuthi**, and Spring Berman*. "Decentralized Control of Multiagent Systems using Local Density Feedback." *IEEE Transactions on Automatic Control (TAC)*, vol. 67, no. 8, pp. 3920–3932, Aug. 2022.

24. Roozbeh Khodambashi, Yousif Alsaid, Rossana Rico, Matthew M. Peet, Hamid Marvi, Rebecca E. Fisher, Spring Berman, Ximin He, and Daniel M. Aukes*. "Heterogeneous Hydrogel Structures with Spatiotemporal Reconfigurability using Addressable and Tunable Voxels." *Advanced Materials*, 33(10):2005906, 2021.

23. **Amir Salimi Lafmejani**, **Hamed Farivarnejad**, and Spring Berman*. "Adaptation of Gradient-based Navigation Control for Holonomic Robots to Nonholonomic Robots." *IEEE Robotics and Automation Letters (RA-L)*, vol. 6, no. 1, pp. 191–198, Jan. 2021.

22. **Karthik Elamvazhuthi**, **Zahi Kakish**, **Aniket Shirsat**, and Spring Berman*. "Controllability and Stabilization for Herding a Robotic Swarm using a Leader: A Mean-Field Approach." *IEEE Transactions on Robotics (T-RO)*, vol. 37, no. 2, pp. 418–432, April 2021.

21. **Azadeh Doroudchi**, Roozbeh Khodambashi, Mohammad Sharifzadeh, Dongting Li, Spring Berman, and Daniel M. Aukes*. "Tracking Control of a Miniature 2-DOF Manipulator with Hydrogel Actuators." *IEEE Robotics and Automation Letters (RA-L)*, vol. 6, no. 3, pp. 4774–4781, July 2021. Presented at the *2021 IEEE International Conference on Soft Robotics (RoboSoft)*.

20. **Amir Salimi Lafmejani** and Spring Berman*. "Nonlinear MPC for Collision-Free and Deadlock-Free Navigation of Multiple Nonholonomic Mobile Robots." *Robotics and Autonomous Systems* vol. 141, 103774, July 2021.

19. Chiao-Yueh Lo, Yusen Zhao, Cheolgyu Kim, Yousif Alsaid, Roozbeh Khodambashi, Matthew Peet, Rebecca Fisher, Hamid Marvi, Spring Berman, Daniel Aukes, Ximin He*. "Highly stretchable self-sensing actuator based on conductive photothermally-responsive hydrogel." *Materials Today*, vol. 50, pp. 35–43, Nov. 2021.

18. **Shiba Biswal**, **Karthik Elamvazhuthi**, and Spring Berman*. "Stabilization of Nonlinear Discrete-Time Systems to Target Measures Using Stochastic Feedback Laws." *IEEE Transactions on Automatic Control (TAC)*, vol. 66, no. 5, pp. 1957–1972, May 2021.

17. **Karthik Elamvazhuthi**, **Shiba Biswal**, and Spring Berman*. "Controllability and Decentralized Stabilization of the Kolmogorov Forward Equation for Markov Chains." *Automatica*, vol. 124, 109351, Feb. 2021.

16. **Hamed Farivarnejad** and Spring Berman*. "Design and Analysis of a Potential-Based Controller for Safe Robot Navigation in Unknown GPS-Denied Environments with Strictly Convex Obstacles." *Systems & Control Letters*, vol. 144, 104772, Oct. 2020.

15. **Ragesh K. Ramachandran**, **Zahi Kakish**, and Spring Berman*. "Information Correlated Lévy Walk Exploration and Distributed Mapping using a Swarm of Robots." *IEEE Transactions on Robotics (T-RO)*, vol. 36, no. 5:1422–1441, Oct. 2020.

14. **Amir Salimi Lafmejani**, **Azadeh Doroudchi**, **Hamed Farivarnejad**, Ximin He, Daniel Aukes, Matthew M. Peet, Hamid Marvi, Rebecca E. Fisher, and Spring Berman*. "Kinematic Modeling and Trajectory Tracking Control of an Octopus-Inspired Continuum Robot." *IEEE Robotics and Automation Letters (RA-L)*, 5(2):3460–3467, April 2020.

13. Hosain Bagheri, Anna Hu, Sheldon Cummings, Cayla Roy, Rachel Casleton, Ashley Wan, Nicole Erjavic, Spring Berman, Matthew M. Peet, Daniel M. Aukes, Ximin He, Stephen C. Pratt, Rebecca E. Fisher, and Hamid Marvi*. "New Insights on the Control and Function of Octopus Suckers." *Advanced Intelligent Systems*, 2:1900154, 2020.

12. **Karthik Elamvazhuthi** and Spring Berman*, "Mean-Field Models in Swarm Robotics: A Survey." *Bioinspiration & Biomimetics, Special Issue on Swarming Systems*, ed. David L. Hu, 15(1):015001, Nov. 2019.

11. **Karthik Elamvazhuthi**, Hendrik Kuiper, Matthias Kawski, and Spring Berman*, "Bilinear Controllability of a Class of Advection-Diffusion-Reaction Systems." *IEEE Transactions on Automatic Control (TAC)*, 64(6):2282-2297, June 2019.

10. **Karthik Elamvazhuthi**, Piyush Grover, and Spring Berman*, "Optimal Transport over Deterministic Discrete-time Nonlinear Systems using Stochastic Feedback Laws." *IEEE Control Systems Letters (L-CSS)*, 3(1):168-173, Jan. 2019.

9. **Sean Wilson**, Aurélie Buffin, Stephen C. Pratt, and Spring Berman*, "Multi-Robot Replication of Ant Collective Towing Behaviours." *Royal Society Open Science*, 5(10):180409, Oct. 2018.

8. **Karthik Elamvazhuthi**, Hendrik Kuiper, and Spring Berman*, "PDE-Based Optimization for Stochastic Mapping and Coverage Strategies using Robotic Swarms." *Automatica*, 95:356-367, Sept. 2018.

7. Vaibhav Deshmukh∞, **Karthik Elamvazhuthi**, **Shiba Biswal**, **Zahi Kakish**, and Spring Berman*. "Mean-Field Stabilization of Markov Chain Models for Robotic Swarms: Computational Approaches and Experimental Results." *IEEE Robotics and Automation Letters (RA-L)*, 3(3):1985-1992, July 2018.

6. Fangbo Zhang*, Andrea L. Bertozzi, **Karthik Elamvazhuthi**, and Spring Berman, "Performance Bounds on Spatial Coverage Tasks by Stochastic Robotic Swarms," *IEEE Transactions on Automatic Control (TAC)*, 63(6): 1563-1578, June 2018.

5. **Ragesh K. Ramachandran**, **Sean Wilson**, and Spring Berman*, "A Probabilistic Approach to Automated Construction of Topological Maps using a Stochastic Robotic Swarm," *IEEE Robotics and Automation Letters (RA-L)*, 2(2):616-623, Apr. 2017.

4. **Sean Wilson**, Ruben Gameros‡, Michael Sheely, Matthew Lin, Kathryn Dover, Robert Gevorkyan, Matt Haberland, Andrea Bertozzi, and Spring Berman*, "Pheeno, A Versatile Swarm Robotic Research and Education Platform," *IEEE Robotics and Automation Letters (RA-L)*, 1(2):884-891, July 2016.

3. **Sean Wilson**, Theodore P. Pavlic, **Ganesh P. Kumar**, Aurélie Buffin, Stephen C. Pratt, and Spring Berman*, "Design of Ant-Inspired Stochastic Control Policies for Collective Transport by Robotic Swarms," *Swarm Intelligence*, vol. 8, issue 4, pp. 303-327, Dec. 2014.

2. Theodore P. Pavlic*, **Sean Wilson**, **Ganesh P. Kumar**, and Spring Berman, "Control of Stochastic Boundary Coverage by Multirobot Systems," *ASME Journal of Dynamic Systems, Measurement, and Control*, Special Issue on Stochastic Models, Control, and Algorithms in Robotics, vol. 137, no. 3, 034505, Oct. 2014.

1. Sabine Hauert, Spring Berman, Radhika Nagpal, and Sangeeta N. Bhatia*, "A Computational Framework for Identifying Design Guidelines to Increase the Penetration of Targeted Nanoparticles into Tumors," *Nano Today*, vol. 8, issue 6, pp. 566-576, Dec. 2013.

Journal Publications Prior to ASU (All Published)

3. Spring Berman*, Quentin Lindsey, Mahmut Selman Sakar, Vijay Kumar, and Stephen C. Pratt, "Experimental Study and Modeling of Group Retrieval in Ants as an Approach to Collective Transport in Swarm Robotic Systems," *Proceedings of the IEEE*, Special Issue on Swarming in Natural and Engineered Systems, vol. 99, issue 9, pp. 1470-1481, Sept. 2011.

2. Spring Berman*, Ádám Halász, M. Ani Hsieh, and Vijay Kumar, "Optimized Stochastic Policies for Task Allocation in Swarms of Robots," *IEEE Transactions on Robotics*, vol. 25, no. 4, pp. 927-937, Aug. 2009.

1. M. Ani Hsieh*, Ádám Halász, Spring Berman, and Vijay Kumar, "Biologically Inspired Redistribution of a Swarm of Robots Among Multiple Sites," *Swarm Intelligence*, vol. 2, no. 2-4, pp. 121-141, Dec. 2008.

Refereed Conference Papers From ASU (Published, In Press, and/or Accepted)

Note: Papers are reviewed by at least 2, typically 3 or more referees.

44. **Shenbagaraj Kannapiran**, Sreenithy Chandran, Suren Jayasuriya, and Spring Berman*. "PathFinder: Attention-Driven Dynamic Non-Line-of-Sight Tracking with a Mobile Robot." *2024 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Abu Dhabi, UAE.

43. **Sangeet Sankaramangalam Ulhas**, **Shenbagaraj Kannapiran**, and Spring Berman*. "GAN-Based Domain Adaptation for Creating Digital Twins of Small-Scale Driving Testbeds: Opportunities and Challenges." *2024 IEEE Intelligent Vehicles Symposium (IV)*, Jeju Island, Korea.

42. **Bryan C.H. Chu**, James Keller, and Spring Berman*. "Trajectory Waypoint Spacing for Spline-Based Flight Plans." *6th Decennial Vertical Flight Society (VFS) Aeromechanics Specialists' Conference*, Santa Clara, CA, 2024.

41. **Shenbagaraj Kannapiran**, Nalin Bendapudi, Ming-Yuan Yu, Devarth Parikh, Spring Berman, Ankit Vora, and Gaurav Pandey*. "Stereo Visual Odometry with Deep Learning-Based Point and Line Feature Matching using an Attention Graph Neural Network." *2023 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Detroit, MI.

40. **Azadeh Doroudchi**, Zhi Qiao, Wenlong Zhang, and Spring Berman*. "Implementation of a Cosserat Rod-Based Configuration Tracking Controller on a Multi-Segment Soft Robotic Arm." *2023 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Detroit, MI.

39. **Rakshith Subramanyam**, Kowshik Thopalli, Spring Berman, Pavan Turaga, and Jayaraman J. Thiagarajan*. "Single-Shot Domain Adaptation via Target-Aware Generative Augmentations." *2023 IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, Rhodes Island, Greece.

38. **Amir Salimi Lafmejani**, Spring Berman, and Georgios Fainekos*. "NMPC-LBF: Nonlinear MPC with Learned Barrier Function for Decentralized Safe Navigation of Multiple Robots in Unknown Environments." *2022 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pp. 10297–10303.

37. Carlo Sinigaglia~, Andrea Manzoni, Francesco Braghin, and Spring Berman*. "Indirect Optimal Control of Advection-Diffusion Fields through Robotic Swarms." *2022 International Symposium on Mathematical Theory of Networks and Systems (MTNS)*, pp. 299–304.

36. Carlo Sinigaglia~, Francesco Braghin, and Spring Berman*. "Optimal Control of Velocity and Nonlocal Interactions in the Mean-Field Kuramoto Model." *2022 American Control Conference (ACC)*, pp. 290–295.

35. **Shenbagaraj Kannapiran**, Jeroen van Baar, and Spring Berman*. "A Visual Inertial Odometry Framework for 3D Points, Lines and Planes." *2021 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS).*

34. **Azadeh Doroudchi** and Spring Berman*. "Configuration Tracking for Soft Continuum Robotic Arms Using Inverse Dynamic Control of a Cosserat Rod Model." *2021 IEEE International Conference on Soft Robotics (RoboSoft)*.

33. **Zahi Kakish**, Karthik Elamvazhuthi, and Spring Berman*. "Using Reinforcement Learning to Herd a Robotic Swarm to a Target Distribution." *2021 International Symposium on Distributed Autonomous Robotic Systems (DARS)*.

32. **Aniket Shirsat** and Spring Berman*. "Decentralized Multi-target Tracking with Multiple Quadrotors using a PHD Filter." *2021 AIAA SciTech Forum*.

31. **Hamed Farivarnejad**, **Amir Salimi Lafmejani**, and Spring Berman*. "Fully Decentralized Controller for Multi-Robot Collective Transport in Space Applications." *2021 IEEE Aerospace Conference*.

30. **Amir Salimi Lafmejani**, **Hamed Farivarnejad**, Seyed Mostafa Rezayat Sorkhabadi, Fatemeh Zahedi, **Azadeh Doroudchi**, and Spring Berman*. "Collision-Free Velocity Tracking of a Moving Ground Target by Multiple Unmanned Aerial Vehicles." *2021 International Symposium on Swarm Behavior and Bio-Inspired Robotics (SWARM)*.

29. **Aniket Shirsat**, **Karthik Elamvazhuthi**, and Spring Berman*. "Multi-Robot Target Search using Probabilistic Consensus on Discrete Markov Chains." *2020 IEEE International Symposium on Safety, Security, and Rescue Robotics (SSRR)*, pp. 108–115.

28. **Shenbagaraj Kannapiran** and Spring Berman*. "Go-CHART: A Miniature Remotely Accessible Self-Driving Car Robot." *2020 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pp. 2265–2272.

27. **Amir Salimi Lafmejani**, **Hamed Farivarnejad**, and Spring Berman*. "H-Infinity Optimal Tracking Controller for Three-Wheeled Omnidirectional Mobile Robots with Uncertain Dynamics." *2020 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pp. 7587–7594.

26. **Shiba Biswal**, **Karthik Elamvazhuthi**, and Spring Berman*. "Stabilization of Multi-Agent Systems to Target Distributions using Local Interactions." *2020 International Symposium on Mathematical Theory of Networks and Systems (MTNS)*, pp. 60–65.

25. **Shiba Biswal**, **Karthik Elamvazhuthi**, Hans Mittelmann, and Spring Berman*. "Spectral Gap Optimization of Divergence Type Diffusion Operators." *2020 European Control Conference (ECC)*, pp. 1268–1273.

24. **Amir Salimi Lafmejani**, **Hamed Farivarnejad**, **Azadeh Doroudchi**, and Spring Berman*. "A Consensus Strategy for Decentralized Kinematic Control of Multi-Segment Soft Continuum Robots." *2020 American Control Conference (ACC)*, pp. 909–916.

23. **Hamed Farivarnejad** and Spring Berman*. "Decentralized Collective Transport along Manifolds Compatible with Holonomic Constraints by Robots with Minimal Global Information." *2020 American Control Conference (ACC)*, pp. 2068–2075.

22. **Azadeh Doroudchi**, Roozbeh Khodambashi, **Amir Salimi Lafmejani**, Daniel M. Aukes, and Spring Berman*. "Dynamic Modeling of a Hydrogel-based Continuum Robotic Arm with Experimental Validation." *2020 IEEE International Conference on Soft Robotics (RoboSoft)*.

21. **Hamed Farivarnejad** and Spring Berman*. "Decentralized PD Control for Multi-Robot Collective Transport to a Target Location Using Minimal Information." *2020 SPIE Defense + Commercial Sensing Symposium*, Volume 11425, Unmanned Systems Technology XXII, 1142506.

20. **Shiba Biswal**, **Karthik Elamvazhuthi**, and Spring Berman*. "Fastest Mixing Markov Chain on a Compact Manifold." *2019 IEEE Conference on Decision and Control (CDC)*, Nice, France. ***Outstanding Student Paper Award***

19. **Ragesh K. Ramachandran** and Spring Berman*. "Automated Construction of Metric Maps using a Stochastic Robotic Swarm Leveraging Received Signal Strength." *2019 International Symposium on Swarm Behavior and Bio-Inspired Robotics (SWARM)*, Okinawa, Japan.

18. **Karthik Elamvazhuthi** and Spring Berman*. "Nonlinear Generalizations of Diffusion-Based Coverage by Robotic Swarms." *2018 IEEE Conference on Decision and Control (CDC)*, Miami Beach, FL.

17. **Azadeh Doroudchi**, Sachin Shivakumar, Rebecca E. Fisher, Hamid Marvi, Daniel Aukes, Ximin He, Spring Berman, and Matthew M. Peet*. "Decentralized Control of Distributed Actuation in a Segmented Soft Robot Arm." *2018 IEEE Conference on Decision and Control (CDC)*, Miami Beach, FL.

16. **Karthik Elamvazhuthi**, **Shiba Biswal**, and Spring Berman*. "Mean-Field Stabilization of Robotic Swarms to Probability Distributions with Disconnected Supports." *2018 American Control Conference (ACC)*, Milwaukee, WI.

15. **Hamed Farivarnejad** and Spring Berman*. "Stability and Convergence Analysis of a Decentralized Proportional-Integral Control Strategy for Collective Transport." *2018 American Control Conference (ACC)*, Milwaukee, WI.

14. **Karthik Elamvazhuthi**, **Shiba Biswal**, Vaibhav Deshmukh∞, Matthias Kawski, and Spring Berman*. "Mean-Field Controllability and Decentralized Stabilization of Markov Chains." *2017 IEEE Conference on Decision and Control (CDC)*, Melbourne, Australia.

13. **Karthik Elamvazhuthi**, Hendrik Kuiper, and Spring Berman*, "Controllability to Equilibria of the 1-D Fokker-Planck Equation with Zero-Flux Boundary Condition." *2017 IEEE International Conference on Decision and Control (CDC)*, Melbourne, Australia.

12. Hanjun Li, Chunhan Feng, Henry Ehrhard, Yijun Shen, Bernardo Cobos, Fangbo Zhang, **Karthik Elamvazhuthi**, Spring Berman, Matt Haberland*, and Andrea L. Bertozzi, "Decentralized Stochastic Control of Robotic Swarm Density: Theory, Simulation, and Experiment." *2017 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Vancouver, BC, Canada.

11. **Ragesh K. Ramachandran** and Spring Berman*. "The Effect of Communication Topology on Scalar Field Estimation by Large Networks with Partially Accessible Measurements," *2017 American Control Conference (ACC)*, Seattle, WA.

10. **Ragesh K. Ramachandran**, **Sean Wilson**, and Spring Berman*. "A Probabilistic Topological Approach to Feature Identification using a Stochastic Robotic Swarm," *2016 International Symposium on Distributed Autonomous Robotic Systems (DARS)*, London, UK.
(Accepted for oral presentation - 25% acceptance rate)

9. **Hamed Farivarnejad**, **Sean Wilson**, and Spring Berman*, "Decentralized Sliding Mode Control for Autonomous Collective Transport by Multi-Robot Systems," *2016 IEEE International Conference on Decision and Control (CDC)*, Las Vegas, NV, pp. 1826–1833.

8. **Karthik Elamvazhuthi**, Chase Adams#, and Spring Berman*, "Coverage and Field Estimation on Bounded Domains by Diffusive Swarms," *2016 IEEE International Conference on Decision and Control (CDC)*, Las Vegas, NV, pp. 2867–2874.

7. **Karthik Elamvazhuthi**, **Sean Wilson**, and Spring Berman*, "Confinement Control of Double Integrators using Partially Periodic Leader Trajectories," *2016 American Control Conference (ACC)*, Boston, MA, pp. 5537–5544.

6. **Ragesh K. Ramachandran**, **Karthik Elamvazhuthi**, and Spring Berman*, "An Optimal Control Approach to Mapping GPS-Denied Environments using a Stochastic Robotic Swarm." *2015 International Symposium on Robotics Research (ISRR)*, Sestri Levante, Italy.

5. **Karthik Elamvazhuthi** and Spring Berman*, "Optimal Control of Stochastic Coverage Strategies for Robotic Swarms," *2015 IEEE International Conference on Robotics and Automation (ICRA)*, Seattle, WA, pp. 1822–1829.

4. **Karthik Elamvazhuthi** and Spring Berman*, "Scalable Formation Control of Multi-Robot Chain Networks using a PDE Abstraction," *2014 International Symposium on Distributed Autonomous Robotic Systems (DARS)*, Daejeon, Korea.

3. **Ganesh P. Kumar** and Spring Berman*, "Statistical Analysis of Stochastic Multi-Robot Boundary Coverage," *2014 IEEE International Conference on Robotics and Automation (ICRA)*, Hong Kong, pp. 74–81.

2. Theodore P. Pavlic, **Sean Wilson**, **Ganesh P. Kumar**, and Spring Berman*, "An Enzyme-Inspired Approach to Stochastic Allocation of Robotic Swarms Around Boundaries," *2013 International Symposium on Robotics Research (ISRR)*, Singapore.

1. **Ganesh P. Kumar**, Aurélie Buffin, Theodore P. Pavlic, Stephen C. Pratt, and Spring Berman*, "A Stochastic Hybrid System Model of Collective Transport in the Desert Ant *Aphaenogaster cockerelli*," *2013 ACM International Conference on Hybrid Systems: Computation and Control (HSCC)*, Philadelphia, PA, pp. 119–124.

Refereed Conference Papers Prior to ASU (All Published)

Note: Papers are reviewed by at least 2, typically 3 or more referees.

10. Karthik Dantu*, Spring Berman, Bryan Kate, and Radhika Nagpal, "A Comparison of Deterministic and Stochastic Approaches to Allocating Spatially Dependent Tasks in Micro-Aerial Vehicle Swarms," *2012 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Vilamoura, Algarve, Portugal, pp. 793–800.

9. Spring Berman*, Radhika Nagpal, and Ádám Halász, "Optimization of Stochastic Strategies for Spatially Inhomogeneous Robot Swarms: A Case Study in Commercial Pollination," *2011 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, San Francisco, CA, pp. 3923–3930. (Acceptance rate: 32%)

8. Spring Berman*, Vijay Kumar, and Radhika Nagpal, "Design of Control Policies for Spatially Inhomogeneous Robot Swarms with Application to Commercial Pollination," *2011 IEEE International Conference on Robotics and Automation (ICRA)*, Shanghai, China, pp. 378–385.

7. Spring Berman*, Quentin Lindsey, Mahmut Selman Sakar, Vijay Kumar, and Stephen C. Pratt, "Study of Group Food Retrieval by Ants as a Model for Multi-Robot Collective Transport Strategies," *2010 Robotics: Science and Systems Conference (RSS)*, Zaragoza, Spain. (Acceptance rate: 16%)

6. Loïc Matthey, Spring Berman*, and Vijay Kumar, "Stochastic Strategies for a Swarm Robotic Assembly System," *2009 IEEE International Conference on Robotics and Automation (ICRA)*, Kobe, Japan, pp. 1953–1958.

5. Spring Berman*, Ádám Halász, M. Ani Hsieh, and Vijay Kumar, "Navigation-Based Optimization of Stochastic Strategies for Allocating a Robot Swarm Among Multiple Sites," *2008 IEEE International Conference on Decision and Control (CDC)*, Cancun, Mexico, pp. 4376–4381.

4. Ádám Halász*, M. Ani Hsieh, Spring Berman, and Vijay Kumar, "Dynamic Redistribution of a Swarm of Robots Among Multiple Sites," *2007 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, San Diego, CA, pp. 2320–2325.

3. Spring Berman*, Ádám Halász, Vijay Kumar, and Stephen C. Pratt, "Bio-Inspired Group Behaviors for the Deployment of a Swarm of Robots to Multiple Destinations," *2007 IEEE International Conference on Robotics and Automation (ICRA)*, Rome, Italy, pp. 2318–2323.

2. Spring Berman*, Ádám Halász, and Vijay Kumar, "MARCO: A Reachability Algorithm for Multi-Affine Systems with Applications to Biological Systems," *2007 ACM International Conference on Hybrid Systems: Computation and Control (HSCC)*, LNCS 4416, eds. A. Bemporad, A. Bicchi, G. Buttazzo. pp. 76–89.

1. Spring Berman*, Ádám Halász, Vijay Kumar, and Stephen C. Pratt, "Algorithms for the Analysis and Synthesis of a Bio-Inspired Swarm Robotic System," *2007 International Conference on the Simulation of Adaptive Behavior (SAB)*, LNCS 4433, eds. E. Sahin, W. Spears, A. Winfield. pp. 56–70.

Invited Conference Papers Prior to ASU (Published)

1. Spring Berman* and Vijay Kumar, "Abstractions and Algorithms for Assembly Tasks with Large Numbers of Robots and Parts," *2009 IEEE Conference on Automation Science and Engineering (CASE)*, Bangalore, India, pp. 25–28.

Undergraduate Research Symposia Abstracts with ASU Students

9. Enoch O'Neal[#] and Spring Berman, "A Graphical User Interface and Simulation for Control of a Drone Swarm with Haptic Feedback," *Proc. of the Fulton Undergraduate Research Symposium (FURI)*, Arizona State University, Tempe, AZ, Fall 2019.

8. Kevin Sidbon[#] and Spring Berman, "Autonomous Navigation and Pathfinding by Small Mobile Robots," *Proc. of the Fulton Undergraduate Research Symposium (FURI)*, Arizona State University, Tempe, AZ, Summer-Fall 2017.

7. Juan Bahena[#] and Spring Berman, "Design and Programming of an LED Ring for Visual Feedback on a Swarm Robotic Platform," *Proc. of the Fulton Undergraduate Research Symposium (FURI)*, Arizona State University, Tempe, AZ, Fall 2017.

6. Juan Bahena[#] and Spring Berman, "Design and Programming of an LED Ring for Displaying Behavioral and Charging States on an Autonomous Swarm Robotic Platform," *Proc. of the Fulton Undergraduate Research Symposium (FURI)*, Arizona State University, Tempe, AZ, Spring 2017.

5. Felipe Riveros[#] and Spring Berman, "Implementation of a Tank Tread Drivetrain to Pheeno, a Swarm Robotic Platform," *Proc. of the Fulton Undergraduate Research Symposium (FURI)*, Arizona State University, Tempe, AZ, Spring 2017.

4. Anna Lynn Martin[#] and Spring Berman, "Evaluation of Force-Sensing Materials for a Small Robotic Gripper," *ASU/NASA Space Grant Undergraduate Fellowship*, Arizona State University, Tempe, AZ, Fall 2016 - Spring 2017.

3. Anna Lynn Martin[#] and Spring Berman, "Determining the Grip Strength of a Robotic Manipulator," *ASU/NASA Space Grant Undergraduate Fellowship*, Arizona State University, Tempe, AZ, Fall 2015 - Spring 2016.

2. Xinyu Wang[#] and Spring Berman, "Design and Implementation of a Marker-Depositing Hopper Module for a Small Mobile Ground Robot," *Proc. of the Fulton Undergraduate Research Symposium (FURI)*, Arizona State University, Tempe, AZ, Fall 2015.

1. Chase Adams[#] and Spring Berman, "Utilizing Widely Available Electronics in Quadrotor Helicopters to Create a Flexible and Open-Source Framework," *Proc. of the Fulton Undergraduate Research Symposium (FURI)*, Arizona State University, Tempe, AZ, Summer 2014 - Fall 2014.

Refereed Manuscripts Submitted / In Revision from ASU

2. Armin Mokhtarian, Patrick Scheffe, Maximilian Kloock, Simon Schäfer, Heeseung Bang, Viet-Anh Le, **Sangeet Ulhas**, Johannes Betz, Sean Wilson, Spring Berman, Amanda Prorok, and Bassam Alrifaee[*]. "A Survey on Small-Scale Testbeds for Connected and Automated Vehicles and Robot Swarms." In revision for *IEEE Robotics & Automation Magazine*, 2024.

1. Carlo Sinigaglia[~], Andrea Manzoni, Francesco Braghin, and Spring Berman[*]. "Robust Optimal Density Control of Robotic Swarms." In revision for *Automatica*, 2024.

Selected Invited Presentations – External

27. **University of Pennsylvania**, *GRASP SFI Seminar*, Feb. 28, 2024. "Scalable Control of Distributed Robotic Systems for Environmental Sensing and Interaction" (remote presentation).

26. **Cyber-Defence Campus, armasuisse Science and Technology**, *U.S.-Swiss Swarm Intelligence Workshop on Distributed Robotics: From Groups to Swarms*, Zürich, Switzerland, Sept. 20, 2023. "Scalable Control Strategies for Versatile Robotic Swarms based on Models of Individual and Collective Dynamics."

25. **Louisiana State University**, *Control and Optimization Seminar*, Mar. 3, 2023. "Scalable Control of Robotic Swarms with Limited Information" (remote presentation).

24. **ETH Zürich, Institute for Dynamic Systems and Control**, *Autonomy Talks*, Zürich, Switzerland, July 26, 2022. "Scalable Control of Robotic Swarms in Uncertain Environments" (remote presentation).

23. **Michigan State University**, *Robotics and Control Seminar Series*, Dec. 1, 2021. "Control Strategies for Robotic Swarms in Uncertain Environments" (remote presentation).

22. **University of Utah**, *Robotics Seminar*, Sept. 2, 2021. "Control Strategies for Robotic Swarms in Uncertain Environments" (remote presentation).

21. **Sandia National Laboratories**, *AutonomyNM Bootcamp Lecture Series*, July 20, 2021. "Control and Optimization of Swarm Robotic Systems" (remote presentation).

20. **Purdue University, Center for Innovation in Control, Optimization, and Networks (ICON)**, *Panel on Intelligent Robotic Swarms: Current Capabilities and a Vision for the Future*, Oct. 16, 2020. "Control of Robotic Swarms with Limited Information and the Future Trajectory of Swarms" (remote presentation).

19. **University of California, Los Angeles**, *Electrical & Computer Engineering Seminar*, Los Angeles, CA, May 13, 2019. "Scalable Control of Robotic Swarms in Uncertain Environments."

18. **University of Maryland, Baltimore County**, *Mechanical Engineering Seminar*, Baltimore, MD, May 10, 2019. "Scalable Control of Robotic Swarms in Uncertain Environments."

17. **Electrical and Computer Engineering Department Heads Association (ECEDHA) Annual Conference and ECExpo**, *Robotics Plenary Panel*, Tucson, AZ, Mar. 23, 2019. "Autonomous Collective Systems Laboratory."

16. **Phoenix Mobile & Emerging Tech Festival**, Arizona State University, Tempe, AZ, Nov. 3, 2018. "Robotic Testbed for Connected and Autonomous Vehicles Demonstration." (One of two presenters)

15. **Office of Naval Research (ONR) Global Workshop**, *Swarm Robotics: Pushing the State of the Art*, Rome, Italy, Oct. 26, 2018. "Scalable Control of Robotic Swarms in Inaccessible, Uncertain Environments."

14. **Dagstuhl Seminar**, *Algorithmic Foundations of Programmable Matter*, Schloss Dagstuhl, Wadern, Germany, Aug. 14, 2018. "Swarm Robotics: Applications, Open Challenges, and a Control-Theoretic Framework for Programmable Matter."

13. **University of California, Los Angeles**, *Kickoff Workshop for the UCLA Simons Mathematical NanoSystems Initiative*, Los Angeles, CA, Jan. 17, 2018. "A Computational Framework for Identifying Design Guidelines to Increase the Penetration of Targeted Nanoparticles into Tumors."

12. **Université Toulouse 1 Capitole**, *Workshop on Cross-Disciplinary Approaches for Building Intelligent Swarms of Drones*, Toulouse, France, Nov. 14, 2017. "A Scalable Control and Estimation Framework for Robotic Swarms in Uncertain Environments."

11. **Massachusetts Institute of Technology**, *Robotics Seminar*, Cambridge, MA, Oct. 3, 2017. "A Control and Estimation Framework for Robotic Swarms in Uncertain Environments."

10. **University of California, San Diego**, *Dynamic System and Controls Seminar*, La Jolla, CA, May 12, 2017. "A Control and Estimation Framework for Robotic Swarms in Unknown Environments."

9. **University of Southern California**, *Aerospace and Mechanical Engineering Seminar*, Los Angeles, CA, Nov. 30, 2016. "A Control and Estimation Framework for Robotic Swarms in Unknown Environments."

8. **Google X Headquarters**, *Google X Science Fair*, Mountain View, CA, Sept. 15, 2016. "Swarm Control & Estimation."

   • Prof. Berman and four of her lab members presented posters of their research and a demonstration of their new small robot platform "Pheeno" to visitors at their booth

7. **Army Research Laboratory (ARL)** *Workshop on Heterogeneity, Diversity and Resilience in Multi-Robot Systems*, Arlington, VA, Aug. 16, 2016. "A Control and Estimation Framework for Heterogeneous Robotic Swarms with Stochastic Behaviors."

6. **Georgia Institute of Technology**, *Decision and Control Laboratory Seminar*, Atlanta, GA, Oct. 5, 2015. "A Control and Estimation Framework for Adaptive Robotic Swarms."

5. **Massachusetts Institute of Technology**, *Workshop on Biological Distributed Algorithms (BDA)*, Cambridge, MA, Aug. 19, 2015. "Control and Estimation Techniques for Adaptive Robotic Swarms."

4. **University of Arizona**, *Aerospace and Mechanical Engineering Seminar*, Tucson, AZ, Feb. 5, 2015. "Scalable Control of Robotic Swarms with Minimal Capabilities and Information."

3. **United States Military Academy**, *DARPA Young Faculty Award presentations*, West Point, NY, Sept. 11, 2014. "Specification and Control of Customizable Multi-Robot Systems for Distributed Sensing and Cooperative Manipulation."

2. **University of California, Los Angeles**, *Special Applied Math Talk*, Los Angeles, CA, Aug. 14, 2014. "Control of Swarm Robotic Systems for Coverage and Manipulation Tasks."

1. **University of Southern California**, *First USC Symposium on the Futures of Robotics*, Los Angeles, CA, Dec. 7, 2011. "A Scalable Approach to Designing Robot Control Policies for Macroscopic Swarm Behaviors."

Selected Invited Presentations – ASU Internal

11. **ASU School of Arts, Media and Engineering Seminar**, *Digital Culture Speaker Series*, Arizona State University, Tempe, AZ, Feb. 6, 2020. "Control of Robotic Swarms in Uncertain Environments."

10. **Data-Oriented Mathematical and Statistical Sciences Research Training Group Seminar**, School of Mathematical and Statistical Sciences, Arizona State University, Tempe, AZ, Oct. 28, 2019. "Scalable Control of Robotic Swarms in Uncertain Environments."

9. **ASU Micro Air Vehicles (MAV) Club**, Arizona State University, Tempe, AZ, Mar. 3, 2017. "A Control and Estimation Framework for Robotic Swarms in Unknown Environments."

8. **Faculty Focus presentation for MAE Advisory Board**, Arizona State University, Tempe, AZ, Dec. 2, 2016. "A Control and Estimation Framework for Robotic Swarms in Unknown Environments."

7. **Biomimicry Center Launch Event**, Arizona State University, Tempe, AZ, Mar. 3, 2015. "Swarmimicry: Engineering Certain Outcomes in an Uncertain World."

6. **ASU Software Developers Association (SoDA)**, Arizona State University, Tempe, AZ, Feb. 26, 2015. "Scalable Control of Robotic Swarms with Minimal Capabilities and Information."

5. **ASU Mathematics Club**, Arizona State University, Tempe, AZ, Jan. 28, 2015. "Swarm Robotic Systems."

4. **SESE Engineering Coffee**, Arizona State University, Tempe, AZ, Oct. 17, 2014. "Control of Swarm Robotic Systems for Coverage and Manipulation Tasks."

3. **Dynamics and Controls Colloquium**, Arizona State University, Tempe, AZ, Feb. 8, 2013. "Modeling, Analysis, and Control of Collective Behaviors in Swarm Robotic Systems."

2. **School of Mathematical and Natural Sciences**, Arizona State University, Glendale, AZ, Jan. 17, 2013. "Modeling, Analysis, and Control of Swarm Robotic Systems: Approaches Inspired by Social Insect Colonies."

1. **Social Insect Research Group Seminar**, Arizona State University, Tempe, AZ, Aug. 28, 2012. "Ant and Honeybee Colonies as Inspiration for Swarm Robotic Systems."

Selected Invited Conference Presentations

15. **Workshop on Biological Distributed Algorithms (BDA 2023)**, Orlando, FL, June 23, 2023. "Decentralized Control of Octopus-Inspired Soft Robot Arms" (remote presentation).

14. **Maryland Robotics Center Research Symposium**, University of Maryland, College Park, Maryland, May 25, 2023. "Move, Manipulate, Multitask, Map: Model-Based Controllers for Versatile Swarms." Keynote presentation.

13. **International Conference on Robot Intelligence Technology and Applications (RiTA 2022)**, Griffith University, Gold Coast Campus, Australia, Dec. 7, 2022. "Scalable Control of Robotic Swarms in Uncertain Environments" (remote presentation).

12. **IEEE International Conference on Robotics and Automation (ICRA 2021)**, Workshop: *Robot Swarms in the Real World: From Design to Deployment*, June 4, 2021. "Control Strategies for Collective Payload Transport in Unknown Environments with Obstacles" (remote presentation).

11. **IEEE International Conference on Robotics and Automation (ICRA 2021)**, Workshop: *Micro-Nano Swarm Robotics*, June 4, 2021. "Density Control of Robotic Swarms using Local Feedback" (remote presentation).

10. **Dynamics Days 2020**, International Conference on Chaos and Nonlinear Dynamics, Hilton Hartford, Hartford, Connecticut, Jan. 3, 2020. "Mean-Field Approaches to Controlling the Spatiotemporal Dynamics of Robotic Swarms."

9. **Workshop on Insect-Inspired Models for Social Behavior**, Arizona State University, Tempe, AZ, Jan. 14, 2019. "Bio-Inspired Control Strategies for Robot Swarms."

8. **ASU Origins Project**, Scientific Workshop: *Artificial Intelligence and Autonomous Weapons Systems: Technology, Warfare, and Our Most Destructive Machines; Session III: The New Battlespace: Autonomy in Motion*, Tempe Mission Palms, Tempe, AZ, February 17, 2018. "Swarm Robotics: Recent Developments and Open Challenges."

7. **Robotics: Science and Systems Conference (RSS)**, Workshop: *Become a Swarm Robotics Hacker Overnight*, Lesley University, Cambridge, MA, July 15, 2017. "Bio-Inspired Engineering of Robot Swarms."

6. **American Control Conference (ACC)**, Tutorial Session: *Bio-inspired Network Dynamics and Control*, Seattle, WA, May 25, 2017. "Ant-Inspired Control Strategies for Multi-Robot Cooperative Manipulation."

5. **Conference on Governance of Emerging Technologies: Law, Policy and Ethics**, Plenary Session: *Responsible Development of AI*, Arizona State University Sandra Day O'Connor College of Law, Phoenix, AZ, May 17, 2017. "Swarm Robotics: Recent Developments and Open Challenges."

4. **SIAM Conference on the Life Sciences**, Minisymposium: *Collective Dynamics in the Life and Social Sciences*, Boston, MA, July 12, 2016. "Swarm Robotic Control Strategies Inspired by Biological Collective Behaviors."

3. **Robotics: Science and Systems Conference (RSS)**, Workshop: *Challenges in Modeling and Control of Centimeter-Scale Robots*, University of Michigan, Ann Arbor, MI, June 18, 2016. "Control and Estimation Techniques for Robotic Swarms with Stochastic Behaviors."

2. **KI-Net NSF Research Network Conference**, Collective Dynamics and Model Verification: Connecting Kinetic Modeling to Data, Arizona State University, Tempe, AZ, Apr. 17, 2015. "Continuum Abstractions for Scalable Control of Robotic Swarms with Minimal Capabilities and Information."

1. **Annual Meeting of the Entomological Society of America**, Keynote speaker, Symposium: *How Cool is Entomology?*, Austin, TX, Nov. 13, 2013. "Ant and Honeybee Colonies as Inspiration for Robotic Swarms."

Peer-reviewed Conference Abstracts

Note: Presenter is indicated by *P*.

6. **Sangeet Sankaramangalam Ulhas**^{P}, Aditya Ravichander$^{\infty}$, Kathryn A. Johnson, Theodore P. Pavlic, Lance Gharavi, and Spring Berman. "CHARTOPOLIS: A Small-Scale Labor-art-ory for Research and Reflection on Autonomous Vehicles, Human-Robot Interaction, and Sociotechnical Imaginaries." Workshop on Miniature Robotic Platforms for Full Scale Autonomous Vehicle Research, *IROS 2022: IEEE/RSJ International Conference on Intelligent Robots and Systems*, Kyoto, Japan, Oct. 27, 2022. Oral presentation (remote).

5. **Ragesh K. Ramachandran**^{P} and Spring Berman. "Post Processing of Occupancy Grid Maps using Persistent Homology." Workshop on Topological Methods in Robot Planning, *IEEE International Conference on Robotics and Automation (ICRA)*, Montreal, Canada, May 24, 2019. Poster presentation.

4. **Ragesh K. Ramachandran**^{P} and Spring Berman. "Topological Mapping Using a Heterogeneous Robotic Swarm." *IEEE International Conference on Robotics and Automation (ICRA)*, Workshop on Emerging Topological Techniques in Robotics, Stockholm, Sweden, May 20, 2016. Poster presentation.

3. **Sean Wilson**^{P}, Ruben Gameros^{‡,P}, and Spring Berman. "Pheeno, A Versatile Swarm Robotic Research and Education Platform." *International Symposium on Swarm Behavior and Bio-Inspired Robotics (SWARM 2015)*, Workshop on Embodied Sensorimotor Interaction: From Locomotion to Collective Behavior, Kyoto, Japan, Oct. 28, 2015. Poster presentation.

2. Theodore P. Pavlic^{P}, **Sean Wilson**, **Ganesh P. Kumar**, Stephen C. Pratt, and Spring Berman. "Enzyme-Inspired Stochastic Algorithm Implementations for Multi-Robot Teams that Approximate Robust Social-Insect Behaviors." *Workshop on Biological Distributed Algorithms (BDA)*, Cambridge, MA, Aug. 18, 2015. Oral presentation.

1. Theodore P. Pavlic, **Sean Wilson**^{P}, **Ganesh P. Kumar**, and Spring Berman. "Design of Stochastic Policies for Synchronous Collective Transport of Multiple Payloads by Robotic Swarms." *European Conference on Artificial Life (ECAL)*, Workshop on Collective Behaviours and Social Dynamics, Taormina, Italy, Sept. 2, 2013. Oral presentation.

INTELLECTUAL PROPERTY

Note: **Bold Font** indicates an ASU Ph.D. Student, advised by Prof. Berman

6. **Aniket Shirsat** and Spring Berman, "Systems and Methods for Decentralized Multi-Target Tracking with Multiple Quadrotors using a PHD Filter," ***U.S. Patent No. 11,989,034***, granted May 21, 2024.

5. Sreenithy Chandran, **Shenbagaraj Kannapiran**, Suren Jayasuriya, and Spring Berman, "Systems and Methods for a Dynamic Non-Line-of-Sight Tracking with Mobile Robots," U.S. Patent Office, Provisional Application, No. 63/572,900, filed on Apr. 1, 2024.

4. **Aniket Shirsat**, Shatadal Mishra, Wenlong Zhang, and Spring Berman, "Systems and Methods for Probabilistic Consensus on Feature Distribution for Multi-Robot Systems with Markovian Exploration Dynamics," U.S. Patent Office, Provisional Application, No. 63/375,160, filed on Sept. 9, 2022.

3. Ivan Ermanoski, Christian Fortunato, and Spring Berman, "System and Method for Wireless Power Transmission," U.S. Utility Patent Application, No. 17/876,415, filed on July 28, 2022.

2. Ivan Ermanoski, Christian Fortunato, and Spring Berman, "System and Method for Wireless Power Transmission," U.S. Patent Office, Provisional Application, No. 63/226,663, filed on July 28, 2021.

1. **Shenbagaraj Kannapiran** and Spring Berman, "Systems and Methods for a Miniature Remotely Accessible Self-Driving Car Robot," U.S. Patent Office, Provisional Application, No. 62/948,687, filed on Dec. 17, 2019.

PROFESSIONAL ACTIVITIES AND SERVICE

International / National Conference Committees

15. **Program Committee Member**, 2024 International Conference on Swarm Intelligence (ANTS).
14. **Co-Chair for Workshops and Tutorials**, **Organizing Committee** of the 2022 IEEE International Conference on Robotics and Automation (ICRA), Jan. 2021–May 2022.
13. **Publicity Chair**, **Organizing Committee** of the 2022 International Conference on Robot Intelligence Technology and Applications (RiTA), May 2022–Dec. 2022.
12. **Program Committee Member**, International Conference on Swarm Intelligence (ANTS), Oct. 2019.
11. **Technical Program Co-Chair**, **Organizing Committee** of the International Symposium on Distributed Robotic Systems (DARS), Nov. 2016.
10. **Program Committee Member**, International Conference on Swarm Intelligence (ANTS), Sept. 2016.
9. **Publications Co-Chair**, **Organizing Committee** of the Robotics: Science and Systems (RSS) Conference, June 2016.
8. **Program Committee Member**, ACM International Conference on Hybrid Systems: Computation and Control (HSCC), Apr. 2016.
7. **Program Committee Member**, Intelligent Robotics and Multi-Agent Systems (IRMAS) track of ACM/SIGAPP Symposium on Applied Computing (SAC), Apr. 2016.
6. **Program Committee Member**, 1st International Workshop on Spatial COllective PErvasive Computing Systems (SCOPES) at the IEEE International Conference on Self-Adaptive and Self-Organizing Systems (SASO), Sept. 2015.
5. **Co-chair for Workshops and Tutorials**, **Organizing Committee** of the IEEE International Conference on Robotics and Automation (ICRA), May 2015.
4. **Program Committee Member**, International Symposium on Distributed Robotic Systems (DARS), Nov. 2014.
3. **Program Committee Member**, International Conference on Simulation Modeling and Programming for Autonomous Robots (SIMPAR), Oct. 2014.
2. **Program Committee Member**, International Conference on Swarm Intelligence (ANTS), Sept. 2012.
1. **Program Committee Member**, International Symposium on Distributed Robotic Systems (DARS), Nov. 2010.

International / National Seminars and Conference Sessions Organized

4. **Workshop Co-organizer**, "Workshop 4: Social Dynamics beyond Vehicle Autonomy," part of the Institute for Pure and Applied Mathematics (IPAM) Long Program on *Mathematical Challenges and Opportunities for Autonomous Vehicles*, University of California, Los Angeles, Nov. 30 – Dec. 4, 2020. Other co-organizers: Sebastian Motsch, Benedetto Piccoli, and Joan Walker.
3. **Seminar Co-organizer**, "Algorithmic Foundations of Programmable Matter," Dagstuhl Seminar 18331, Schloss Dagstuhl–Leibniz-Zentrum fuer Informatik, Dagstuhl, Germany, Aug. 12-17, 2018. Other co-organizers: Sándor Fekete, Matthew J. Patitz, and Christian Scheideler.
2. **Minisymposium Co-organizer**, "PDE Models and Control of Swarm Dynamics," SIAM Conference on Analysis of Partial Differential Equations, Scottsdale, AZ, Dec. 8-9, 2015.
1. **Workshop Co-organizer**, "Micro-Nano Robotic Swarms for Biomedical Applications," Full-day workshop at the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), Chicago, IL, Sept. 14, 2014.

International / National Conference Sessions Chaired

5. **Session Co-Chair**, *Sensor Networks* session, American Control Conference (ACC), May 2017.
4. **Session Co-Chair**, *Sliding-Mode Control I* session, IEEE International Conference on Decision and Control (CDC), Dec. 2016.
3. **Session Chair**, *Cooperative Control and Agent-based Systems* session, American Control Conference (ACC), July 2016.
2. **Session Chair**, *SLAM I* session, IEEE International Conference on Robotics and Automation (ICRA), May 2015.
1. **Session Chair**, *Distributed Robotic Systems I* session, IEEE International Conference on Robotics and Automation (ICRA), June 2014.

Journal Editorial Board Membership

2. **Journal Associate Editor**, *IEEE Robotics and Automation Letters (RA-L)*, 2017–2020.
1. **Journal Editorial Board Member**, *Swarm Intelligence*, 2013–2019.

Conference Editorial Board Membership

4. **Associate Editor**, Program Committee of the 2023 American Control Conference (ACC)
3. **Associate Editor**, Conference Editorial Board of the 2015 IEEE International Conference on Robotics and Automation (ICRA)
2. **Associate Editor**, Conference Editorial Board of the 2014 IEEE International Conference on Robotics and Automation (ICRA)
1. **Associate Editor**, Conference Editorial Board of the 2013 IEEE International Conference on Robotics and Automation (ICRA)

Journal Referee Service

25. Artificial Life and Robotics (SWARM Special Issue)
24. Asian Journal of Control
23. ASME Journal of Dynamic Systems, Measurement, and Control
22. Energy Nexus
21. IEEE Access
20. IEEE Robotics and Automation Letters
19. IEEE Robotics and Automation Magazine
18. IEEE Transactions on Automatic Control
17. IEEE Transactions on Automation Science and Engineering
16. IEEE Transactions on Control Systems Technology
15. IEEE Transactions on Evolutionary Computation
14. IEEE Transactions on Robotics
13. International Journal of Nonlinear Sciences and Numerical Simulation
12. International Journal of Robotics Research
11. Journal of Aerospace Computing, Information, and Communication
10. Journal of Integrative Neuroscience
9. Journal of Micro-Nano Mechatronics
8. Journal of Robotics and Autonomous Systems
7. Leibniz Transactions on Embedded Systems - Special Issue on Distributed Hybrid Systems
6. Nature Machine Intelligence
5. PLOS Computational Biology
4. PLOS ONE
3. Proceedings of the National Academy of Sciences (PNAS)
2. Soft Matter
1. Swarm Intelligence

Conference Referee Service

14. ACM International Conference on Hybrid Systems: Computation and Control (HSCC)
13. ACM/SIGAPP Symposium on Applied Computing (SAC)
12. American Control Conference (ACC)
11. IEEE International Conference on Decision and Control (CDC)
10. IEEE International Conference on Robotics and Automation (ICRA)
9. IEEE International Conference on Self-Adaptive and Self-Organizing Systems (SASO)
8. IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)
7. International Conference on Robot Intelligence Technology and Applications (RiTA)
6. International Conference on Simulation, Modeling, and Programming for Autonomous Robots (SIMPAR)
5. International Conference on Swarm Intelligence (ANTS)
4. International Symposium on Distributed Autonomous Robotic Systems (DARS)
3. International Symposium on Multi-Robot and Multi-Agent Systems (MRS)
2. International Symposium on Swarm Behavior and Bio-Inspired Robotics (SWARM)
1. Robotics: Science and Systems (RSS)

Proposal Review Service

6. **National Science Foundation**:
   5 panel reviews (2013, 2014, 2014, 2015, 2021)
   2 ad-hoc reviews (2017, 2022)
5. **U.S. Army Corps of Engineers** Engineer Research and Development Center (ERDC):
   2 proposal reviews (2016)
4. **U.S. Army Research Office**: 2 proposal reviews (2013, 2023)
3. **U.S. Department of Homeland Security**: 1 proposal review (2024)
2. **Deutsche Forschungsgemeinschaft** (German Research Foundation):
   1 proposal review (2016)
1. **Israel Science Foundation**: 1 proposal review (2015)

ASU-level Committees and Initiatives

4. **Workshop Organizer**, ASU Global Security Initiative (GSI) Workshop on Bio-Inspired Resilient Distributed Systems (BIRDS), Arizona State University, May 16, 2018

3. **Associate Director**, Center for Human, Artificial Intelligence, and Robotic Teaming (CHART), under the ASU Global Security Initiative (GSI), Fall'17–Present
   • See **Research Support** for further details

2. **Core Faculty Affiliate**, ASU Global Security Initiative (GSI), Spring'16–Present
   • GSI is an ASU-wide interdisciplinary hub for research on complex emerging global challenges and is ASU's primary interface to the U.S. Department of Defense and Intelligence Community.

1. **Member**, Committee for the Development of Biomimicry and Bio-inspired Research and Education Initiatives at ASU, Spring'13–Spring'15

Engineering School-level Committees and Initiatives

16. **Program Chair**, 2024 Arizona State University Southwest Robotics Symposium (Tempe, AZ, Oct. 31-Nov. 1, 2024), Fall'24

15. **Member**, Grand Challenge Scholars Program Faculty, Fall'21–present

14. **Member**, Robotics and Autonomous Systems (RAS) Graduate Faculty Assembly, Fall'18–present

13. **Member**, Dean's Faculty Advisory Council (DFAC), Fall'19–Summer'22

12. **Participant**, Kern Entrepreneurial Engineering Network (KEEN), Kern Family Foundation, Arizona, Fall'19–Fall'20
    • KEEN is a collaboration of hundreds of engineering faculty from different institutions, and ASU is a partner in this collaboration. The goal is to instill an entrepreneurship mindset (EM) in engineering students to complement their technical skill set via numerous course enhancements and non-curricular interventions.
    • Attended professional development workshops on integrating EM into engineering courses; participated in coaching sessions on integrating EM instructional content into MAE 318: System Dynamics and Control I (implemented in Spring'20).

11. **Publications Chair**, 2019 Arizona State University Southwest Robotics Symposium (Tempe, AZ, Jan. 24-25, 2019), Fall'18–Spring'19

10. **Member**, ASU Leadership Academy (LA) Robotics Team (teamLA Cohort III), Fall'17–Fall'18

9. **Member**, Faculty Search Committee (SESE / Fulton Schools of Engineering), Fall'17–Spring'18
   Search: Alberto Enrique Behar Memorial Research Professorship

8. **Member**, Faculty Search Committee (CIDSE / SEMTE / TPS), Fall'16–Spring'17
   Search: Airborne Networking & Autonomous Robotic Systems

7. **Member**, Engineering New Faculty Advisory Council (NFAC), Welcoming Sub-Committee, Spring'14–Fall'16
   • NFAC facilitates the integration of new engineering faculty into ASU by fostering a culture of collaboration and community

6. **Member**, Faculty Search Committee (SEMTE / TPS), Fall'15–Spring'16
   Search: Robotics

5. **Member**, Faculty Search Committee (SEMTE / TPS / ECEE / CIDSE), Fall'14–Spring'15
   Search: Autonomous, Intelligent and Robotic Systems

4. **Member**, Faculty Search Committee (TPS / SEMTE), Fall'14–Spring'15
   Search: Wearable Robot Technologies

3. **Member**, Faculty Search Committee (TPS / SEMTE / CIDSE), Spring'14
   Search: Robotics

2. **Co-host**, ASU Biorobotics Seminar Series, Spring'14, Spring'13, Fall'12
   • Helped initiate a new seminar series to invite faculty from other universities to present their work on topics at the interface of biology and robotics, including bio-inspired robot collectives and biomimetic robots. Invited and hosted 6 speakers.

1. **Member**, Organization Committee of the Piper Health Solutions Workshop on Rehabilitation Robotics, Tempe, AZ, Feb. 22-23, 2013

Unit-level Committees

7. **Member**, SEMTE Honors and Awards Committee (HAC), Fall'24–present

6. **Co-Chair**, Faculty Search Committee (SEMTE), Fall'22–Spring'23
   Search: Robotics, Controls, and Autonomous Systems

5. **Co-Chair**, Faculty Search Committee (SEMTE), Fall'21–Spring'22
   Search: Robotics, Autonomous Systems, and Artificial Intelligence

4. **Co-Chair**, Faculty Search Committee (SEMTE), Fall'20–Spring'21
   Search: Convergent Innovation in Artificial Intelligence and Engineering

3. **Co-Chair**, Faculty Search Committee (SEMTE), Fall'19–Spring'20
   Search: Control Theory and Applications

2. **Member**, Faculty Search Committee (SEMTE), Fall'18–Spring'19
   Search: Robotics and Autonomous Systems

1. **Co-organizer**, SEMTE Controls Symposium: "Advanced Control Methods for Emerging Applications", Arizona State University, Tempe, AZ, Dec. 12, 2014.

Program-level Committees

2. **Member,** Mechanical and Aerospace Engineering (MAE) Undergraduate Affairs Committee, Fall'24–present

1. **Member**, Mechanical and Aerospace Engineering (MAE) Graduate Affairs Committee, Spring'22–present

Professional Society Committees

2. **Member**, Technical Committee on Multi-Robot Systems, IEEE Robotics and Automation Society, Spring'17–Present

1. **Member**, "Swarm Intelligence" Task Force, IEEE Computational Intelligence Society, Spring'16–Spring'18

Professional Society Memberships

2. Institute of Electrical and Electronics Engineers (IEEE), Jan. 2006–Present
   - IEEE Robotics and Automation Society
   - IEEE Control Systems Society
   - IEEE Women in Engineering

1. American Society of Mechanical Engineers (ASME), Aug. 2002–Dec. 2016

PERSONNEL: STUDENT SUPERVISION / MENTORING, TEACHING, DISSERTATION COMMITTEES, RESEARCHERS, AND OUTREACH

Note:
* Asterisk indicates students who are/were funded by a grant on which Prof. Berman is the PI.

As Chair or Co-chair/Primary Advisor: Prof. Berman advises these students' graduate thesis/applied project research and undergraduate research, and she meets with them on a regular basis (lab meetings, project-specific meetings, and one-on-one meetings) to discuss research progress.

As Co-chair/Non-Primary Advisor or Committee Member: Prof. Berman meets with these students at milestones in their graduate or undergraduate programs: semester progress reports, qualifying exams, prospectus presentations, and thesis defenses.

Ph.D. Students Advised as Chair

10. **Sean Thomas Wilson***, Mechanical Engineering, Fall 2012 – Summer 2017
    - **Graduated:** Spring 2017
    - Ph.D. Thesis: "Scalable Control Strategies and a Customizable Swarm Robotic Platform for Boundary Coverage and Collective Transport Tasks"
    - **Awards:** (1) ASU Outstanding Graduate Student Research Award - Mechanical & Aerospace Engineering, Spring'17
      (2) ASU Mechanical & Aerospace Engineering University Graduate Fellowship, Fall'12
    - Position after graduation: Research Engineer II in Prof. Magnus Egerstedt's lab at the Georgia Institute of Technology, Atlanta, GA

9. **Ragesh Kumar Ramachandran***, Mechanical Engineering, Fall 2014 – Fall 2018

   • **Graduated:** Fall 2018
   • Ph.D. Thesis: "Exploration, Mapping and Scalar Field Estimation using a Swarm of Resource-Constrained Robots"
   • Position after graduation: Postdoctoral researcher in Prof. Gaurav Sukhatme's lab at the University of Southern California, Los Angeles, CA

8. **Karthik Elamvazhuthi***, Mechanical Engineering, Spring 2015 – Summer 2019

   • **Graduated:** Summer 2019
   • Ph.D. Thesis: "Controllability and Stabilization of Kolmogorov Forward Equations for Robotic Swarms"
   • **Award:** ASU Outstanding Graduate Student Research Award in Mechanical and Aerospace Engineering
   • Position after graduation: Postdoctoral Research Associate in Prof. Berman's lab, then CAM Assistant Adjunct Professor in the Dept. of Mathematics, University of California, Los Angeles

7. **Shiba Biswal***, Mechanical Engineering, Summer 2015 – Spring 2020

   • **Graduated:** Spring 2020
   • Ph.D. Thesis: "Self-Organization of Multi-Agent Systems Using Markov Chain Models"
   • **Awards:** (1) ASU Outstanding Graduate Student Research Award in Mechanical and Aerospace Engineering
   (2) Outstanding Student Paper Award, *2019 IEEE Conf. on Decision and Control (CDC)*
   • Position after graduation: Postdoctoral Research Associate in Prof. Berman's lab, then Hedrick Assistant Adjunct Professor in the Dept. of Mathematics, University of California, Los Angeles

6. **Hamed Farivarnejad***, Mechanical Engineering, Spring 2015 – Fall 2020

   • **Graduated:** Fall 2020
   • Ph.D. Thesis: "Decentralized Control of Collective Transport by Multi-Robot Systems with Minimal Information"
   • Position after graduation: Postdoctoral Research Associate in Prof. Berman's lab, then Robotics Engineer at Redwire Space

5. **Zahi Kakish***, Mechanical Engineering, Summer 2016 – Spring 2021

   • **Graduated:** Spring 2021
   • Ph.D. Thesis: "Robotic Swarm Control using Deep Reinforcement Learning Strategies based on Mean-Field Models"
   • Position after graduation: Machine Learning Engineer at Sandia National Laboratories

4. **Aniket Shirsat***, Mechanical Engineering, Fall 2016 – Spring 2022

   • **Graduated:** Spring 2022
   • Ph.D. Thesis: "Swarm Robotic Consensus Strategies for Multi-Target Tracking and Feature Reconstruction"
   • Position after graduation: Application Engineer at Uhnder, Inc.

3. **Shenbagaraj Kannapiran***, Mechanical Engineering, Summer 2018 – Present

   • Passed Ph.D. Comprehensive Exam / Dissertation Proposal Prospectus in Summer 2021

2. **Bryan Chu**, Aerospace Engineering, Spring 2019 – Present
   - Passed Ph.D. Qualifying Exam in Fall 2019

1. **Sangeet Sankaramangalam Ulhas***, Mechanical Engineering, Spring 2020 – Present

Ph.D. Students Advised as Co-Chair

8. **Ganesh Peruvemba Kumar***, Computer Science and Engineering, Fall 2012 – Spring 2016
   - **Graduated:** Spring 2016
   - Primary Advisor: Prof. Spring Berman
   - Ph.D. Committee Co-chair: Prof. Georgios Fainekos (CIDSE)
   - Ph.D. Thesis: "Development and Analysis of Stochastic Boundary Coverage Strategies for Multi-Robot Systems"
   - Position after graduation: Assistant Research Scientist in Prof. Berman's lab, then Robot Software Engineer at drive.ai

7. **Azadeh Doroudchi***, Electrical Engineering, Spring 2017 – Spring 2022
   - **Graduated:** Spring 2022
   - Primary Advisor: Prof. Spring Berman
   - Ph.D. Committee Co-chair: Prof. Konstantinos Tsakalis (EECE)
   - Ph.D. Thesis: "Dynamic Modeling and Control of Octopus-Inspired Soft Continuum Robots with Distributed Sensing and Actuation"
   - Position after graduation: Senior Controls Engineer at ASML

6. **Amir Salimi Lafmejani***, Electrical Engineering, Summer 2019 – Summer 2022
   - **Graduated:** Summer 2022
   - Primary Advisor: Prof. Spring Berman
   - Ph.D. Committee Co-chair: Prof. Konstantinos Tsakalis (EECE)
   - Ph.D. Thesis: "Decentralized Motion Planning for Autonomous Multi-Agent Systems: Multi-Segment Manipulators and Mobile Robot Collectives"
   - Position after graduation: Machine Learning Research Engineer in the Multi-Agent Team at Motion2AI

5. **Rakshith Subramanyam**, Electrical Engineering, Fall 2019 – Summer 2024
   - **Graduated:** Summer 2024
   - Ph.D. Committee Co-chair: Prof. Pavan Turaga (AME, ECEE)
   - Ph.D. Thesis: "Robust and Reliable Deep Learning by Synergizing with Pre-Trained Models"
   - Position after graduation: AI Research Lead at Axio AI

4. **Ruben Gameros***, Exploration Systems Design: Systems Engineering (SESE graduate program), Spring 2017 – Present
   - Primary Advisor: Prof. Spring Berman
   - Ph.D. Committee Co-chair: Paul Scowen (SESE)
   - Passed Ph.D. Comprehensive Exam in Spring 2021

3. **Aditya Ramani**, Mechanical Engineering, Fall 2019 – Present
   • Primary Advisor: Prof. Giulia Pedrielli (SCAI)

2. **Albert Chu**, Computer Science, Spring 2021 – Present
   • Ph.D. Committee Co-chair: Prof. Theodore Pavlic (SCAI, SOLS)
   • Passed Ph.D. Comprehensive Exam in Summer 2024

1. **Naeun Kim**, Mechanical Engineering, Spring 2024 – Present
   • Primary Advisor: Prof. Paul Grogan (SCAI)

M.S. Students Advised as Chair

23. **Karthik Elamvazhuthi***, Mechanical Engineering, Summer 2013 – Fall 2014
    • **Graduated:** Fall 2014
    • M.S. Thesis: "A Variational Approach to Planning, Allocation and Mapping in Robot Swarms using Infinite Dimensional Models"
    • Position after graduation: Ph.D. student in Prof. Berman's lab

22. **Jared Duensing**, Aerospace Engineering, Spring 2015 – Summer 2015
    • **Graduated:** Summer 2015
    • M.S. Applied Project: "Visual Feedback of Quadrotor Systems"
    • Position after graduation: Research Aerospace Engineer, NASA Ames Research Center

21. **Yuan Gao**, Mechanical Engineering, Fall 2015 – Summer 2016
    • **Graduated:** Summer 2016
    • M.S. Applied Project: "Keyboard Playing Mobile Robot"
    • Position after graduation: Ph.D. student, Robotics and Locomotion Laboratory, University of Massachusetts Lowell

20. **Vincent Velarde**, Mechanical Engineering, Spring 2016 – Summer 2016
    • **Graduated:** Summer 2016
    • M.S. Applied Project: "Modeling, Control, and Navigation of a Quadrotor"
    • Position after graduation: Systems Engineer II, Raytheon Missile Systems

19. **Shota Ichikawa**, Mechanical Engineering, Fall 2016 – Spring 2017
    • **Graduated:** Spring 2017
    • M.S. Applied Project: "Effect of Collision Avoidance on Spatial Coverage by Diffusive Robotic Swarms"
    • Position after graduation: R&D Vibration and Acoustic Engineer, K&A JPN Inc. / HSEA Technology Inc.

18. **Vaibhav Deshmukh***, Mechanical Engineering, Fall 2015 – Summer 2017

    • **Graduated:** Summer 2017
    • Position after graduation: Assistant Research Technologist in Prof. Berman's lab, then Control System Engineer at Caterpillar Trimble Control Technologies LLC

17. **Rakshith Subramanyam**, Electrical Engineering, Spring 2017 – Spring 2018

    • **Graduated:** Spring 2018
    • M.S. Thesis: "Chartopolis – A Self Driving Car Test Bed"
    • Position after graduation: Ph.D. student in Prof. Berman's lab

16. **Zz Mae Haggerty***, Mechanical Engineering, Spring 2017 – Summer 2018

    • **Graduated:** Summer 2018
    • M.S. Thesis: "A Bio-Inspired Algorithm and Foldable Robot Platform for Collective Excavation"
    • Position after graduation: Mechanical Design Engineer, Case Medical, Inc.

15. **Sri Ram Prasath Ramasubramaniyan**, Aerospace Engineering, Fall 2016 – Summer 2018

    • **Graduated:** Summer 2018
    • M.S. Thesis: "Fabrication, Modeling and Control of a Spherical Tail-Sitter UAV"

14. **Sushrut Gandhi**, Mechanical Engineering, Fall 2017 – Spring 2019

    • **Graduated:** Spring 2019
    • M.S. Thesis: "Design, Simulation and Testing of a Controller And Software Framework for Automated Construction by a Robotic Manipulator"
    • Position after graduation: Application Engineer at Roboteq, Inc.

13. **Immanuella Kankam**, Mechanical Engineering, Fall 2018 – Summer 2019

    • **Graduated:** Summer 2019
    • M.S. Thesis: "Design of an Immersive Virtual Environment to Investigate How Different Drivers Crash in Trolley-Problem Scenarios"
    • Position after graduation: Engineer at Intel Corporation

12. **Sangeet Sankaramangalam Ulhas**, Mechanical Engineering, Spring 2019 – Summer 2019

    • **Graduated:** Summer 2019
    • M.S. Thesis: "Cross Platform Training of Neural Networks to Enable Object Identification by Autonomous Vehicles"
    • Position after graduation: Ph.D. student in Prof. Berman's lab

11. **Elikplim Gah**, Mechanical Engineering, Fall 2019 – Spring 2020

    • **Graduated:** Spring 2020
    • M.S. Thesis: "Ant-Inspired Control Strategies for Collective Transport by Dynamic Multi-Robot Teams with Temporary Leaders"
    • Position after graduation: Ph.D. student at Northeastern University

10. **Karthik Ganesan**, Mechanical Engineering, Fall 2019 – Spring 2020

    • **Graduated:** Spring 2020
    • M.S. Applied Project: "Development of Middleware for the Go-CHART, a Miniature Self-Driving Car Robot"
    • Position after graduation: Software Application Engineer at Duke University

9. **Yashaswy Govada**, Mechanical Engineering, Fall 2019 – Fall 2020

    • **Graduated:** Fall 2020
    • M.S. Thesis: "Simulation Framework for Driving Data Collection and Object Detection Algorithms to Aid Autonomous Vehicle Emulation of Human Driving Styles"
    • Position after graduation: Application Engineer at Uhnder, Inc.

8. **Rohan Sharma**, Robotics and Autonomous Systems (Mechanical and Aerospace Concentration), Spring 2021 – Fall 2021

    • **Graduated:** Fall 2021
    • Master's Capstone Project: "Filtering-Based Car-Following Control of Autonomous Vehicle Platoon using CARLA Simulator"
    • Position after graduation: Manufacturing Controls Engineer at Tesla

7. **Manaswini Ayalasomayajula**, Robotics and Autonomous Systems, Fall 2019 – Spring 2022

    • **Graduated:** Spring 2022
    • M.S. Thesis: "Design of a Graph Neural Network Coupled with an Advantage Actor-Critic Reinforcement Learning Algorithm for Multi-Agent Navigation"
    • Position after graduation: Robotic Software Engineer at Rizse

6. **Sushilkumar Muralikumar**, Mechanical Engineering, Fall 2019 – Fall 2022

    • **Graduated:** Fall 2022
    • M.S. Thesis: "Vison-Based Control Using Object Detection and Depth Estimation for Robotic Pick and Place Tasks in Construction Applications"
    • Position after graduation: Consultant - Technology (AI/ML) at Virtusa

5. **Matthew Nolan**, Robotics and Autonomous Systems, Summer 2022 – Fall 2022

    • **Graduated:** Fall 2022
    • M.S. Applied Project: "Vision-Based Control of a Holonomic Ground Robot using a Camera-Equipped UAV"
    • Position after graduation: Vice President of Robotics at Thermasat Inc.

4. **Connor Nail**, Robotics and Autonomous Systems (Mechanical Engineering Concentration), Summer 2022 – Fall 2022

    • **Graduated:** Fall 2022
    • M.S. Applied Project: "Virtual Reality Controlled Robotic Arm"
    • Position after graduation: Academic Associate at The Luminosity Lab, Arizona State University

3. **Aditya Ravichander**, Robotics and Autonomous Systems (Electrical Engineering Concentration), Summer 2021 – Spring 2023
   - **Graduated:** Spring 2023
   - Position after graduation: System Engineer at Volvo Trucks North America

2. **Brendan Wacenske**, Mechanical Engineering, Fall 2022 – Summer 2024
   - **Graduated:** Summer 2024
   - M.S. Thesis: "A Low-Cost pH Monitoring and Control System for Algae Cultivation"
   - Position after graduation: Assistant Research Technologist, Arizona State University

1. **Archit Jain**, Robotics and Autonomous Systems, Summer 2023 – Fall 2023
   - **Graduated:** Fall 2023
   - M.S. Applied Project: "Autonomous Battery Swapping For Aerial Vehicles"
   - Position after graduation: Lead Roboticist/AI Platform Developer at Progress Robotics/SellCX

M.S. Students Advised as Co-Chair

8. **Anandrao Biradar**, Mechanical Engineering, Fall 2013 – Spring 2014
   - **Graduated:** Spring 2014
   - Primary Advisor: Prof. Srikanth Saripalli (SESE)
   - M.S. Thesis: "Wind Estimation and its Effects on Path Following of UAVs, Applying Corrections in Navigation"

7. **Prasannakumar Ghadage**, Mechanical Engineering, Fall 2013 – Spring 2014
   - **Graduated:** Spring 2014
   - Primary Advisor: Prof. Srikanth Saripalli (SESE)
   - M.S. Thesis: "Novel Waypoint Generation Method for Increased Mapping Efficiency using UAVs"

6. **Laksh Raura**, Mechanical Engineering, Fall 2014 – Spring 2016
   - **Graduated:** Spring 2016
   - Primary Advisor: Prof. Jekan Thanga (SESE)
   - M.S. Thesis: "Design and Development of Rolling and Hopping Ball Robots for Low Gravity Exploration"

5. **Nirangkush Das**, Mechanical Engineering, Fall 2016 – Fall 2018
   - **Graduated:** Fall 2018
   - Primary Advisor: Prof. Armando Rodriguez (ECEE)
   - M.S. Thesis: "Trajectory Modeling, Estimation and Interception of a Thrown Ball using a Robotic Ground Vehicle"

4. **Vivek Verma**, Mechanical Engineering, Spring 2020 – Spring 2021
   - **Graduated:** Spring 2021
   - Primary Advisor: Prof. Sebastien Motsch (School of Mathematical and Statistical Sciences)
   - M.S. Thesis: "Segmentation and Classification of Melanoma"

3. **Soham Sarkar**, Mechanical Engineering, Fall 2019 – Fall 2021

   • **Graduated:** Fall 2021
   • Primary Advisor: Prof. Armando Rodriguez (ECEE)
   • M.S. Thesis: "Modeling, Analysis and Control of Cart-Inverted Pendulum Systems and Fundamental Tradeoffs"

2. **Pranav Kamojjhala**, Computer Science, Spring 2020 – Spring 2022

   • **Graduated:** Spring 2022
   • Primary Advisor: Prof. Spring Berman
   • M.S. Committee Co-chair: Prof. Georgios Fainekos (SCAI)
   • M.S. Thesis: "Multi-Agent Control for Collective Construction using Chemical Reaction Network Models"

1. **Aksheshkumar Shah**, Mechanical Engineering, Fall 2020 – Spring 2022

   • **Graduated:** Spring 2022
   • Primary Advisor: Prof. Hemanth Venkateswara (Georgia State University, Computer Science)
   • M.S. Thesis: "Adversarial Machine Learning for Recommendation Systems"

Undergraduate Students Advised as Chair

25. **Chase Adams**, Mechanical Engineering and Computational Mathematical Sciences, Summer 2014 – Spring 2016

    • **Graduated:** Spring 2016
    • **Award:** Fulton Undergraduate Research Initiative research award (Summer 2014 - Fall 2014)
    • Research volunteer (Spring 2015 - Spring 2016)

24. **Gregory Scott Hutchins**, Mechanical Engineering, Summer 2015 – Spring 2016

    • **Graduated:** Spring 2016
    • Barrett Honors Thesis (Fall 2015 - Spring 2016): "Development of Graphical User Interfaces and Algorithms for Controlling a Robotic Swarm"
    • Research volunteer (Summer 2015)

23. **Xinyu Wang**, Mechanical Engineering, Fall 2015

    • **Graduated:** Spring 2016
    • **Award:** Fulton Undergraduate Research Initiative research award (Fall 2015)

22. **Zz Mae Haggerty**, Mechanical Engineering, Summer 2015 – Fall 2016

    • **Graduated:** Fall 2016
    • Research volunteer

21. **Zemichael Hailu**, Mechanical Engineering, Spring 2016

    • **Graduated:** Fall 2016
    • Research volunteer

20. **Hunter Murphy**, Mechanical Engineering, Fall 2016 – Spring 2017

    • **Graduated:** Spring 2017
    • Barrett Honors Thesis (Fall 2016 - Spring 2017): "An Adaptive Boundary Coverage Control Strategy for Swarm Robotic Systems"

19. **Caleb Peckham**, Mechanical and Aerospace Engineering, Summer 2015

    • **Graduated:** Spring 2017
    • *Home institution*: Princeton University, Princeton, NJ
    • Research volunteer

18. **Felipe Riveros**, Mechanical Engineering, Fall 2016 – Spring 2017

    • **Graduated:** Spring 2017
    • **Award:** Fulton Undergraduate Research Initiative research award (Spring 2017)
    • Research volunteer (Fall 2016)

17. **Jordan Gisch**, Aeronautical Engineering, Summer 2016 – Summer 2017

    • **Graduated:** 2019
    • ASU Grand Challenge Scholar
    • Research volunteer

16. **Juan Bahena**, Mechanical Engineering, Fall 2016 – Fall 2017

    • **Graduated:** Fall 2017
    • **Award:** Fulton Undergraduate Research Initiative research awards (Spring 2017, Fall 2017)
    • Research volunteer (Fall 2016)

15. **Anna Lynn Martin**, Mechanical Engineering, Fall 2015 – Fall 2017

    • **Graduated:** Spring 2018
    • Barrett Honors Thesis (Spring 2017 - Fall 2017): "Design and Testing of a Low-Cost Force Sensor for a Small Robotic Manipulator"
    • **Award:** NASA Space Grant Undergraduate Fellowships (Fall 2015 - Spring 2016, Fall 2016 - Spring 2017)

14. **Kevin Sidbon**, Software Engineering, Summer 2017 – Fall 2017

    • **Award:** Fulton Undergraduate Research Initiative research award (Summer 2017, Fall 2017)

13. **Madilyn Mendoza**, Mechanical Engineering, Summer 2017 – Spring 2018

    • **Graduated:** Spring 2018
    • Barrett Honors Thesis (Fall 2017 – Spring 2018): "RFID Assisted Traffic Sign Recognition System for Autonomous Vehicles"

12. **Natalie Beaulieu**, Aerospace Engineering, Spring 2018 – Spring 2019

    • **Graduated:** Spring 2019
    • Barrett Honors Thesis (Fall 2018 – Spring 2019): "An Investigation of Morality in Driving Situations as a Basis for Determining Autonomous Vehicle Ethics"

11. **Brennan Mohr**, Mechanical Engineering, Spring 2018 – Spring 2019

    • **Graduated:** Spring 2019
    • Barrett Honors Thesis (Fall 2018 – Spring 2019): "Design and Fabrication of a Low-Cost Gripper for a Swarm Robotic Platform"

10. **Hanyu She**, Mechanical Engineering, Fall 2018 – Spring 2019

    • **Graduated:** Spring 2019
    • Barrett Honors Thesis (Fall 2018 – Spring 2019): "Design and Simulation of Controllers for Multi-Robot Transport over Inclines"

9. **Daniel Shuster**, Mechanical Engineering, Fall 2018 – Spring 2019

    • **Graduated:** Spring 2019
    • Barrett Honors Thesis (Fall 2018 – Spring 2019): "Attitudes Towards Autonomous Vehicles (AVs): Insights Gained through Surveys and Proposed Experiments on a Small-Scale Traffic Testbed"

8. **Jeffrey Chien**, Mechanical Engineering, Spring 2019 – Summer 2019

    • **Graduated:** Spring 2019
    • Research volunteer

7. **Bryce Copenhaver**, Engineering (Robotics), Fall 2019 – Spring 2020

    • **Graduated:** Spring 2020
    • Barrett Honors Thesis (Fall 2019 – Spring 2020): "Autonomous Racing: An Exploration of Localization, Waypoint Following, and Actuation for High-Speed Autonomous Vehicles"

6. **Enoch O'Neal**, Mechanical Engineering, Fall 2019

    • **Graduated:** 2019
    • **Award:** Fulton Undergraduate Research Initiative research award (Fall 2019)

5. **Lily Baye-Wallace**, Mechanical Engineering, Summer 2020 – Fall 2020

    • **Graduated:** 2020
    • Barrett Honors Thesis (Summer 2020 – Fall 2020): "Analysis of Local Minima arising from Potential-Based Controllers for Multi-Robot Transport with Convex Obstacle Avoidance"

4. **Zachary Taylor**, Aerospace Engineering, Spring 2021 – Spring 2022

    • **Graduated:** Spring 2022
    • Barrett Honors Thesis (Spring 2021 – Spring 2022): "Prospective Applications of Autonomous Unmanned Aerial Vehicles (UAVs) for Mass Evacuations"

3. **Brittine Young**, Mechanical Engineering, Fall 2021 – Spring 2022

    • **Graduated:** Spring 2022
    • Barrett Honors Thesis (Fall 2021 – Spring 2022): "Autonomous Vehicle Controllers that Mimic Responsible Human Driving Behaviors: Review and Data Collection Recommendations"

2. **Max Gao**, Engineering (Robotics), Fall 2022 – Summer 2023

   • **Graduated:** Summer 2023
   • Barrett Honors Thesis (Fall 2022 – Summer 2023): "Social Insect-Inspired Behaviors for Collective Search Operations by Unmanned Aerial Vehicle (UAV) Swarms"

1. **Patricia Trejo**, Mechanical Engineering, Summer 2023 – Spring 2024

   • **Graduated:** Spring 2024
   • Barrett Honors Thesis (Fall 2023 – Spring 2024): "Tele-operated Robotic Arm using Virtual Reality Controller for Precision Improvement"

Undergraduate Students Advised as Committee Member

9. **Shih-Ling Phuong**, Mechanical Engineering, Fall 2013 – Spring 2014

   • **Graduated:** Spring 2014
   • Barrett Honors Thesis (Fall 2013 - Spring 2014): "Statistically Based Registration in Sensor Networks"

8. **Elena Whitton**, Mechanical Engineering, Fall 2014 – Spring 2015

   • **Graduated:** Spring 2015
   • Barrett Honors Thesis (Fall 2014 - Spring 2015): "Human Perception of Swarm Behavior"

7. **Garrett Fleetwood**, Mechanical Engineering and Economics, Fall 2016 – Spring 2017

   • **Graduated:** Spring 2017
   • Barrett Honors Thesis (Fall 2016 - Spring 2017): "A Concept for Using Superformula and Information Theory to Identify and Prioritize Interesting Objects in Autonomous Exploration"

6. **Kathie Lundberg**, Electrical Engineering, Fall 2017 – Spring 2018

   • **Graduated:** Spring 2018
   • Barrett Honors Thesis (Fall 2017 – Spring 2018): "Image Processing for an Autonomous Throwing Arm and Smart Catching System"

5. **Amanda Thart**, Electrical Engineering, Fall 2017 – Spring 2018

   • **Graduated:** Spring 2018
   • Barrett Honors Thesis (Fall 2017 – Spring 2018): "Image Processing for an Autonomous Throwing Arm and Smart Catching System"

4. **Brent Wallace**, Electrical Engineering, Spring 2019 – Fall 2019

   • **Graduated:** Fall 2019
   • Barrett Honors Thesis (Spring 2019 – Fall 2019): "Modeling, Analysis, Control and Design of Highly Maneuverable Quadcopters"

3. **Anna Kruse**, Mechanical Engineering, Spring 2021 – Spring 2022

   • **Graduated:** Spring 2022
   • Barrett Honors Thesis (Spring 2021 – Spring 2022): "Impact of Actuation Torque and Pressure of the Soft Ankle Foot Orthosis on Entrainment in Human Locomotion"

2. **Alex Hayden**, Mechanical Engineering, Fall 2021 – Fall 2022

   • **Graduated:** Fall 2022
   • Barrett Honors Thesis (Fall 2021 – Fall 2022): "Energy Efficient Optimal Formation Control of a Multiple Quadrotor UAV System with Payload"

1. **Clara Kohnen**, Aerospace Engineering, Fall 2023 – Present

High School Students Advised

2. **Padmapriya Rangarajan**, Summer 2016
   High School: Desert Vista High School, Phoenix, AZ

1. **Sritanay Vedartham**, Summer 2019 – Spring 2020
   High School: BASIS Scottsdale, Scottsdale, AZ

Postdoctoral Researchers Advised

4. **Karthik Elamvazhuthi***, Postdoctoral Research Associate, Aug. 2019 – Sept. 2019

3. **Shiba Biswal***, Postdoctoral Research Associate, July 2020 – Sept. 2020

2. **Hamed Farivarnejad***, Postdoctoral Research Associate, Jan. 2021 – Aug. 2021

1. **Aniket Shirsat**, Postdoctoral Research Scholar, Apr. 2023 – Aug. 2023
   • Co-advisor: Prof. Theodore Pavlic (SCAI, SOLS)

Research Staff Advised

3. **Ruben Gameros***, Research Specialist, Spring 2015 – Fall 2016

2. **Ganesh Peruvemba Kumar***, Assistant Research Scientist, Summer 2016 – Fall 2016

1. **Vaibhav Deshmukh***, Assistant Research Technologist, Summer 2017 – Fall 2017

Visiting Ph.D. Students Advised

2. **Yating Zheng**, School of Systems Science, Beijing Normal University, China, Jan.-Feb. 2018

1. **Carlo Sinigaglia**, Mechanical Engineering, Politecnico di Milano, Italy, July 2021-June 2022

Teaching

7. *Instructor*, **MAE 598 – Special Topics: Multi-Robot Systems**
   Mechanical and Aerospace Engineering, Arizona State University, Tempe, AZ
   • **Semesters taught:** Fall '16, '20, '21, '22, '23, '24
   • **Description:** Developed a new graduate course that combines seminar-style discussions of research on multi-robot systems with instruction on the theoretical foundations of modeling, analyzing, and controlling these systems. Students complete homework assignments to gain practice using the techniques taught in class and explore a particular course topic in a final project.

6. *Co-Instructor*, **LAW 710: Artificial Intelligence: Law, Ethics & Policy**
   - Prior to Spring 2023, the course number was **LAW 791**
   Sandra Day O'Connor College of Law, Arizona State University, Phoenix, AZ
   • **Co-Instructors:** Prof. Gary Marchant (ASU Sandra Day O'Connor College of Law, ASU Center for Law, Science & Innovation), Prof. Jason Robert (ASU School of Life Sciences), Prof. Whitney Stefko Dover (ASU Sandra Day O'Connor College of Law, Ford Motor Company; taught in S'24)
   • **Semesters taught:** Fall '17; Spring '19, '20, '21, '22, '23, '24
   • **Description:** Co-developed a new seminar course that covers the growing applications of artificial intelligence and studies the legal, ethical, and policy implications of these applications.

5. *Instructor*, **MAE 506: Advanced System Modeling, Dynamics and Control**
   Mechanical and Aerospace Engineering, Arizona State University, Tempe, AZ
   • **Semesters taught:** Fall '12, '13, '14, '15
   • **Description:** Graduate course on classical control theory and modern control theory. Includes modeling physical systems, design of feedback control systems, time-domain and frequency-domain analyses of these systems, and an introduction to topics in state-space methods including controllability, observability, observers, and design of linear state feedback control laws.

4. *Instructor*, **MAE 417: System Dynamics and Control II**
   Mechanical and Aerospace Engineering, Arizona State University, Tempe, AZ
   • **Semester taught:** Spring '23
   • **Description:** Undergraduate course on fundamentals of feedback control using linear transfer function system models, analysis in time and frequency domains, design in the s-plane (root locus) and frequency domain, state-space representation and state-feedback control, multivariable control with observers, discrete systems and z-transforms, and nonlinear systems.

3. *Instructor*, **MAE 318: System Dynamics and Control I**
   - Prior to Fall 2017, the course title was **MAE 318: System Dynamics and Control**
   Mechanical and Aerospace Engineering, Arizona State University, Tempe, AZ
   • **Semesters taught:** Spring '14, '15, '16, '17, '18, '19, '20, '21, '22, '24; Fall '17, '18, '19
   • **Description:** Undergraduate course on the dynamics, modeling, and feedback control of physical systems; includes system identification, computer simulations, designing feedback controllers, and collecting and analyzing data for an experimental rotational plant.

2. *Instructor*, **ASU 101-AEE: The ASU Experience** and **ASU 101-MEE: The ASU Experience**
   Mechanical and Aerospace Engineering, Arizona State University, Tempe, AZ
   • **Semesters taught:** Fall '14, '15, '16, '18, '19, '21, '22, '23, '24

• **Description:** Undergraduate course on skills for academic and professional success, engineering ethics, and an introduction to Aerospace Engineering (ASU 101-AEE) or Mechanical Engineering (ASU 101-MEE).

1. *Graduate Teaching Assistant*
Mechanical Engineering and Applied Mechanics, University of Pennsylvania, Philadelphia, PA
MEAM 110: Introduction to Mechanics, Fall '07
MEAM 211: Engineering Mechanics: Dynamics, Spring '07
MEAM 321: Vibrations of Mechanical Systems, Fall '06

Outreach Activities

39. **Participant**, Feasting with Faculty: SEMTE/POLY - Robotics, Energy, Aerospace, Automotive, hosted by ASU Society of Women Engineers, Mar. 2021 (remote)

38. **Panelist**, "ASU Space Cohort, Mission #3: Launch! Panel Discussion: Balancing Risk in Innovation" hosted by ASU Office of the Executive Vice President Knowledge Enterprise, Oct. 2020 (remote)

37. **Host**, Flinn Foundation Scholar lab visit, Arizona State University, Feb. 2020
    • Described the lab's research to two undergraduate women

36. **Presenter**, ASU Grand Challenge Scholars Program, Arizona State University, July 2019
    • Described the lab's research to incoming freshmen and transfer engineering students

35. **Presenter**, Summer Engineering Experience (SEE), Arizona State University, June and July 2019
    • Described the lab's research to high school students participating in the SEE@ASU program

34. **Panelist**, "2019 DoD Multidisciplinary University Research Initiative (MURI) Research Development Kick-Off Event" hosted by ASU OKED Research Development, Arizona State University, Mar. 2019

33. **Development** of a new open-source, open-hardware robot "Pheeno," Summer 2013 – Fall 2018
    • Pheeno is a small, low-cost autonomous mobile robot that is designed for multi-robot research and education. Users can modify Pheeno for their applications by designing custom modules and drivetrains that attach to its core module (∼$260 cost of parts).
    • Pheeno is compatible with the Robot Operating System (ROS), an open-source software framework for robotics development. We have developed ROS software packages for running both 3D simulations and physical experiments with multiple Pheeno robots (Summer 2017 – Fall 2018): http://wiki.ros.org/pheeno_ros
    • The Pheeno code, design files, circuit board schematics, list of components, and user guides to assembly, calibration, and programming of the robot are available at: https://acslaboratory.github.io/

32. **Panelist**, "Aim-High" workshop hosted by the ASU Fulton School of Engineering Dean's Office, Arizona State University, Nov. 2018

31. **Panelist**, "Success in the Early Years" promotion and tenure workshop hosted by the ASU Faculty Women's Association, Arizona State University, Oct. 2018

30. **Presenter**, National Robotics Week event, Arizona State University, Apr. 2018
    • Gave a short presentation on the research in the ACS Lab to middle school female students

29. **Participant**, Women in Engineering Dinner for female students admitted to the ASU Fulton Schools of Engineering, Arizona State University, Apr. 2018

28. **ACS Lab presentation**, Scottsdale Community College, Scottsdale, AZ, Mar. 2018

    • Prof. Berman and two of her students gave a presentation to students and faculty on swarm robotic hardware, software, and theory.

27. **Mentor**, Flinn Foundation Scholars in Mechanical Engineering, Arizona State University, Oct. 2017 – Nov. 2017

26. **Participant**, Feasting with Faculty Event organized by peer mentors for ASU students, Arizona State University, Oct. 2017

25. **ACS Lab participation**, Space Day, Salt River Elementary School, Scottsdale, AZ, Oct. 2017

    • Two of Prof. Berman's students gave a presentation to students on the potential uses of robots in space and conducted a demonstration in which several Pheeno robots navigated a model of an extraterrestrial base

24. **ACS Lab participation**, Phoenix Mobile & Emerging Tech Festival, Arizona State University, Sept. 2017

    • Two of Prof. Berman's students demonstrated a small-scale traffic testbed, in which Pheeno robots emulate autonomous vehicles, on the podium during Executive Vice President Sethuraman Panchanathan's keynote speech

23. **Host**, ACS Lab visit, Arizona State University, July 2017

    • Described the lab's research to 45-50 incoming freshmen engineering students in the ASU Grand Challenge Scholars Program

22. **Participant**, Women in Engineering Dinner for female students admitted to the ASU Fulton Schools of Engineering, Arizona State University, Apr. 2017

21. **Participant**, Day @ Intel STEM Field Trip, Intel Corporation, Chandler, AZ, June 2016

    • Provided information on ASU Engineering programs to 100 girls in grades 8-12
    • Four of Prof. Berman's students demonstrated five Pheeno robots doing coverage and manipulation tasks in a portable arena
    • Visitors remotely controlled a robot to drop a small object through a cardboard window using a graphical user interface (GUI) on a laptop

20. **Host**, ACS Lab visit, Arizona State University, Nov. 2016
    • Described the lab's research to participants in the ASME International Mechanical Engineering Congress & Exposition

19. **Presenter**, National Robotics Week event, Arizona State University, Apr. 2016
    • Gave a short presentation on the research in the ACS Lab to ASU students

18. **Participant**, Feasting with Faculty Event organized by peer mentors for ASU students, Arizona State University, Mar. 2016

17. **Presenter**, Mechanical Engineering Fundamentals of Engineering (FE) Exam Preparation Workshop (Measurement & Instrumentation, Controls, Computer Software) for ASU students, Arizona State University, Feb. 2016

16. **Participant**, Senior Scholar Dinner for prospective domestic freshmen in the ASU Fulton Schools of Engineering, Arizona State University, Jan. 2016

15. **Participant**, Society of Women Engineers: Appetizers with Professors, Arizona State University, Nov. 2015

14. **Participant**, Day @ Intel STEM Field Trip, Intel Corporation, Chandler, AZ, June 2015

    • Provided information on ASU Engineering programs and robotics research in the ACS Lab to 100 girls in grades 8-12

13. **Speaker**, La Vida Robots Meeting, Local Motors, Chandler, AZ, June 2015

    • Presented to potential participants in La Vida Robots, a new Phoenix-wide robot competition team, on swarm robotics, social-good robotics applications, robotics research in the ACS Lab, and the DARPA Robotics Fast Track grant program

12. **Participant**, Go, Girl, Go! Forum, Washington State Convention Center, Seattle, WA, May 2015

    • Spoke to girls from ages 6-18 about robotics and STEM careers during an interactive group mentoring session

11. **ACS Lab participation**, STEM Night, Salt River Elementary School, Scottsdale, AZ, Apr. 2015

    • Two of Prof. Berman's students demonstrated two Pheeno robots
    • Visitors remotely controlled both robots to retrieve small objects

10. **Host**, ACS Lab visit, Arizona State University, Apr. 2015

    • Described the lab's research to ASU undergraduates in a Barrett Honors College class on digital technologies

9. **ACS Lab participation**, Presentation at Salt River Elementary School, Scottsdale, AZ, Mar. 2015

    • Prof. Berman gave a presentation on swarm robotics to the school robotics team; two of her students presented the Pheeno robot

8. **Host**, ACS Lab visit, Arizona State University, Mar. 2015

    • Described the lab's research to 5 ASU undergraduate Grand Challenge Scholars

7. **ACS Lab participation**, ASU Night of the Open Door, Arizona State University, Feb. 2015

    • Three of Prof. Berman's students demonstrated two Pheeno robots
    • Visitors remotely controlled both robots to retrieve small baskets

6. **Participant**, Women in Engineering Lunch for undergraduate women in engineering, Barrett, The Honors College, Arizona State University, Feb. 2015

5. **Mentor**, FIRST LEGO League (FLL), Humanist Community Center, Mesa, AZ, Fall 2014

    • For 12 weeks, 2 hours per week, Prof. Berman and 2 of her students helped mentor several elementary school-aged participants in the 2014 FLL World Class Challenge
    • Assisted children with building and programming LEGO Mindstorms EV3 robots to perform a variety of navigation, sensing, and manipulation tasks on a playing field
    • Culminated in a competition with other FLL teams from the Southeast Mesa region

4. **Participant**, Senior Scholar Dinner for prospective domestic freshmen in the ASU Fulton Schools of Engineering, Arizona State University, Nov. 2014

3. **ACS Lab participation**, ASU Earth and Space Exploration Day, Arizona State University, Oct. 2014
   • Three of Prof. Berman's students demonstrated two Pheeno robots
   • Visitors to the booth remotely controlled one of the robots using a smartphone or tablet to retrieve a small basket

2. **Invited Speaker**, United States Military Academy, West Point, NY, Sept. 2014
   • Presented control strategies for robotic swarms to West Point cadets and faculty

1. **Keynote Speaker**, "How Cool is Entomology?" Symposium, Annual Meeting of the Entomological Society of America, Austin, TX, Nov. 2013
   • Introduced undergraduates to insect-inspired control strategies for robotic swarms

MEDIA

16. **ASU News**, Dec. 2023
    • Featured as part of an article titled, "Combining biomimicry with artificial intelligence technology"

15. **ASU News**, Jan. 2021
    • Featured as part of an article titled, "ASU on the Cutting Edge of Robotics"

14. **Medium.com**, Feb. 2019
    • Featured as part of an article titled, "A strategy for mission readiness"

13. **ASU Knowledge Enterprise**, Jan. 2019
    • Featured as part of an article titled, "We, robot"

12. **ASU Now: Access, Excellence, Impact**, Dec. 2018
    • Featured as part of an article titled, "How smart is the latest artificial intelligence?"

11. **Arizona PBS television series Catalyst**, aired Apr. 2018
    • Segment on research in Prof. Berman's lab: "The swarm intelligence behind self-driving cars"

10. **The University of Arizona College of Medicine Phoenix Newsroom**, Sept. 2017
    • Featured as part of an article titled, "Researchers Study Biology of Octopuses to Develop Autonomous Robots"

9. **Advance at UNM (University of New Mexico)**, July 2017
    • Featured as part of an article titled, "NASA Swarmathon 2017 (Cambridge)"

8. **American Society of Mechanical Engineers (ASME) Magazine**, May 2017
   • Featured in an article titled, "An Army of Tiny Robots to the Rescue"

7. **Christian Science Monitor**, Feb. 2017
   • Quoted in an article titled, "In a future full of robots, where do humans fit in?"

6. **Society for Industrial and Applied Mathematics (SIAM) News Blog**, July 2016
   • Featured in an article titled, "Modeling the Behavior of Robotic Swarms"

5. **ASU Now: Access, Excellence, Impact**, July 2016
   • Featured in an article titled, "Thinking Big with Small Robots: ASU engineer spearheading ways to control robot swarms to tackle large problems"

4. **ASU Now: Access, Excellence, Impact**; **ASU Full Circle: Engineering News for Alumni and Friends**, Feb. 2016
   • Featured as part of an article titled, "Five Things We Love About Robots"

3. **ASU Now: Access, Excellence, Impact**, Dec. 2015
   • Featured in an article titled, "Controlling a Robot Swarm: Strides in robotics earn ASU engineer international spotlight"

2. **ASU News [Science & Tech]**; **ASU Full Circle: Engineering News for Alumni and Friends**, Jan. 2015
   • Featured as part of an article titled, "Fortifying National Defense with Robot Swarms and Resilient Materials"

1. **Zygote Quarterly Magazine**, Issue 4, Winter 2012
   • Featured as part of an article titled, "Seeking Intelligence Inside the Swarm"

RESEARCH SUPPORT

July'22–Jan.'25 — *Subrecipient Co-Investigator*, "Autonomous Systems Control via Social Insect Models Phase II (ASC-SIM II)," SBIR Program Contract #N68335-22-G-0033; Subcontract #BF-5065-SK001, **U.S. Navy**
• **$663,487 ASU total** (35% Recognition)
• PI: Prof. Theodore Pavlic (SCAI/SOLS, ASU)
• Other Co-Investigator: Prof. Jennifer Fewell (SOLS, ASU)
• Goal: To develop a planning and control architecture that synthesizes autonomous swarming behaviors for unmanned aerial vehicles.

Sept.'18–
Aug.'24

Co-Investigator, "NRT: Citizen-Centered Smart Cities and Smart Living," Award #1828010, **National Science Foundation** Research Traineeship (NRT) Program
• **$2,997,124** total (11% Recognition)
• PI: Prof. Troy McDaniel (The Polytechnic School, ASU)
• Co-Principal Investigators (all at ASU): Prof. Ann McKenna, Prof. Gail-Joon Ahn, Prof. Ram Pendyala, Prof. Cynthia Selin
• Other Co-Investigators (all at ASU): Ashish Amresh, Prof. Brian Gerber, Prof. Thaddeus Miller
• Goal: Train the next generation of master's and doctoral students to become future Smart City thought leaders, scientists, entrepreneurs, research scholars, policy makers, and engineers through an integrated and interdisciplinary focus on the technological, societal and environmental research aspects of citizen-centered solutions for Smart Cities.

Jan.'22–
Mar.'24

Co-Principal Investigator, "EAGER: Embodiment of Human Values Profiles in the Control of Autonomous Vehicles," Award #2146691
National Science Foundation, Mind, Machine, and Motor (M3X) Program, Division of Civil, Mechanical, and Manufacturing Innovation (CMMI)
• **$300,000 total** (33% Recognition)
• PI: Prof. Kathryn Johnson (Psychology, ASU)
• Other Co-Principal Investigator: Prof. Theodore Pavlic (SCAI/SOLS, ASU)
• Goal: To develop a framework for generating autonomous vehicle responses to uncertain, dynamic situations, executed at short time scales, that align with human values and moral priorities.

Apr.'17–
Dec.'22

Subrecipient Principal Investigator and Co-Investigator, "Octopus-Inspired Autonomous Arms for Soft Robots with Adaptive Motions," Award #N00014-17-1-2117
Office of Naval Research (ONR)
• **$1,378,093 ASU total** (24% Recognition), **$2,098,880** total
• PI: Prof. Ximin He (Materials Science and Engineering, UCLA)
• Other Co-Investigators: Prof. Daniel Aukes (ASU), Prof. Hamid Marvi (ASU), Prof. Matthew Peet (ASU), Prof. Rebecca Fisher (University of Arizona)
• Goal: To develop a framework for the modeling, design, rapid prototyping, and control of autonomous soft robotic arms with a novel force-responsive hydrogel material and octopus-inspired distributed neuromuscular sensing and actuation.

July'21–
Feb.'22

Co-Investigator, "Distributed Swarm Control (DiSCo)," Subcontract #BF-8004-SK001, **Boston Fusion Corp**, Lexington, MA
• **$49,999 total** (33% Recognition)
• PI: Prof. Theodore Pavlic (SCAI/SOLS, ASU)
• Other Co-Investigator: Prof. Jennifer Fewell (SOLS, ASU)
• Goal: To develop autonomous swarming behaviors and distributed command and control for unmanned aerial vehicles.

Jan.'18– Jan.'22 *Associate Director*, "Center for Human, Artificial Intelligence, and Robotic Teaming (CHART)," **ASU Strategic Initiative Funds: Global Security Initiative**
• **$709,630 total** for the first 4 years
• Director: Prof. Nancy Cooke (Human Systems Engineering, ASU)
• Goal: To investigate and understand how to develop, compose, train, manage, and assess heterogeneous teams of humans, robots, and autonomous agents to result in highly effective and ethical teams that also keep the human out of harm's way.

Dec.'20– July'21 *Subrecipient Principal Investigator*, "ADAPT - Advanced Agile Manufacturing of Limited-Production Swarming Unmanned Systems (UxS) to Support Humanitarian Assistance," SBIR Program Contract #N68335-21-C-0195; Subcontract #NAVY-ADAPTHH-21-C-0195 PHII, **Office of Naval Research (ONR)**
• **$64,304 ASU total** (76% Recognition)
• Co-Investigators: Prof. Nancy Cooke (Human Systems Engineering, ASU), Prof. Brian Gerber (College of Public Service and Community Solutions, ASU)
• Goal: To develop advanced, agile manufacturing of limited-production swarming unmanned systems to support humanitarian assistance operations.

July'16– June'21 *Principal Investigator*, "Resilient Collective Systems," **Arizona State University Strategic Initiative Funds: Global Security Initiative**
• **$1,250,000** total (100% Recognition)
• Goal: To advance the state-of-the-art in the prediction, control, and programming of swarm robotic collective behaviors, in collaboration with ASU faculty from multiple disciplines; to strengthen and promote ASU's research capabilities in the area of biologically-inspired collective behaviors.

May'20– Apr.'21 *Co-Investigator*, "A Testbed for Research on Distributed Human, Artificial Intelligence and Robot Teaming," **Office of Naval Research (ONR)** Defense University Research Instrumentation Program (DURIP)
• **$446,845** total (10% Recognition)
• PI: Prof. Nancy Cooke (Human Systems Engineering, ASU)
• Other Co-Principal Investigators (all at ASU): Prof. Lance Gharavi, Dr. Lixiao Huang, Prof. Wenlong Zhang, Prof. Erin Chiou, Prof. Yu Zhang, Prof. Subbarao Kambhampati
• Goal: Develop a testbed in which to study distributed human, artificial intelligence, and robot teaming, in order to conduct research projects on scenarios in which effective human-autonomy teaming is critical to mission success.

May.'20–
Sept.'20

Subrecipient Co-Investigator, "HellHivesTM for ADAPT," SBIR Program Contract #N68335-20-C-0427; Subcontract #NAVY-HHADAPT-20-C-0427PHI
Office of Naval Research (ONR)
• **$50,000 ASU total** (75% Recognition), $200,000 total
• PI: Prof. Brian Gerber (College of Public Service and Community Solutions, ASU)
• Other Co-Investigators: Prof. Nancy Cooke (Human Systems Engineering, ASU), Prof. Melanie Gall (College of Public Service and Community Solutions, ASU)
• Goal: ADAPT - Advanced, Agile Manufacturing of Limited-Production Swarming Unmanned Systems (UxS) to Support Humanitarian Assistance and Disaster Relief (HADR) Operations

Sept.'18–
Sept.'19

Co-Investigator, "Developing and Signaling Trust in Synthetic Autonomous Agents (SAAs)," Polyplexus Pilot Program, **Defense Advanced Research Projects Agency (DARPA)**
• **$99,999** total (25% Recognition)
• PI: Prof. Kathryn Johnson (Psychology, ASU)
• Other Co-Investigators:
- Prof. Erin Chiou (Human Systems Engineering, ASU)
- Prof. Adam Cohen (Psychology, ASU)
• Goal: To draw on social psychological research in order to program synthetic autonomous agents (e.g., self-driving cars) to make decisions and behave with moral integrity, and to identify the most efficacious signal of programmed moral integrity in order to garner appropriate trust from human operators and the general public.

June'16–
May'19

Principal Investigator, "Scalable Control of Adaptive Multi-Robot Systems in Inaccessible Environments," Award #N00014-16-1-2605
Office of Naval Research (ONR) Young Investigator Award
• **$499,554** total (100% Recognition)
• Goal: To develop a rigorous methodology for real-time control and observation of multi-robot systems in uncertain, inaccessible environments with limited or absent GPS and communication.

Sept.'14–
Aug.'18

Principal Investigator, "Collaborative Research: Modeling, Analysis, and Control of the Spatio-temporal Dynamics of Swarm Robotic Systems," Award #1436960
National Science Foundation, Sensors, Dynamics, & Control Program, Division of Civil, Mechanical, and Manufacturing Innovation (CMMI)
• **$250,000 ASU total** (100% Recognition), **$500,001** total
• External Collaborator / Co-PI: Prof. Andrea Bertozzi (Mathematics, UCLA)
• Goal: To develop a formal methodology for analyzing and controlling the spatio-temporal dynamics of robotic swarms that are deployed in complex unknown environments for mapping and coverage tasks.

Dec.'16–
Jan.'18

Co-Investigator, "A Methodology for Modeling Swarm Behavioral Dynamics from Local Observations," Contract #FA8651-17-F-1013; Subcontract #D8083-S1
Defense Advanced Research Projects Agency (DARPA)
• **$175,000** total (25% Recognition)
• PI: Prof. Stephen Pratt (School of Life Sciences, ASU)
• Other Co-Investigators:
- Prof. Juergen Liebig (School of Life Sciences, ASU)
- Prof. Theodore Pavlic (School of Computing, Informatics, and Decision Systems Engineering / School of Sustainability, ASU)
• Primary grant recipient: Georgia Tech Research Institute, Atlanta, GA
• Goal: To develop mathematical and computational tools for constructing tractable models of swarm behavioral dynamics from local measurements within the swarm, validated using experimental data on nest-site selection and hierarchy formation in ants.

Aug.'14–
July'17

Principal Investigator, "A Scalable Control Framework for Boundary Coverage and Cooperative Manipulation by Robotic Swarms," Award #1363499
National Science Foundation, Sensors, Dynamics, & Control Program, Division of Civil, Mechanical, and Manufacturing Innovation (CMMI)
• **$260,000** total (100% Recognition)
• Goal: To develop a rigorous top-down control framework for swarm robotic boundary coverage and manipulation tasks in unknown environments using only local sensing and common broadcast information.

Sept.'14–
Sept.'16

Principal Investigator, "Specification and Control of Customizable Multi-Robot Systems for Distributed Sensing and Cooperative Manipulation," Award #D14AP00054
Defense Advanced Research Projects Agency (DARPA) Young Faculty Award
• **$499,071** total (100% Recognition)
• Goal: To enable non-expert users to automatically determine the physical and functional composition of customizable multi-robot systems that optimize sensing and manipulation performance metrics in realistic environments.