

SPRING MELODY BERMAN

Curriculum Vitae

School for Engineering of Matter, Transport and Energy
 Ira A. Fulton Schools of Engineering, Arizona State University
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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

- May 2018–
Present **Associate Professor**, Mechanical and Aerospace Engineering
Graduate Faculty, Computer Science
Graduate Faculty, Exploration Systems Design
Honors Faculty, Barrett, the Honors College
Adjunct Faculty, Sandra Day O’Connor College of Law
Founder and Director, Autonomous Collective Systems (ACS) Laboratory
Arizona State University, Tempe, AZ
- June 2012–
May 2018 **Assistant Professor**, Mechanical and Aerospace Engineering
Graduate Faculty, Computer Science
Graduate Faculty, Exploration Systems Design
Honors Faculty, Barrett, the Honors College
Adjunct Faculty, Sandra Day O’Connor College of Law
Founder and Director, Autonomous Collective Systems (ACS) Laboratory
Arizona State University, Tempe, AZ

- June 2010-
May 2012
- Postdoctoral Fellow, Computer Science*
Harvard University, Cambridge, MA
Advisor: Radhika Nagpal
- Member of the Colony team on the project “RoboBees: A Convergence of Body, Brain and Colony” (NSF grant CCF-0926148)
 - Developed a methodology for controlling the spatio-temporal population dynamics of robotic swarms using advection-diffusion-reaction partial differential equation models
 - Applied this methodology to optimize control policies for swarms of robotic bees to accomplish spatial coverage tasks, such as crop pollination, and to optimize nanoparticle systems for targeted cancer treatment
- June 2005-
May 2010
- Ph.D. Candidate, Mechanical Engineering and Applied Mechanics Dept.*
University of Pennsylvania, Philadelphia, PA
Advisor: Vijay Kumar
- Developed a methodology for controlling the population dynamics of robotic swarms using affine and multi-affine ordinary differential equation models
 - Applied the methodology to problems of swarm task allocation, including multi-site surveillance, and product assembly from heterogeneous parts
 - Collaborated on an experimental study and model of group prey retrieval in ants as a paradigm for multi-robot collective transport
 - Developed a novel algorithm for reachability analysis of multi-affine hybrid systems
- June 2004-
August 2004
- Summer Undergraduate Research Fellow, Control and Dynamical Systems Dept.*
California Institute of Technology, Pasadena, CA
Advisor: Jerrold Marsden
- Computed Lagrangian Coherent Structures (LCS) in ocean velocity data and investigated correlations between LCS and environmental/biological features
- Sept. 2004-
May 2005;
May 2003-
May 2004;
June 2002-
Aug. 2002
- Undergraduate Research Assistant, Mechanical and Aerospace Engineering Dept.*
Princeton University, Princeton, NJ
Advisor: Naomi Leonard
- Developed novel method for estimating decorrelation scales from mobile sensor data
 - Developed criteria for evaluating sampling performance for specific sensor trajectories
 - Evaluated the coverage efficiency of underwater gliders using real and simulated data
 - Designed a thermocline tracking algorithm for an underwater glider
 - Implemented thermocline-tracking and gradient-following algorithms on a Webb Research underwater glider simulator
 - Designed and tested a Slocum glider wind tunnel model

SELECTED HONORS & AWARDS

- 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

- Sept. 2016 **Nominated for the Blavatnik National Award for Young Scientists in Physical Sciences & Engineering**
This annual award recognizes excellence in three disciplinary categories. Each invited institution can nominate one candidate in each category.
- 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**
- Oct. 2015 **“25 Women in Robotics You Need to Know About”**
Selected by Robohub, an online communication platform to connect people around the world involved in robotics research, education, and entrepreneurship
- Aug. 2014 **Defense Advanced Research Projects Agency (DARPA) Young Faculty Award**
- 2012 **Grolier Discovery Award**
Poetry collection *All Time Acceptable* published by the Grolier Poetry Press, Grolier Poetry Bookshop, Cambridge, MA
- Oct. 2009 **Participant in NSF ADVANCE Negotiating the Ideal Faculty Position Workshop**
Held at Rice University; 71 participants were selected from over 1000 applicants
- 2007–2010 **National Science Foundation (NSF) Graduate Research Fellowship**
- 2005–2007 **National Defense Science and Engineering Graduate Fellowship**
- 2005 **Sau-Hai Lam Prize in Mechanical and Aerospace Engineering**
Awarded annually to honor undergraduate academic achievement and excellence in the Mechanical and Aerospace Engineering Department at Princeton University
- 2005 **Morgan W. McKinzie Senior Thesis Fund Prize, 2nd Place**
Awarded annually to undergraduates having the best Senior Thesis in the Mechanical and Aerospace Engineering Department at Princeton University

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

(×) High School Student, advised by Prof. Berman

Note: Journal impact factors are from 2018 Journal Citation Reports, Thomson Reuters.

Book Chapters Prior to ASU (Published)

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. [2018 Impact factor: 2.244]

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

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, Oct. 2019. [2018 Impact factor: 3.130]
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. [2018 Impact factor: 5.007]
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. [Journal launched in 2017; Impact factor not available yet]
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. [2018 Impact factor: 2.504]
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. [2018 Impact factor: 6.126]
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. [Journal launched in 2015; Impact factor not available yet]
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. [2018 Impact factor: 5.007]
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. [Journal launched in 2015; Impact factor not available yet]

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. [Journal launched in 2015; Impact factor not available yet]
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. [2016 Impact factor: 3.115]
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. [2016 Impact factor: 1.388]
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. [2016 Impact factor: 17.476].

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. [2016 Impact factor: 9.237]
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. [2016 Impact factor: 4.036]
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. [2016 Impact factor: 3.115]

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

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

20. **Shiba Biswal**, **Karthik Elamvazhuthi**, and Spring Berman*. “Fastest Mixing Markov Chain on a Compact Manifold.” Accepted to the *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.” Accepted to *SWARM 2019: The 3rd International Symposium on Swarm Behavior and Bio-Inspired Robotics*, Okinawa, Japan.
18. **Karthik Elamvazhuthi** and Spring Berman*. “Nonlinear Generalizations of Diffusion-Based Coverage by Robotic Swarms.” *Proc. of the IEEE Conference on Decision and Control (CDC)*, Miami Beach, FL, 2018.

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.” *Proc. of the IEEE Conference on Decision and Control (CDC)*, Miami Beach, FL, 2018.
16. **Karthik Elamvazhuthi**, **Shiba Biswal**, and Spring Berman*. “Mean-Field Stabilization of Robotic Swarms to Probability Distributions with Disconnected Supports.” *Proc. of the American Control Conference (ACC)*, Milwaukee, WI, 2018.
15. **Hamed Farivarnejad** and Spring Berman*. “Stability and Convergence Analysis of a Decentralized Proportional-Integral Control Strategy for Collective Transport.” *Proc. of the American Control Conference (ACC)*, Milwaukee, WI, 2018.
14. **Karthik Elamvazhuthi**, **Shiba Biswal**, Vaibhav Deshmukh[∞], Matthias Kawski, and Spring Berman*. “Mean-Field Controllability and Decentralized Stabilization of Markov Chains.” *Proc. of the IEEE Conference on Decision and Control (CDC)*, Melbourne, Australia, 2017.
13. **Karthik Elamvazhuthi**, Hendrik Kuiper, and Spring Berman*, “Controllability to Equilibria of the 1-D Fokker-Planck Equation with Zero-Flux Boundary Condition.” *Proc. of the IEEE International Conference on Decision and Control (CDC)*, Melbourne, Australia, 2017.
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.” *Proc. of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Vancouver, BC, Canada, 2017.
11. **Ragesh K. Ramachandran** and Spring Berman*. “The Effect of Communication Topology on Scalar Field Estimation by Large Networks with Partially Accessible Measurements,” *Proc. of the American Control Conference (ACC)*, Seattle, WA, 2017.
10. **Ragesh K. Ramachandran**, **Sean Wilson**, and Spring Berman*. “A Probabilistic Topological Approach to Feature Identification using a Stochastic Robotic Swarm,” *Proc. of the International Symposium on Distributed Autonomous Robotic Systems (DARS)*, London, UK, 2016. (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,” *Proc. of the IEEE International Conference on Decision and Control (CDC)*, Las Vegas, NV, pp. 1826-1833, 2016.
8. **Karthik Elamvazhuthi**, Chase Adams[#], and Spring Berman*, “Coverage and Field Estimation on Bounded Domains by Diffusive Swarms,” *Proc. of the IEEE International Conference on Decision and Control (CDC)*, Las Vegas, NV, pp. 2867-2874, 2016.
7. **Karthik Elamvazhuthi**, **Sean Wilson**, and Spring Berman*, “Confinement Control of Double Integrators using Partially Periodic Leader Trajectories,” *Proc. of the American Control Conference (ACC)*, Boston, MA, pp. 5537-5544, 2016.
6. **Ragesh K. Ramachandran**, **Karthik Elamvazhuthi**, and Spring Berman*, “An Optimal Control Approach to Mapping GPS-Denied Environments using a Stochastic Robotic Swarm.” *Proc. of the International Symposium on Robotics Research (ISRR)*, Sestri Levante, Italy, 2015.

5. **Karthik Elamvazhuthi** and Spring Berman*, “Optimal Control of Stochastic Coverage Strategies for Robotic Swarms,” *Proc. of the IEEE International Conference on Robotics and Automation (ICRA)*, Seattle, WA, pp. 1822-1829, 2015.
4. **Karthik Elamvazhuthi** and Spring Berman*, “Scalable Formation Control of Multi-Robot Chain Networks using a PDE Abstraction,” *Proc. of the International Symposium on Distributed Autonomous Robotic Systems (DARS)*, Daejeon, Korea, 2014.
3. **Ganesh P. Kumar** and Spring Berman*, “Statistical Analysis of Stochastic Multi-Robot Boundary Coverage,” *Proc. of the IEEE International Conference on Robotics and Automation (ICRA)*, Hong Kong, pp. 74-81, 2014.
2. Theodore P. Pavlic, **Sean Wilson**, **Ganesh P. Kumar**, and Spring Berman*, “An Enzyme-Inspired Approach to Stochastic Allocation of Robotic Swarms Around Boundaries,” *Proc. of the International Symposium on Robotics Research (ISRR)*, Singapore, 2013.
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*,” *Proc. of the ACM International Conference on Hybrid Systems: Computation and Control (HSCC)*, Philadelphia, PA, pp. 119-124. 2013.

Refereed Conference Papers Prior to ASU (All Published)
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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,” *Proc. of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Vilamoura, Algarve, Portugal, pp. 793-800, 2012.
9. Spring Berman*, Radhika Nagpal, and Ádám Halász, “Optimization of Stochastic Strategies for Spatially Inhomogeneous Robot Swarms: A Case Study in Commercial Pollination,” *Proc. of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, San Francisco, CA, pp. 3923-3930, 2011. (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,” *Proc. of the IEEE International Conference on Robotics and Automation (ICRA)*, Shanghai, China, pp. 378-385, 2011.
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,” *Proc. of the Robotics: Science and Systems Conference (RSS)*, Zaragoza, Spain, 2010. (Acceptance rate: 16%)
6. Loïc Matthey, Spring Berman*, and Vijay Kumar, “Stochastic Strategies for a Swarm Robotic Assembly System,” *Proc. of the IEEE International Conference on Robotics and Automation (ICRA)*, Kobe, Japan, pp. 1953-1958, 2009.
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,” *Proc. of the IEEE International Conference on Decision and Control (CDC)*, Cancun, Mexico, pp. 4376-4381, 2008.

4. Ádám Halász*, M. Ani Hsieh, Spring Berman, and Vijay Kumar, “Dynamic Redistribution of a Swarm of Robots Among Multiple Sites,” *Proc. of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, San Diego, CA, pp. 2320-2325, 2007.
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,” *Proc. of the IEEE International Conference on Robotics and Automation (ICRA)*, Rome, Italy, pp. 2318-2323, 2007.
2. Spring Berman*, Ádám Halász, and Vijay Kumar, “MARCO: A Reachability Algorithm for Multi-Affine Systems with Applications to Biological Systems,” *Proc. of the ACM International Conference on Hybrid Systems: Computation and Control (HSCC)*, LNCS 4416, eds. A. Bemporad, A. Bicchi, G. Buttazzo. pp. 76-89, 2007.
1. Spring Berman*, Ádám Halász, Vijay Kumar, and Stephen C. Pratt, “Algorithms for the Analysis and Synthesis of a Bio-Inspired Swarm Robotic System,” *Proc. of the International Conference on the Simulation of Adaptive Behavior (SAB)*, LNCS 4433, eds. E. Sahin, W. Spears, A. Winfield. pp. 56-70, 2007.

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,” *Proc. of the IEEE Conference on Automation Science and Engineering (CASE)*, Bangalore, India, pp. 25-28, 2009.

Undergraduate Research Symposia Abstracts with ASU Students

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.

Manuscripts Submitted / In Revision from ASU

16. **Shiba Biswal, Karthik Elamvazhuthi, and Spring Berman***. “Stabilization of Nonlinear Discrete-Time Systems to Target Measures Using Stochastic Feedback Laws.” In revision for *IEEE Transactions on Automatic Control (TAC)*.
15. **Ragesh K. Ramachandran, Zahi Kakish, and Spring Berman***. “Information Correlated Lévy Walk Exploration and Distributed Mapping using a Swarm of Robots.” In revision for *IEEE Transactions on Robotics (T-RO)*.
14. **Karthik Elamvazhuthi, Shiba Biswal, and Spring Berman***. “Controllability and Decentralized Stabilization of the Kolmogorov Forward Equation for Markov Chains.” In revision for *Automatica*.
13. **Karthik Elamvazhuthi, Zahi Kakish, Aniket Shirsat, and Spring Berman***. “Controllability and Stabilization for Herding a Robotic Swarm using a Leader: A Mean-Field Approach.” Submitted to *IEEE Transactions on Robotics*, 2019.
12. **Hamed Farivarnejad and Spring Berman***. “Switching Gradients for Safe Robot Navigation in GPS-Denied Environments with Unknown Convex Obstacles.” Submitted to *Systems & Control Letters*, 2019.
11. **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.” Submitted to *IEEE Robotics and Automation Letters (RA-L)*, 2019.
10. **Zahi Kakish, Karthik Elamvazhuthi, and Spring Berman***. “Using Reinforcement Learning to Herd a Robotic Swarm to a Target Distribution.” Submitted to *IEEE Robotics and Automation Letters (RA-L)*, 2019.
9. 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.” Submitted to *Trust in Human-Robot Interaction: Research and Applications*, ed. Chang Soo Nam and Joseph B. Lyons, Elsevier, 2019.
8. Roozbeh Khodambashi, **Azadeh Doroudchi**, Mohammad Sharifzadeh, Dongting Li, Yousif Alsaid, Chiao-Yueh Lo, Rebecca E. Fisher, Hamid Marvi, Matthew M. Peet, Ximin He, Spring Berman, and Daniel Aukes*. “Multi DOF Electrical Control of Hydrogel-based Soft Machines.” Submitted to *Soft Robotics*, 2019.
7. Hosain Bagheri, Anna Hu, Sheldon Cummings, Cayla Roy, Rachel Casleton, Ashley Wan, Nicole Erjavic, Spring Berman, Matthew M. Peet, Daniel Aukes, Ximin He, Rebecca E. Fisher, and Hamid Marvi*. “Control and Function of Octopus Suckers.” Submitted to *PLOS ONE*, 2019.

6. **Shiba Biswal, Karthik Elamvazhuthi, Hans Mittelmann, and Spring Berman***. “Spectral Gap Optimization of Divergence Type Diffusion Operators.” Submitted to the *2020 European Control Conference (ECC)*, Saint Petersburg, Russia.
5. **Amir Salimi Lafmejani, Hamed Farivarnejad, Azadeh Doroudchi, and Spring Berman***. “A Consensus Strategy for Decentralized Kinematic Control of Multi-Segment Soft Continuum Robots.” Submitted to the *2020 American Control Conference (ACC)*, Denver, Colorado.
4. **Hamed Farivarnejad and Spring Berman***. “Decentralized Collective Transport along Manifolds Compatible with Holonomic Constraints by Robots with Minimal Global Information.” Submitted to the *2020 American Control Conference (ACC)*, Denver, Colorado.
3. **Shenbagaraj Kannapiran and Spring Berman***. “Go-CHART: A Miniature Remotely Accessible Self-Driving Car Robot.” Submitted to the *2020 IEEE International Conference on Robotics and Automation (ICRA)*, Paris, France.
2. **Zahi Kakish, Sritanay Vedartham^x, and Spring Berman***. “Towards Decentralized Human-Swarm Interaction by Means of Sequential Hand Gesture Recognition.” Submitted to the *2020 IEEE International Conference on Robotics and Automation (ICRA)*, Paris, France.
1. **Aniket Shirsat, Karthik Elamvazhuthi, and Spring Berman***. “Feature-Based Map Formation using Consensus on Discrete Markov Chains.” Submitted to the *2020 IEEE International Conference on Robotics and Automation (ICRA)*, Paris, France.

Invited Presentations – External

37. **Office of Naval Research (ONR) Science of Autonomy Program Meeting**, Arlington, VA, Aug. 8, 2019. “Adaptive Swarms in Inaccessible Environments.”
36. **University of California, Los Angeles, Electrical & Computer Engineering Seminar**, Los Angeles, CA, May 13, 2019. “Scalable Control of Robotic Swarms in Uncertain Environments.”
35. **University of Maryland, Baltimore County, Mechanical Engineering Seminar**, Baltimore, MD, May 10, 2019. “Scalable Control of Robotic Swarms in Uncertain Environments.”
34. **Office of Naval Research (ONR) Basic Research Challenge Program Review Meeting**, University of California, Los Angeles, Apr. 12, 2019. “Octopus-Inspired Autonomous Arms for Soft Robots with Adaptive Motions.” (One of six presenters)
33. **Electrical and Computer Engineering Department Heads Association (ECEDHA) Annual Conference and ECExpo, Robotics Plenary Panel**, Tucson, AZ, Mar. 23, 2019. “Autonomous Collective Systems Laboratory.”
32. **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)
31. **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.”
30. **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.”

29. **Office of Naval Research (ONR)** *Science of Autonomy Program Meeting*, Arlington, VA, Aug. 9, 2018. “Octopus Inspired Autonomous Arms for Soft Robots with Adaptive Motions.” (One of two presenters)
28. **Office of Naval Research (ONR)** *Science of Autonomy Program Meeting*, Arlington, VA, Aug. 7, 2018. “Adaptive Swarms in Inaccessible Environments.”
27. **Office of Naval Research (ONR)** *Bio-Inspired Autonomous Systems Program Review Meeting*, Arlington, VA, June 6, 2018. “Octopus-Inspired Autonomous Arms for Soft Robots with Adaptive Motions.” (One of three presenters)
26. **Office of Naval Research (ONR)** *Basic Research Challenge Program Review Meeting*, University of Southern California, Los Angeles, CA, Mar. 12, 2018. “Octopus-Inspired Autonomous Arms for Soft Robots with Adaptive Motions.” (One of six presenters)
25. **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.”
24. **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.”
23. **Massachusetts Institute of Technology**, *Robotics Seminar*, Cambridge, MA, Oct. 3, 2017. “A Control and Estimation Framework for Robotic Swarms in Uncertain Environments.”
22. **Office of Naval Research (ONR)** *Science of Autonomy Program Meeting*, Arlington, VA, Aug. 4, 2017. “Adaptive Swarms in Inaccessible Environments / Octopus-Inspired Autonomous Robotic Arms.”
21. **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.”
20. **Office of Naval Research (ONR)** *Basic Research Challenge Kickoff Meeting*, College Park, MD, April 13, 2017. “Octopus-Inspired Autonomous Arms for Soft Robots with Adaptive Motions.” (One of six presenters)
19. **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.”
18. **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
17. **Office of Naval Research (ONR)** *Science of Autonomy Program Meeting*, Arlington, VA, Aug. 22, 2016. “Scalable Control of Adaptive Multi-Robot Systems in Inaccessible Environments.”
16. **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.”

15. **Defense Advanced Research Projects Agency (DARPA) Young Faculty Award 2015 Kickoff / 2014 Principal Investigator Review Meeting**, Arlington, VA, Oct. 29, 2015. "Specification and Control of Customizable Multi-Robot Systems for Distributed Sensing and Cooperative Manipulation." [Poster presentation]
14. **Georgia Institute of Technology, Decision and Control Laboratory Seminar**, Atlanta, GA, Oct. 5, 2015. "A Control and Estimation Framework for Adaptive Robotic Swarms."
13. **Massachusetts Institute of Technology, Workshop on Biological Distributed Algorithms (BDA)**, Cambridge, MA, Aug. 19, 2015. "Control and Estimation Techniques for Adaptive Robotic Swarms."
12. **University of Arizona, Aerospace and Mechanical Engineering Seminar**, Tucson, AZ, Feb. 5, 2015. "Scalable Control of Robotic Swarms with Minimal Capabilities and Information."
11. **Defense Advanced Research Projects Agency (DARPA) Young Faculty Award 2014 Kick-off Meeting / 2013 Principal Investigator Review Meeting**, Arlington, VA, Oct. 3, 2014. "Specification and Control of Customizable Multi-Robot Systems for Distributed Sensing and Cooperative Manipulation." [Poster presentation]
10. **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."
9. **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."
8. **Office of Naval Research (ONR) Science of Autonomy Program Review**, Arlington, VA, Apr. 9, 2013. "Group Retrieval in Ants as a Model for Multi-Robot Collective Transport."
7. **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."
6. **Oregon State University, Mechanical, Industrial, & Manufacturing Engineering Seminar**, Corvallis, OR, Nov. 11, 2011. "Social Insect Colonies as Inspiration for Swarm Robotic Systems."
5. **BBN Technologies, Lunchtime seminar**, Cambridge, MA, Oct. 20, 2011. "A Scalable Approach to Designing Robot Control Policies for Macroscopic Swarm Behaviors."
4. **Massachusetts Institute of Technology, Theory of Distributed Systems Group**, Cambridge, MA, June 3, 2011. "Abstractions, Analysis Techniques, and Controller Synthesis for Robot Swarms."
3. **West Virginia University, Department of Mathematics**, Morgantown, WV, Mar. 2-3, 2011.
 - "Ant and Honeybee Colonies as Inspiration for Swarm Robotic Systems"
 - "Abstractions, Analysis Techniques, and Synthesis of Scalable Control Strategies for Robot Swarms."
2. **Rice University, Department of Mechanical Engineering and Materials Science**, Houston, TX, Jan. 26, 2011. "Abstractions, Analysis Techniques, and Synthesis of Scalable Control Strategies for Robot Swarms."

1. **Boston University, Hybrid and Networked Systems Laboratory**, Boston, MA, Oct. 22, 2010. “Abstractions, Analysis Techniques, and Synthesis of Scalable Control Strategies for Robot Swarms.”

Invited Presentations – ASU Internal

12. **ASU Southwest Robotics Symposium**, Arizona State University, Tempe, AZ, Jan. 25, 2019. “Autonomous Collective Systems Laboratory.”
11. **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.”
10. **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.”
9. **ASU Micro Air Vehicles (MAV) Club**, Arizona State University, Tempe, AZ, Oct. 16, 2015. “A Control and Estimation Framework for Adaptive Robotic Swarms.”
8. **Biomimicry Center Launch Event**, Arizona State University, Tempe, AZ, Mar. 3, 2015. “Swarmimicry: Engineering Certain Outcomes in an Uncertain World.”
7. **ASU Software Developers Association (SoDA)**, Arizona State University, Tempe, AZ, Feb. 26, 2015. “Scalable Control of Robotic Swarms with Minimal Capabilities and Information.”
6. **ASU Mathematics Club**, Arizona State University, Tempe, AZ, Jan. 28, 2015. “Swarm Robotic Systems.”
5. **SESE Engineering Coffee**, Arizona State University, Tempe, AZ, Oct. 17, 2014. “Control of Swarm Robotic Systems for Coverage and Manipulation Tasks.”
4. **ASU Micro Air Vehicles (MAV) Club**, Arizona State University, Tempe, AZ, Oct. 8, 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.”

Invited Conference Presentations

12. **Workshop on Insect-Inspired Models for Social Behavior**, Arizona State University, Tempe, AZ, Jan. 14, 2019. “Bio-Inspired Control Strategies for Robot Swarms.”
11. **Zombie Apocalypse Medicine Meeting**, Arizona State University, Tempe, AZ, Oct. 20, 2018. “Scalable Zombification: Control Strategies for Robotic Swarms.”

10. **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."
9. **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."
8. **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."
7. **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."
6. **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."
5. **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."
4. **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."
3. **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."
2. **Social Biomimicry: Insect Societies and Human Design Conference**, Arizona State University, Tempe, AZ, Feb. 19, 2010. "Bio-Inspired Approaches to Cooperative Manipulation and Transport by Robots."
1. **Robotics: Science and Systems Conference (RSS)**, Workshop: *Robotic Sensor Networks: Principles and Practice*, Atlanta, GA, June 30, 2007. "Stochastic Policies for the Redistribution of a Robot Swarm Among Multiple Sites, with Applications to Urban Surveillance."

Peer-reviewed Conference Presentations, including students

Note: Presenter is indicated by *P*.

40. **Azadeh Doroudchi^P**, 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." *2019 Southwest Robotics Symposium*, Arizona State University, Tempe, AZ, Jan. 24-25, 2019. Poster presentation.

39. **Azadeh Doroudchi**^P, 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.” *IEEE Conference on Decision and Control (CDC)*, Miami Beach, FL, Dec. 19, 2018. Oral presentation.
38. **Karthik Elamvazhuthi**^P and Spring Berman. “Nonlinear Generalizations of Diffusion-Based Coverage by Robotic Swarms.” *IEEE Conference on Decision and Control (CDC)*, Miami Beach, FL, Dec. 17, 2018. Oral presentation.
37. **Karthik Elamvazhuthi**^P, **Shiba Biswal**, and Spring Berman. “Mean-Field Stabilization of Robotic Swarms to Probability Distributions with Disconnected Supports.” *American Control Conference (ACC)*, Milwaukee, WI, June 27-29, 2018. Oral presentation.
36. **Hamed Farivarnejad**^P and Spring Berman. “Stability and Convergence Analysis of a Decentralized Proportional-Integral Control Strategy for Collective Transport.” *American Control Conference (ACC)*, Milwaukee, WI, June 27-29, 2018. Oral presentation.
35. **Azadeh Doroudchi**^P, MohammadReza Ebrahimi, Spring Berman, and Matthew Peet. “Vibration Control of Euler-Bernoulli Beam Using Linear Matrix Inequalities.” *2018 Southwest Robotics Symposium*, Arizona State University, Tempe, AZ, Jan. 25-26, 2018. Oral and poster presentation.
34. Spring Berman^P, Nancy Cooke, Mustafa Demir, **Ruben Gameros**, Sterling Martin, Taylor Reagan, and Rakshith Subramanyam[∞]. “CHARTOPOLIS: A Testbed for Driver Interaction with Driverless Cars.” *2018 Southwest Robotics Symposium*, Arizona State University, Tempe, AZ, Jan. 25-26, 2018. Oral and poster presentation.
33. Nancy Cooke and Spring Berman^P. “CHART: Center for Human, Artificial Intelligence, and Robot Teaming.” *2018 Southwest Robotics Symposium*, Arizona State University, Tempe, AZ, Jan. 25-26, 2018. Poster presentation.
32. **Hamed Farivarnejad**^P and Spring Berman. “Decentralized Controllers for Multi-Robot Cooperative Manipulation in Unknown Environments with Obstacles.” *2018 Southwest Robotics Symposium*, Arizona State University, Tempe, AZ, Jan. 25-26, 2018. Oral and poster presentation.
31. Vaibhav Deshmukh[∞], **Karthik Elamvazhuthi**, **Shiba Biswal**, **Zahi Kakish**^P, and Spring Berman. “Mean-Field Stabilization of Markov Chain Models for Robotic Swarms: Computational Approaches and Experimental Results.” *2018 Southwest Robotics Symposium*, Arizona State University, Tempe, AZ, Jan. 25-26, 2018. Oral and poster presentation.
30. Mahdi Ilami^P, **Karthik Elamvazhuthi**, Reza Ahmed, Michael Kintscher, Spring Berman, and Hamid Marvi. “An Experimentally Verified Nonlinear PDE Model for Ferrofluids.” *2018 Southwest Robotics Symposium*, Arizona State University, Tempe, AZ, Jan. 25-26, 2018. Oral and poster presentation.
29. **Karthik Elamvazhuthi**^P, Hendrik Kuiper, Matthias Kawski, and Spring Berman. “Bilinear Controllability of Advection-Diffusion-Reaction Systems.” *Kickoff Workshop for the UCLA Simons Mathematical NanoSystems Initiative*, UCLA, Los Angeles, CA, Jan. 17, 2018. Poster presentation.
28. H. Bagheri^P, A. B. Gendt, S. D. Cummings, S. Subramanian, S. M. Berman, M. M. Peet, D. M. Aukes, X. He, R. E. Fisher, and H. Marvi. “Octopus Sucker Adhesion and Suction Performance Under Various Environmental Conditions.” *Society for Integrative and Comparative Biology 2018 Annual Meeting*, San Francisco, CA, Jan. 6, 2018. Oral presentation.

27. **Karthik Elamvazhuthi, Shiba Biswal^P**, Vaibhav Deshmukh[∞], Matthias Kawski, and Spring Berman. “Mean-Field Controllability and Decentralized Stabilization of Markov Chains.” *IEEE Conference on Decision and Control (CDC)*, Melbourne, Australia, Dec. 12-15, 2017. Oral presentation.
26. **Karthik Elamvazhuthi^P**, Hendrik Kuiper, and Spring Berman. “Controllability to Equilibria of the 1-D Fokker-Planck Equation with Zero-Flux Boundary Condition.” *IEEE International Conference on Decision and Control (CDC)*, Melbourne, Australia, Dec. 12-15, 2017. Oral presentation.
25. **Ragesh K. Ramachandran^P** and Spring Berman. “The Effect of Communication Topology on Scalar Field Estimation by Large Networks with Partially Accessible Measurements.” *American Control Conference (ACC)*, Seattle, WA, May 25, 2017. Oral presentation.
24. **Karthik Elamvazhuthi^P**, Chase Adams[#], and Spring Berman. “Coverage and Field Estimation on Bounded Domains by Diffusive Swarms.” *IEEE International Conference on Decision and Control (CDC)*, Las Vegas, NV, Dec. 13, 2016. Oral presentation.
23. **Hamed Farivarnejad^P, Sean Wilson**, and Spring Berman. “Decentralized Sliding Mode Control for Autonomous Collective Transport by Multi-Robot Systems.” *IEEE International Conference on Decision and Control (CDC)*, Las Vegas, NV, Dec. 12, 2016. Oral presentation.
22. **Ragesh K. Ramachandran^P, Sean Wilson**, and Spring Berman. “A Probabilistic Topological Approach to Feature Identification using a Stochastic Robotic Swarm.” *International Symposium on Distributed Autonomous Robotic Systems (DARS)*, London, UK, Nov. 7, 2016. Oral presentation.
21. **Karthik Elamvazhuthi^P, Sean Wilson**, and Spring Berman. “Confinement Control of Double Integrators using Partially Periodic Leader Trajectories.” *American Control Conference (ACC)*, Boston, MA, July 8, 2016. Oral presentation.
20. **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.
19. **Sean Wilson^P**, 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 International Conference on Robotics and Automation (ICRA)*, Stockholm, Sweden, May 19, 2016. Oral presentation.
18. **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.
17. **Ragesh K. Ramachandran^P, Karthik Elamvazhuthi**, and Spring Berman. “An Optimal Control Approach to Mapping GPS-Denied Environments using a Stochastic Robotic Swarm.” *International Symposium on Robotics Research (ISRR)*, Sestri Levante, Italy, Sept. 13, 2015. Oral presentation.
16. 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.

15. **Karthik Elamvazhuthi^P** and Spring Berman. “Optimal Control of Stochastic Coverage Strategies for Robotic Swarms.” *IEEE International Conference on Robotics and Automation (ICRA)*, Seattle, WA, May 27, 2015. Oral presentation.
14. **Karthik Elamvazhuthi^P** and Spring Berman. “Scalable Formation Control of Multi-Robot Chain Networks using a PDE Abstraction.” *International Symposium on Distributed Autonomous Robotic Systems (DARS)*, Daejeon, Korea, Nov. 4, 2014. Oral presentation.
13. **Ganesh P. Kumar^P** and Spring Berman. “Statistical Analysis of Stochastic Multi-Robot Boundary Coverage.” *IEEE International Conference on Robotics and Automation (ICRA)*, Hong Kong, June 2, 2014. Oral presentation.
12. Theodore P. Pavlic, **Sean Wilson**, **Ganesh P. Kumar**, and Spring Berman^P. “An Enzyme-Inspired Approach to Stochastic Allocation of Robotic Swarms Around Boundaries.” *International Symposium on Robotics Research (ISRR)*, Singapore, Dec. 16-19, 2013. Oral presentation.
11. 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.
10. **Ganesh P. Kumar^P**, 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*.” *ACM International Conference on Hybrid Systems: Computation and Control (HSCC)*, Philadelphia, PA, Apr. 10, 2013. Oral and poster presentations.
9. Karthik Dantu, Spring Berman^P, Bryan Kate, and Radhika Nagpal. “A Comparison of Deterministic and Stochastic Approaches for Allocating Spatially Dependent Tasks in Micro-Aerial Vehicle Collectives.” *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Vilamoura, Algarve, Portugal, Oct. 8, 2012. Oral presentation.
8. Spring Berman^P, Radhika Nagpal, and Ádám Halász. “Optimization of Stochastic Strategies for Spatially Inhomogeneous Robot Swarms: A Case Study in Commercial Pollination.” *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, San Francisco, CA, Sept. 29, 2011. Oral presentation.
7. Spring Berman^P, Vijay Kumar, and Radhika Nagpal. “Design of Control Policies for Spatially Inhomogeneous Robot Swarms with Application to Commercial Pollination.” *IEEE International Conference on Robotics and Automation (ICRA)*, Shanghai, China, May 10, 2011. Oral presentation.
6. Spring Berman^P, 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.” *Robotics: Science and Systems Conference (RSS)*, Zaragoza, Spain, June 29, 2010. Oral presentation.
5. Loïc Matthey, Spring Berman^P, and Vijay Kumar. “Stochastic Strategies for a Swarm Robotic Assembly System.” *IEEE International Conference on Robotics and Automation (ICRA)*, Kobe, Japan, May 15, 2009. Oral presentation.
4. Spring Berman^P, Ádám Halász, M. Ani Hsieh, and Vijay Kumar. “Navigation-Based Optimization of Stochastic Strategies for Allocating a Robot Swarm Among Multiple Sites.” *IEEE International Conference on Decision and Control (CDC)*, Cancun, Mexico, Dec. 9-11, 2008. Oral presentation.

3. Spring Berman^P, Ádám Halász, Vijay Kumar, and Stephen C. Pratt. “Bio-Inspired Group Behaviors for the Deployment of a Swarm of Robots to Multiple Destinations.” *IEEE International Conference on Robotics and Automation (ICRA)*, Rome, Italy, Apr. 10-14, 2007. Oral presentation.
2. Spring Berman^P, Ádám Halász, and Vijay Kumar. “MARCO: A Reachability Algorithm for Multi-Affine Systems with Applications to Biological Systems.” *ACM International Conference on Hybrid Systems: Computation and Control (HSCC)*, Pisa, Italy, Apr. 3-5, 2007. Oral presentation.
1. Spring Berman^P, Ádám Halász, Vijay Kumar, and Stephen C. Pratt. “Algorithms for the Analysis and Synthesis of a Bio-Inspired Swarm Robotic System.” *International Conference on the Simulation of Adaptive Behavior (SAB)*, Rome, Italy, Sept. 25-29, 2006. Oral presentation.

Non-refereed Conference Presentations, including students
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Note: Presenter is indicated by *P*.

7. **Ruben Gameros**^P, **Rakshith Subramanyam**^{∞,P}, and Spring Berman. “Smart Intersection Management System for Autonomous Vehicles.” *Industry Advisory Board Meeting*, National Science Foundation (NSF) Industry/University Cooperative Research Center for Efficient Vehicles and Sustainable Transportation Systems, Arizona State University, Tempe, AZ, May 22-23, 2017. Poster presentation.
6. Spring Berman^P. “Control of PDE Models of Robotic Swarms with Stochastic Behaviors.” *SIAM Conference on Analysis of Partial Differential Equations (PDEs)*, Minisymposium on PDE Models and Control of Swarm Dynamics, Scottsdale, AZ, Dec. 8, 2015. Oral presentation.
5. **Sean Wilson**^P and Spring Berman. “Design of Ant-Inspired Stochastic Control Strategies for Boundary Coverage and Collective Transport by Robotic Swarms.” *KI-Net NSF Research Network Conference on Collective Dynamics and Model Verification: Connecting Kinetic Modeling to Data*, Arizona State University, Tempe, AZ, Apr. 17, 2015. Poster presentation.
4. **Karthik Elamvazhuthi**^P and Spring Berman. “Control of Stochastic Behaviors in Robotic Swarms using PDE Models.” *KI-Net NSF Research Network Conference on Collective Dynamics and Model Verification: Connecting Kinetic Modeling to Data*, Arizona State University, Tempe, AZ, Apr. 17, 2015. Poster presentation.
3. Spring Berman^P. “Control of Swarm Robotic Systems for Coverage and Manipulation Tasks.” *SEMTE Controls Symposium on Advanced Control Methods for Emerging Applications*, Arizona State University, Tempe, AZ, Dec. 12, 2014. Oral presentation.
2. Spring Berman^P. “Stochastic Coverage Strategies and Collective Transport in Robotic Swarms.” *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Workshop on Micro-Nano Robotic Swarms for Biomedical Applications, Chicago, IL, Sept. 14, 2014. Oral presentation.
1. **Ganesh P. Kumar**^P, **Aurélie Buffin**, **Theodore P. Pavlic**, **Stephen C. Pratt**, and Spring Berman. “Collective Transport in Desert Ants as a Model for Multi-Robot Cooperative Manipulation Strategies.” *ASU Rehabilitation Robotics Workshop*, Arizona State University, Tempe, AZ, Feb. 22-23, 2013. Poster presentation.

PROFESSIONAL ACTIVITIES AND SERVICE

International / National Conference Committees

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

3. **Journal Associate Editor**, *IEEE Robotics and Automation Letters (RA-L)*, since 2017.
2. **Journal Review Editorial Board Member**, *Frontiers in Robotics and AI*, Multi-Robot Systems specialty section, since 2014.
1. **Journal Editorial Board Member**, *Swarm Intelligence*, since 2013.

Conference Editorial Board Membership

3. **Associate Editor**, Conference Editorial Board of the IEEE International Conference on Robotics and Automation (ICRA), May 2015.
2. **Associate Editor**, Conference Editorial Board of the IEEE International Conference on Robotics and Automation (ICRA), June 2014.
1. **Associate Editor**, Conference Editorial Board of the IEEE International Conference on Robotics and Automation (ICRA), May 2013.

Journal Referee Service

19. Asian Journal of Control
18. ASME Journal of Dynamic Systems, Measurement, and Control
17. IEEE Access
16. IEEE Robotics and Automation Magazine
15. IEEE Transactions on Automatic Control
14. IEEE Transactions on Control Systems Technology
13. IEEE Transactions on Evolutionary Computation
12. IEEE Transactions on Robotics
11. International Journal of Nonlinear Sciences and Numerical Simulation
10. International Journal of Robotics Research
9. Journal of Aerospace Computing, Information, and Communication
8. Journal of Integrative Neuroscience
7. Journal of Micro-Nano Mechatronics
6. Journal of Robotics and Autonomous Systems
5. Nature Machine Intelligence
4. PLOS Computational Biology
3. PLOS ONE
2. Soft Matter
1. Swarm Intelligence

Conference Referee Service

11. ACM International Conference on Hybrid Systems: Computation and Control (HSCC)
10. ACM/SIGAPP Symposium on Applied Computing (SAC)
9. American Control Conference (ACC)
8. IEEE International Conference on Decision and Control (CDC)
7. IEEE International Conference on Robotics and Automation (ICRA)
6. IEEE International Conference on Self-Adaptive and Self-Organizing Systems (SASO)
5. IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)

4. International Conference on Simulation, Modeling, and Programming for Autonomous Robots (SIMPAN)
3. International Conference on Swarm Intelligence (ANTS)
2. International Symposium on Distributed Autonomous Robotic Systems (DARS)
1. International Symposium on Multi-Robot and Multi-Agent Systems (MRS)

Proposal Review Service

5. **National Science Foundation:**
4 panel reviews (Mar. 2013, Feb. 2014, May 2014, May 2015)
1 ad-hoc review (Feb. 2017)
4. **U.S. Army Corps of Engineers** Engineer Research and Development Center (ERDC):
2 proposal reviews (Apr. 2016)
3. **Deutsche Forschungsgemeinschaft** (German Research Foundation):
1 proposal review (Apr. 2016)
2. **Israel Science Foundation:** 1 proposal review (Mar. 2015)
1. **U.S. Army Research Office:** 1 proposal review (July 2013)

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

13. **Member**, Dean's Faculty Advisory Council (DFAC), Fall'19–present
12. **Publications Chair**, 2019 Arizona State University Southwest Robotics Symposium (Tempe, AZ, Jan. 24-25, 2019), Fall'18–Spring'19
11. **Member**, Robotics and Autonomous Systems (RAS) Graduate Faculty Assembly, Fall'18–present

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

4. **Co-Chair**, Faculty Search Committee (SEMTE), Fall'19–Spring'20
Search: Control Theory and Applications
3. **Member**, Faculty Search Committee (SEMTE), Fall'18–Spring'19
Search: Robotics and Autonomous Systems
2. **Member**, Focus group for composing a SEMTE vision statement, Spring'17
1. **Co-organizer**, SEMTE Controls Symposium: “Advanced Control Methods for Emerging Applications”, Arizona State University, Tempe, AZ, Dec. 12, 2014.

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)
 - IEEE Robotics and Automation Society
 - IEEE Control Systems Society
 - IEEE Women in Engineering
1. American Society of Mechanical Engineers (ASME)

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 graduate thesis/applied project research and undergraduate research, and she meets with these students on a weekly basis (lab meetings, journal club 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
 - **Current position:** 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”
 - **Current position:** 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
 - M.S. thesis supervised by Prof. Berman, Summer 2013–Fall 2014
(see **M.S. Students Advised as Chair**)
 - **Current position:** Postdoctoral researcher co-supervised by Prof. Andrea Bertozzi and Prof. Stanley Osher at the University of California, Los Angeles
7. **Hamed Farivarnejad***, Mechanical Engineering, Spring 2015 – Present
 - Ph.D. degree expected in Fall 2020
 - Passed Ph.D. Comprehensive Exam / Dissertation Proposal Prospectus in Fall 2018
 - Passed Ph.D. Qualifying Exam in Spring 2016
6. **Shiba Biswal***, Mechanical Engineering, Summer 2015 – Present
 - **Award:** Outstanding Student Paper Award, 2019 IEEE Conference on Decision and Control (CDC)
 - Ph.D. degree expected in Summer 2020
 - Passed Ph.D. Comprehensive Exam / Dissertation Proposal Prospectus in Fall 2019
 - Passed Ph.D. Qualifying Exam in Spring 2017
5. **Zahi Kakish***, Mechanical Engineering, Summer 2016 – Present
 - Ph.D. degree expected in Summer 2020
 - Passed Ph.D. Qualifying Exam in Fall 2017
4. **Aniket Shirsat***, Mechanical Engineering, Fall 2016 – Present
 - Ph.D. degree expected in Fall 2020
 - Passed Ph.D. Qualifying Exam in Fall 2017
3. **Ruben Gameros***, Exploration Systems Design: Systems Engineering (SESE graduate program), Spring 2017 – Present
 - Ph.D. degree expected in Spring 2021
 - Research Specialist / M.S. student supervised by Prof. Berman, Summer 2013–Fall 2016
(see **Research Staff Advised**)
2. **Shenbagaraj Kannapiran***, Mechanical Engineering, Summer 2018 – Present
 - Ph.D. degree expected in Summer 2022

1. **Bryan Chu**, Aerospace Engineering, Spring 2019 – Present
 - Senior Guidance, Navigation & Control Engineer at Boeing, Mesa, Arizona

Ph.D. Students Advised as Co-Chair

6. **Ganesh Peruvemba Kumar***, Computer Science and Engineering, Fall 2012 – Spring 2016
 - **Graduated:** Spring 2016
 - Ph.D. Committee Co-chair: Prof. Georgios Fainekos (CIDSE)
 - **Primary Advisor:** Prof. Spring Berman
 - Ph.D. Thesis: “Development and Analysis of Stochastic Boundary Coverage Strategies for Multi-Robot Systems”
 - Assistant Research Scientist supervised by Prof. Berman, Summer 2016–Fall 2016 (see **Research Staff Advised**)
 - **Current position:** Research Scientist (Motion Planning) at Ford Motor Company
5. **Azadeh Doroudchi***, Electrical Engineering, Spring 2017 – Present
 - Ph.D. degree expected in Spring 2021
 - Ph.D. Committee Co-chair: Prof. Konstantinos Tsakalis (EECE)
 - **Primary Advisor:** Prof. Spring Berman
4. **Amir Salimi Lafmejani***, Electrical Engineering, Summer 2019 – Present
 - Ph.D. degree expected in Summer 2022
 - **Primary Advisor:** Prof. Spring Berman
3. **Rakshith Subramanyam**, Electrical Engineering, Fall 2019 – Present
 - Ph.D. degree expected in Fall 2023
 - **Primary Advisor:** Prof. Spring Berman
 - M.S. thesis supervised by Prof. Berman, Spring 2017–Spring 2018 (see **M.S. Students Advised as Chair**)
2. **Himangshu Kalita**, Mechanical Engineering, Fall 2015 – Fall 2017
 - Ph.D. Committee Co-chair and Primary Advisor: Prof. Jekan Thanga (SESE)
1. **Raviteja Nallapu**, Aerospace Engineering, Spring 2016 – Fall 2017
 - Ph.D. Committee Co-chair and Primary Advisor: Prof. Jekan Thanga (SESE)

Ph.D. Students Advised as Committee Member

26. **Saeed Merza**, Mechanical Engineering, Spring 2013 – Summer 2014
 - **Graduated:** Summer 2014
 - Ph.D. Thesis: “Design of Miniaturized Underwater Vehicle with Propulsions for Deep-sea Research Applications”

25. **Mark Ison**, Mechanical Engineering, Summer 2014 – Spring 2015
 - **Graduated:** Spring 2015
 - Ph.D. Thesis: “On Enhancing Myoelectric Interfaces by Exploiting Motor Learning and Flexible Muscle Synergies”
24. **Reza Kamyar**, Mechanical Engineering, Spring 2015 – Spring 2016
 - **Graduated:** Spring 2016
 - Ph.D. Thesis: “A Parallel Computing Framework for Analysis and Control of Large-scale Systems”
23. **Randall Hellman**, Mechanical Engineering, Spring 2014 – Summer 2016
 - **Graduated:** Summer 2016
 - Ph.D. Thesis: “Haptic Perception, Decision-making, and Learning for Manipulation with Artificial Hands”
22. **Juan Oziel de la Fuente Valadez**, Mechanical Engineering, Spring 2015 – Fall 2016
 - **Graduated:** Fall 2016
 - Ph.D. Thesis: “Nonlinear Phase Based Control to Generate and Assist Oscillatory Motion with Wearable Robotics”
21. **Jeff Skidmore**, Mechanical Engineering, Spring 2016 – Spring 2017
 - **Graduated:** Spring 2017
 - Ph.D. Thesis: “On the Effect of Walking Surface Stiffness on Inter-leg Coordination during Human Walking: a Unique Perspective to Robot-assisted Gait Rehabilitation”
20. **Nathan Cahill**, Mechanical Engineering, Spring 2016 – Summer 2017
 - **Graduated:** Summer 2017
 - Ph.D. Thesis: “Optimal Design Methods for Increasing Power Performance of Multiactuator Robotic Limbs”
19. **Robert Holgate**, Mechanical Engineering, Spring 2016 – Summer 2017
 - **Graduated:** Summer 2017
 - Ph.D. Thesis: “Advanced Prosthetics and Joint Mechanisms”
18. **Bryan Whitsell**, Mechanical Engineering, Fall 2015 – Fall 2017
 - **Graduated:** Fall 2017
 - Ph.D. Thesis: “Human-Robot Interaction Utilizing Asymmetric Cooperation and the Brain”
17. **Fangbo Zhang**, Mathematics, Fall 2015 – Spring 2018
 - *Home institution:* University of California, Los Angeles
 - **Graduated:** Spring 2018
 - Ph.D. Thesis: “A Blob Method for Advection-Diffusion-Reaction Systems with Application to Robotic Swarms”

16. **Karan Puttannaiah**, Electrical Engineering, Summer 2018
 - **Graduated:** Summer 2018
 - Ph.D. Thesis: “A Generalized H-Infinity Mixed Sensitivity Convex Approach to Multivariable Control Design Subject to Simultaneous Output and Input Loop-Breaking Specifications”
15. **Kangjin Kim**, Computer Science, Fall 2014 – Present
14. **Justin Echols**, Electrical Engineering, Summer 2016 – Present
13. **Andrew Thoesen**, Mechanical Engineering, Summer 2016 – Present
12. **Masood Nevisipour**, Mechanical Engineering, Fall 2016 – Present
11. **Andrew Burchill**, Animal Behavior and Ethology, Spring 2017 – Present
10. **Marziye Rahimitouranposhti**, Mechanical Engineering, Spring 2017 – Present
9. **Pengchao Song**, Mechanical Engineering, Spring 2017 – Present
8. **Hosain Bagheri**, Mechanical Engineering, Summer 2017 – Present
7. **Mahdi Ilami**, Mechanical Engineering, Summer 2017 – Present
6. **Yiwei Wang**, Mechanical Engineering, Summer 2017 – Present
5. **Shatadal Mishra**, Systems Engineering, Fall 2018 – Present
4. **Morgan Jones**, Mechanical Engineering, Fall 2018 – Present
3. **Mohammad Khajenejad**, Mechanical Engineering, Spring 2019 – Present
2. **Zhi Qiao**, Mechanical Engineering, Spring 2019 – Present
1. **Brendon Colbert**, Mechanical Engineering, Summer 2019 – Present

M.S. Students Advised as Chair

18. **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”

17. **Jared Duensing**, Aerospace Engineering, Spring 2015 – Summer 2015
 - **Graduated:** Summer 2015
 - M.S. Applied Project: “Visual Feedback of Quadrotor Systems”
 - **Current position:** Research Aerospace Engineer, NASA Ames Research Center
16. **Yuan Gao**, Mechanical Engineering, Fall 2015 – Summer 2016
 - **Graduated:** Summer 2016
 - M.S. Applied Project: “Keyboard Playing Mobile Robot”
 - **Current position:** Ph.D. student, Robotics and Locomotion Laboratory, University of Massachusetts Lowell
15. **Vincent Velarde**, Mechanical Engineering, Spring 2016 – Summer 2016
 - **Graduated:** Summer 2016
 - M.S. Applied Project: “Modeling, Control, and Navigation of a Quadrotor”
 - **Current position:** Systems Engineer II, Raytheon Missile Systems
14. **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”
 - **Current position:** R&D Vibration and Acoustic Engineer, K&A JPN Inc. / HSEA Technology Inc.
13. **Vaibhav Deshmukh***, Mechanical Engineering, Fall 2015 – Summer 2017
 - **Graduated:** Summer 2017
 - Assistant Research Technologist supervised by Prof. Berman, Summer 2017–Fall 2017 (see **Research Staff Advised**)
 - **Current position:** Control System Engineer, Caterpillar Trimble Control Technologies LLC
12. **Rakshith Subramanyam**, Electrical Engineering, Spring 2017 – Spring 2018
 - **Graduated:** Spring 2018
 - M.S. Thesis: “Chartopolis – A Self Driving Car Test Bed”
 - **Current position:** Ph.D. student in Prof. Berman’s lab (see **Ph.D. Students Advised as Co-Chair**)
11. **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”
 - Undergraduate student supervised by Prof. Berman, Summer 2015–Fall 2016 (see **Undergraduate Students Advised as Chair**)
 - **Current position:** Mechanical Design Engineer, Case Medical, Inc.
10. **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”

9. **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”
 - **Current position:** Application Engineer at Roboteq, Inc.
8. **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”
 - **Current position:** Engineer at Intel Corporation
7. **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”
 - **Current position:** Applying to Ph.D. programs
6. **Elikplim Gah**, Mechanical Engineering, Fall 2019 – Present
5. **Yashaswy Govada**, Mechanical Engineering, Fall 2019 – Present
4. **Karthik Ganesan**, Mechanical Engineering, Fall 2019 – Present
3. **Sushilkumar Muralikumar**, Mechanical Engineering, Fall 2019 – Present
2. **Yash Mandlik**, Robotics and Autonomous Systems, Fall 2019 – Present
1. **Manaswini Ayalasonmayajula**, Robotics and Autonomous Systems, Fall 2019 – Present

M.S. Students Advised as Co-Chair
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6. **Anandrao Biradar**, Mechanical Engineering, Fall 2013 – Spring 2014
 - **Graduated:** Spring 2014
 - M.S. Thesis: “Wind Estimation and its Effects on Path Following of UAVs, Applying Corrections in Navigation”
 - M.S. Committee Co-chair and Primary Advisor: Prof. Srikanth Saripalli (SESE)
5. **Prasannakumar Ghadage**, Mechanical Engineering, Fall 2013 – Spring 2014
 - **Graduated:** Spring 2014
 - M.S. Thesis: “Novel Waypoint Generation Method for Increased Mapping Efficiency using UAVs”
 - M.S. Committee Co-chair and Primary Advisor: Prof. Srikanth Saripalli (SESE)

4. **Laksh Raura**, Mechanical Engineering, Fall 2014 – Spring 2016
 - **Graduated:** Spring 2016
 - M.S. Thesis: “Design and Development of Rolling and Hopping Ball Robots for Low Gravity Exploration”
 - M.S. Committee Co-chair and Primary Advisor: Prof. Jekan Thanga (SESE)
3. **Nirangkush Das**, Mechanical Engineering, Fall 2016 – Fall 2018
 - **Graduated:** Fall 2018
 - M.S. Thesis: “Trajectory Modeling, Estimation and Interception of a Thrown Ball using a Robotic Ground Vehicle”
 - M.S. Committee Co-chair and Primary Advisor: Prof. Armando Rodriguez (ECEE)
2. **Victor Worlanyo**, Mechanical Engineering, Fall 2018 – Present
 - M.S. Committee Co-chair and Primary Advisor: Prof. Armando Rodriguez (ECEE)
1. **Soham Sarkar**, Mechanical Engineering, Fall 2019 – Present
 - M.S. Committee Co-chair and Primary Advisor: Prof. Armando Rodriguez (ECEE)

M.S. Students Advised as Committee Member
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20. **Harshil Patel**, Mechanical Engineering, Spring 2013
 - **Graduated:** Spring 2013
 - M.S. Thesis: “Control of 3D Human Arm Impedance”
19. **Shiba Biswal**, Mechanical Engineering, Summer 2013 – Spring 2015
 - **Graduated:** Spring 2015
 - M.S. Thesis: “Modeling and Control of Flapping Wing Micro Aerial Vehicles”
18. **Aniket Shirsat**, Mechanical Engineering, Summer 2014 – Spring 2015
 - **Graduated:** Spring 2015
 - M.S. Applied Project: “Modeling And Control of a Quadrotor Aircraft UAV”
17. **Zhenyu Lin**, Electrical Engineering, Spring 2015 – Summer 2015
 - **Graduated:** Summer 2015
 - M.S. Thesis: “Modeling, Design and Control of Multiple Low-Cost Robotic Ground Vehicles”
16. **Daniel Larsson**, Mechanical Engineering, Spring 2016
 - **Graduated:** Spring 2016
 - M.S. Thesis: “Dynamics, Modeling, Simulation and Control of Mid-Flight Coupling of Quadrotors”

15. **Zhichao Li**, Electrical Engineering, Summer 2016
 - **Graduated:** Summer 2016
 - M.S. Thesis: “Modeling and Control of a Longitudinal Platoon of Ground Robotic Vehicles”
14. **Jesus Aldaco Lopez**, Electrical Engineering, Summer 2016
 - **Graduated:** Summer 2016
 - M.S. Thesis: “Image Processing Based Control of Mobile Robotics”
13. **Xianglong Lu**, Electrical Engineering, Summer 2016
 - **Graduated:** Summer 2016
 - M.S. Thesis: “Modeling and Control for Vision Based Rear Wheel Drive Robot and Solving Indoor SLAM Problem Using LIDAR”
12. **Evgeny Meyer**, Aerospace Engineering, Spring 2015 – Summer 2016
 - **Graduated:** Summer 2016
 - M.S. Thesis: “A Convex Approach for Stability Analysis of Partial Differential Equations”
11. **Venkatraman Renganathan**, Electrical Engineering, Summer 2016
 - **Graduated:** Summer 2016
 - M.S. Thesis: “3D Animation & Kill Zone Analysis of an EMRAAT Bank-to-Turn Missile-Target Engagement”
10. **Mohammad Alzorgan**, Mechanical and Aerospace Engineering, Spring 2016 – Fall 2016
 - **Graduated:** Fall 2016
 - M.S. Thesis: “Look-Ahead Information Based Optimization Strategy for Hybrid Electric Vehicles”
9. **Yatiraj Shetty**, Mechanical Engineering, Fall 2015 – Fall 2016
 - **Graduated:** Fall 2016
 - M.S. Thesis: “Robust Human Motion Tracking Using Low-Cost Inertial Sensors”
8. **Puneet Jethani**, Mechanical Engineering, Spring 2016 – Spring 2017
 - **Graduated:** Spring 2017
 - M.S. Thesis: “Power Management Strategy of a Fuel Cell Hybrid Electric Vehicle with Integrated Ultra-Capacitor with Driving Pattern Recognition”
7. **Georgios Konstantinos Karavas**, Mechanical Engineering, Spring 2017 – Summer 2017
 - **Graduated:** Summer 2017
 - M.S. Thesis: “Brain Computer Interfaces for the Control of Robotic Swarms”
6. **Nikhilesh Ravishankar**, Electrical Engineering, Spring 2017 – Summer 2017
 - **Graduated:** Summer 2017
 - M.S. Thesis: “Autonomous Quadrotor Navigation by Detecting Vanishing Points in Indoor Environments”

5. **Rushabh Talati**, Mechanical Engineering, Spring 2018
 - **Graduated:** Spring 2018
 - M.S. Thesis: “Implementation and Comparison of H-Infinity Observers for Time-Delay Systems”
4. **Daniel D’Souza**, Computer Science, Spring 2018
 - **Graduated:** Spring 2018
 - M.S. Thesis: “Addressing Problems Facing Unmanned Aerial System Scheduling Systems in Urban Environments”
3. **Sami Mian**, Computer Engineering, Fall 2016 – Spring 2018
 - **Graduated:** Spring 2018
 - M.S. Thesis: “A Novel Battery Management & Charging Solution for Autonomous UAV Systems”
2. **Abdullah Altawaitan**, Electrical Engineering, Summer 2019
 - **Graduated:** Summer 2019
 - M.S. Thesis: “Modeling, Design, and Control of Multiple Quadrotors”
1. **Kashyap Sathyamurthy**, Mechanical and Aerospace Engineering, Summer 2019 – Present

Undergraduate Students Advised as Chair
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20. **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)
19. **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)
18. **Xinyu Wang**, Mechanical Engineering, Fall 2015
 - **Graduated:** Spring 2016
 - **Award:** Fulton Undergraduate Research Initiative research award (Fall 2015)
17. **Zz Mae Haggerty**, Mechanical Engineering, Summer 2015 – Fall 2016
 - **Graduated:** Fall 2016
 - Research volunteer

16. **Zemichael Hailu**, Mechanical Engineering, Spring 2016
 - **Graduated:** Fall 2016
 - Research volunteer
15. **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”
14. **Caleb Peckham**, Mechanical and Aerospace Engineering, Summer 2015
 - **Graduated:** Spring 2017
 - *Home institution:* Princeton University, Princeton, NJ
 - Research volunteer
13. **Felipe Riveros**, Mechanical Engineering, Fall 2016 – Spring 2017
 - **Graduated:** Spring 2017
 - **Award:** Fulton Undergraduate Research Initiative research award (Spring 2017)
 - Research volunteer (Fall 2016)
12. **Jordan Gisch**, Aeronautical Engineering, Summer 2016 – Summer 2017
 - ASU Grand Challenge Scholar
 - Research volunteer
11. **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)
10. **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)
9. **Kevin Sidbon**, Software Engineering, Summer 2017 – Fall 2017
 - **Award:** Fulton Undergraduate Research Initiative research award (Summer 2017, Fall 2017)
8. **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”

7. **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”
6. **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”
5. **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”
4. **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”
3. **Jeffrey Chien**, Mechanical Engineering, Spring 2019 – Summer 2019
 - **Graduated:** Spring 2019
 - Research volunteer
2. **Bryce Copenhaver**, Engineering (Robotics), Fall 2019 – Present
 - Barrett Honors Thesis (Fall 2019 – Spring 2020)
1. **Enoch O’Neal**, Mechanical Engineering, Fall 2019
 - **Award:** Fulton Undergraduate Research Initiative research award (Fall 2019)

Undergraduate Students Advised as Committee Member

6. **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”
5. **Elena Whitton**, Mechanical Engineering, Fall 2014 – Spring 2015
 - **Graduated:** Spring 2015
 - Barrett Honors Thesis (Fall 2014 - Spring 2015): “Human Perception of Swarm Behavior”

4. **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”
3. **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”
2. **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”
1. **Brent Wallace**, Electrical Engineering, Spring 2019 – Present
 - Barrett Honors Thesis (Spring 2019 – Fall 2019)

High School Students Advised

2. **Padmapriya Rangarajan**, Summer 2016
High School: Desert Vista High School, Phoenix, AZ
1. **Sritanay Vedartham**, Summer 2019 – Present
High School: BASIS Scottsdale, Scottsdale, AZ

Postdoctoral Researchers Advised

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

Research Staff Advised

3. **Ruben Gameros***, Research Specialist, Spring 2015 – Fall 2016
 - M.S. student in Mechanical Engineering supervised by Prof. Berman, Summer 2013 – Spring 2015
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
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1. **Yating Zheng**, School of Systems Science, Beijing Normal University, China, Jan.-Feb. 2018

Teaching

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|-------------|---|
| Spring 2019 | <p><i>Instructor, “MAE 318: System Dynamics and Control I”</i>
 Mechanical and Aerospace Engineering, Arizona State University, Tempe, AZ</p> <ul style="list-style-type: none"> ● Description: Undergraduate course on the dynamics, modeling, and feedback control of physical systems. Includes laboratory component. ● Students registered: 53 ● Teaching evaluation score for the instructor (Part 2): 4.57 / 5.0 |
| Spring 2019 | <p><i>Co-Instructor, “LAW 791 - Topic: Artificial Intelligence: Law, Ethics & Policy”</i>
 Sandra Day O’Connor College of Law, Arizona State University, Phoenix, AZ
 Co-Instructors: Prof. Gary Marchant (ASU Center for Law, Science & Innovation) and Prof. Jason Robert (ASU Lincoln Center for Applied Ethics)</p> <ul style="list-style-type: none"> ● Description: Co-developed a new seminar course (first taught in Fall 2017) that covers the growing applications of artificial intelligence and studies the legal, ethical, and policy implications of these applications. ● Students registered: 28 ● Teaching evaluation score for the instructor (Part 2): 4.77 / 5.0 |
| Fall 2018 | <p><i>Instructor, “MAE 318: System Dynamics and Control I”</i>
 Mechanical and Aerospace Engineering, Arizona State University, Tempe, AZ</p> <ul style="list-style-type: none"> ● Students registered: 90 ● Teaching evaluation score for the instructor (Part 2): 4.59 / 5.0 |
| Fall 2018 | <p><i>Instructor, “ASU 101-AEE: The ASU Experience”</i>
 Aerospace Engineering, Arizona State University, Tempe, AZ</p> <ul style="list-style-type: none"> ● Description: Undergraduate course on skills for academic and professional success, engineering ethics, and an introduction to Aerospace Engineering. ● Students registered: 19 ● Teaching evaluation score for the instructor (Part 2): 3.69 / 5.0 |
| Spring 2018 | <p><i>Instructor, “MAE 318: System Dynamics and Control I”</i>
 Mechanical and Aerospace Engineering, Arizona State University, Tempe, AZ</p> <ul style="list-style-type: none"> ● Students registered: 89 ● Teaching evaluation score for the instructor (Part 2): 4.60 / 5.0 |
| Fall 2017 | <p><i>Co-Instructor, “LAW 791 - Topic: Artificial Intelligence: Law, Ethics & Policy”</i>
 Sandra Day O’Connor College of Law, Arizona State University, Phoenix, AZ
 Co-Instructors: Prof. Gary Marchant (ASU Center for Law, Science & Innovation) and Prof. Jason Robert (ASU Lincoln Center for Applied Ethics)</p> <ul style="list-style-type: none"> ● Students registered: 40 ● Teaching evaluation score for the instructor (Part 2): 4.43 / 5.0 |

- Fall 2017 *Instructor, “MAE 318: System Dynamics and Control I”*
Mechanical and Aerospace Engineering, Arizona State University, Tempe, AZ
- Students registered: 86
 - Teaching evaluation score for the instructor (Part 2): **4.22 / 5.0**
- Spring 2017 *Instructor, “MAE 318: System Dynamics and Control”*
Mechanical and Aerospace Engineering, Arizona State University, Tempe, AZ
- **Description:** Same as MAE 318: System Dynamics and Control I
 - Students registered: 82
 - Teaching evaluation score for the instructor (Part 2): **4.56 / 5.0**
- Fall 2016 *Instructor, “MAE 598 - Topic: Multi-Robot Systems”*
Mechanical and Aerospace Engineering, Arizona State University, Tempe, AZ
- **Description:** Developed a new graduate course on modeling, analyzing, and controlling multi-robot systems. The course combines instruction on theoretical foundations with seminar-style discussions of recent research in the field.
 - Course website: <http://faculty.engineering.asu.edu/acs/teaching>
 - Students registered: 40
 - Teaching evaluation score for the instructor (Part 2): **4.58 / 5.0**
- Fall 2016 *Instructor, “ASU 101-MEE: The ASU Experience”*
Mechanical Engineering, Arizona State University, Tempe, AZ
- **Description:** Undergraduate course on skills for academic and professional success, engineering ethics, and an introduction to Mechanical Engineering.
 - Students registered: 19
 - Teaching evaluation score for the instructor (Part 2): **4.58 / 5.0**
- Spring 2016 *Instructor, “MAE 318: System Dynamics and Control”*
Mechanical and Aerospace Engineering, Arizona State University, Tempe, AZ
- Students registered: 106
 - Teaching evaluation score for the instructor (Part 2): **4.66 / 5.0**
- Fall 2015 *Instructor, “MAE 506: Advanced System Modeling, Dynamics and Control”*
Mechanical and Aerospace Engineering, Arizona State University, Tempe, AZ
- **Description:** Graduate course on classical control theory and modern control theory.
 - Students registered: 56
 - Teaching evaluation score for the instructor (Part 2): **4.59 / 5.0**
- Fall 2015 *Instructor, “ASU 101-MEE: The ASU Experience”*
Mechanical Engineering, Arizona State University, Tempe, AZ
- Students registered: 19
 - Teaching evaluation score for the instructor (Part 2): **4.46 / 5.0**
- Spring 2015 *Instructor, “MAE 318: System Dynamics and Control”*
Mechanical and Aerospace Engineering, Arizona State University, Tempe, AZ
- Students registered: 90
 - Teaching evaluation score for the instructor (Part 2): **4.34 / 5.0**

- Fall 2014 *Instructor*, “**MAE 506: Advanced System Modeling, Dynamics and Control**”
Mechanical and Aerospace Engineering, Arizona State University, Tempe, AZ
- Students registered: 43
 - Teaching evaluation score for the instructor (Part 2): **4.4 / 5.0**
- Fall 2014 *Instructor*, “**ASU 101-MEE: The ASU Experience**”
Mechanical Engineering, Arizona State University, Tempe, AZ
- Students registered: 19
 - Teaching evaluation score for the instructor (Part 2): **4.18 / 5.0**
- Spring 2014 *Instructor*, “**MAE 318: System Dynamics and Control**”
Mechanical and Aerospace Engineering, Arizona State University, Tempe, AZ
- Students registered: 60
 - Teaching evaluation score for the instructor (Part 2): **2.93 / 5.0**
- Fall 2013 *Instructor*, “**MAE 506: Advanced System Modeling, Dynamics and Control**”
Mechanical and Aerospace Engineering, Arizona State University, Tempe, AZ
- Students registered: 29
 - Teaching evaluation score for the instructor (Part 2): **3.58 / 5.0**
- Fall 2012 *Instructor*, “**MAE 506: Advanced System Modeling, Dynamics and Control**”
Mechanical and Aerospace Engineering, Arizona State University, Tempe, AZ
- Students registered: 27
 - Teaching evaluation score for the instructor (Part 2): **4.19 / 5.0**
- Graduate Teaching Assistant*, Mechanical Engineering and Applied Mechanics Dept.,
University of Pennsylvania, Philadelphia, PA
- Fall 2007 • “**MEAM 110: Introduction to Mechanics**”
Spring 2007 • “**MEAM 211: Engineering Mechanics: Dynamics**”
Fall 2006 • “**MEAM 321: Vibrations of Mechanical Systems**”

Outreach Activities

36. **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://acsllaboratory.github.io/>
35. **Presenter**, ASU Grand Challenge Scholars Program, Arizona State University, July 2019
- Described the lab’s research to incoming freshmen and transfer engineering students
34. **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

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

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

- Sept.'18–
Aug.'23 *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. Sethuraman Panchanathan (CIDSE, ASU)
 - Co-Principal Investigators (all at ASU):
 - Prof. Ann McKenna (The Polytechnic School)
 - Prof. Gail-Joon Ahn (School of Computing, Informatics, and Decision Systems Eng.)
 - Prof. Ram Pendyala (School of Sustainable Engineering and the Built Environment)
 - Prof. Cynthia Selin (School for the Future of Innovation in Society)
 - Other Co-Investigators (all at ASU):
 - Ashish Amresh (School of Computing, Informatics, and Decision Systems Eng.)
 - Prof. Brian Gerber (Watts College of Public Service and Community Solutions)
 - Prof. Thaddeus Miller (School for the Future of Innovation in Society)
 - 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.'18– Jan.'22 *Associate Director*, “Center for Human, Artificial Intelligence, and Robotic Teaming (CHART)”
Arizona State University 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.
- 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.

- Apr.'17–
Mar.'21
- 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 (The Polytechnic School, ASU)
 - Prof. Hamid Marvi (Mechanical and Aerospace Engineering, ASU)
 - Prof. Matthew Peet (Aerospace Engineering, ASU)
 - Prof. Rebecca Fisher (Department of Basic Medical Sciences, 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.
- 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.