

SPRING MELODY BERMAN

Curriculum Vitae

School for Engineering of Matter, Transport and Energy
 Ira A. Fulton Schools of Engineering, Arizona State University
 ERC, Room 375; 501 E. Tyler Mall, ECG 301, Tempe, AZ 85287-6106, USA
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 Lab website: <http://faculty.engineering.asu.edu/acs/>

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

- June 2012-
Present *Assistant Professor*, Mechanical and Aerospace Engineering
Graduate Faculty, Computer Science
Graduate Faculty, Exploration Systems Design
Honors Faculty, Barrett, the Honors College
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) (<http://robobees.seas.harvard.edu/>)
 - 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

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, 2017. [2016 Impact factor: 2.706]

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

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)*, vol. 2, issue 2, pp. 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)*, vol. 1, issue 2, pp. 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.

14. **Karthik Elamvazhuthi**, Vaibhav Deshmukh[∞], Matthias Kawski, and Spring Berman^{*}, “Mean-Field Controllability and Decentralized Stabilization of Markov Chains, Part I: Global Controllability and Rational Feedbacks.” Accepted to the *IEEE International 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.” Accepted to 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.” Accepted to 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

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

3. Fangbo Zhang*, Andrea L. Bertozzi, Karthik Elamvazhuthi, and Spring Berman, “Performance Bounds on Spatial Coverage Tasks by Stochastic Robotic Swarms.” In revision for *IEEE Transactions on Automatic Control (TAC)*, 2017. [2016 Impact factor: 4.270]

2. **Karthik Elamvazhuthi**, Hendrik Kuiper, and Spring Berman*, “PDE-Based Optimization for Stochastic Mapping and Coverage Strategies using Robotic Swarms.” Submitted to *Automatica*, 2016. [2016 Impact factor: 5.451]
1. **Hamed Farivarnejad** and Spring Berman*, “Stability and Convergence Analysis of a Decentralized Proportional Control Strategy for Collective Transport.” Submitted to the *International Symposium on Multi-Robot and Multi-Agent Systems (MRS)*, Los Angeles, CA, 2017.

Invited Presentations – External

24. **Université Toulouse 1 Capitole**, *Workshop on Cross-Disciplinary Approaches for Building Intelligent Swarms of Drones*, Toulouse, France, scheduled for Nov. 13-14, 2017. “A Scalable Control and Estimation Framework for Robotic Swarms in Uncertain Environments.”
23. **Massachusetts Institute of Technology**, *Robotics Seminar*, Cambridge, MA, scheduled for Oct. 3, 2017.
22. **Office of Naval Research (ONR)** *Science of Autonomy Program Meeting*, Arlington, VA, scheduled for 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

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

9. **Robotics: Science and Systems Conference (RSS)**, Workshop: *Become a Swarm Robotics Hacker Overnight*, Lesley University, Cambridge, MA, scheduled for 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*.

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

Summary of Professional Activities and Service:

11 International/national conference committees
2 International/national seminars and conference sessions organized
5 International/national conference sessions chaired
 Member of **3** Journal Editorial Boards
 Member of **3** Conference Editorial Boards
 Peer Reviewer for **16** Journals
 Peer Reviewer for **10** Conferences
 Proposal Review Service for **5** Funding Agencies
2 ASU-level Committees and Initiatives, **9** Engineering School-level Committees, and **2** Unit-level Committees

International / National Conference Committees

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 (SIMPAN), 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

3. **Seminar Co-organizer**, “Algorithmic Foundations of Programmable Matter,” Dagstuhl Seminar, Wadern, Germany, scheduled for Aug. 12-17, 2018.
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

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

Conference Referee Service

10. ACM International Conference on Hybrid Systems: Computation and Control (HSCC)
9. ACM/SIGAPP Symposium on Applied Computing (SAC)
8. American Control Conference (ACC)
7. IEEE International Conference on Decision and Control (CDC)
6. IEEE International Conference on Robotics and Automation (ICRA)
5. IEEE International Conference on Self-Adaptive and Self-Organizing Systems (SASO)
4. IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)
3. International Conference on Simulation, Modeling, and Programming for Autonomous Robots (SIMPAN)
2. International Conference on Swarm Intelligence (ANTS)
1. International Symposium on Distributed Autonomous Robotic Systems (DARS)

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. **U.S. Army Research Office:** 1 proposal review (July 2013)
2. **Deutsche Forschungsgemeinschaft** (German Research Foundation): 1 proposal review (Apr. 2016)
1. **Israel Science Foundation:** 1 proposal review (Mar. 2015)

ASU-level Committees and Initiatives

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

9. **Member**, ASU Leadership Academy (LA) Robotics Team (teamLA Cohort III), Fall'17–Spring'18
8. **Member**, Faculty Search Committee (CIDSE / SEMTE / TPS), Fall'16–Spring'17
Search: Airborne Networking & Autonomous Robotic Systems
7. **Member**, Faculty Search Committee (SEMTE / TPS), Fall'15–Spring'16
Search: Robotics
6. **Member**, Faculty Search Committee (SEMTE / TPS / ECEE / CIDSE), Fall'14–Spring'15
Search: Autonomous, Intelligent and Robotic Systems
5. **Member**, Faculty Search Committee (TPS / SEMTE), Fall'14–Spring'15
Search: Wearable Robot Technologies
4. **Member**, Faculty Search Committee (TPS / SEMTE / CIDSE), Spring'14
Search: Robotics
3. **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
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

2. **Member**, Focus group for composing a SEMTE vision statement, since Spring 2017.
1. **Co-organizer**, SEMTE Controls Symposium: “Advanced Control Methods for Emerging Applications”, Arizona State University, Tempe, AZ, Dec. 12, 2014.

Professional Society Committees

1. **Member**, “Swarm Intelligence” Task Force, IEEE Computational Intelligence Society, since May 2016.

Professional Society Memberships

- 2. American Society of Mechanical Engineers (ASME)
- 1. Institute of Electrical and Electronics Engineers (IEEE)
 - IEEE Robotics and Automation Society
 - IEEE Control Systems Society

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

Summary of Mentoring:

Ph.D. Students Advised as Chair:	Graduated: 1	Current: 7
Ph.D. Students Advised as Co-chair:	Graduated: 1	Current: 3
Ph.D. Students Advised as Committee Member:	Graduated: 8	Current: 12
M.S. Students Advised as Chair:	Graduated: 5	Current: 4
M.S. Students Advised as Co-chair:	Graduated: 3	Current: 1
M.S. Students Advised as Committee Member:	Graduated: 15	Current: 0
Undergraduate Students (Research) Advised as Chair:	Graduated: 8	Current: 4
Undergraduate Students (Research) Advised as Committee Member:	Graduated: 3	
High-School Students (Research) Advised:	1	
Research Staff Advised:	2	
Student Fellowships and Awards:	8	

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
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8. **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:** Postdoctoral researcher in Prof. Magnus Egerstedt’s lab at the Georgia Institute of Technology, Atlanta, GA
7. **Ragesh Kumar Ramachandran***, Mechanical Engineering, Fall 2014 – Present
 - Ph.D. degree expected in Fall 2018
 - Passed Ph.D. Comprehensive Exam / Dissertation Proposal Prospectus in Spring 2017
 - Passed Ph.D. Qualifying Exam in Summer 2015
6. **Karthik Elamvazhuthi***, Mechanical Engineering, Spring 2015 – Present
 - Ph.D. degree expected in Spring 2019
 - Passed Ph.D. Qualifying Exam in Fall 2015
 - M.S. thesis supervised by Prof. Berman, Summer 2013–Fall 2014
(see **M.S. Students Advised as Chair**)
5. **Hamed Farivarnejad***, Mechanical Engineering, Spring 2015 – Present
 - Ph.D. degree expected in Spring 2019
 - Passed Ph.D. Qualifying Exam in Spring 2016
4. **Shiba Biswal***, Mechanical Engineering, Summer 2015 – Present
 - Ph.D. degree expected in Summer 2019
 - Passed Ph.D. Qualifying Exam in Spring 2017
3. **Zahi Kakish***, Mechanical Engineering, Summer 2016 – Present
 - Ph.D. degree expected in Summer 2020
2. **Aniket Shirsat***, Mechanical Engineering, Fall 2016 – Present
 - Ph.D. degree expected in Fall 2020
1. **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**)

Ph.D. Students Advised as Co-Chair

4. **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:** Robotics Software Engineer at Drive.ai, an autonomous vehicle system startup in Mountain View, CA
3. **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
2. **Himangshu Kalita**, Mechanical Engineering, Fall 2015 – Present
 - Ph.D. Committee Co-chair and Primary Advisor: Prof. Jekan Thanga (SESE)
1. **Raviteja Nallapu**, Aerospace Engineering, Spring 2016 – Present
 - Ph.D. Committee Co-chair and Primary Advisor: Prof. Jekan Thanga (SESE)

Ph.D. Students Advised as Committee Member

20. **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”
19. **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”
18. **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”
17. **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”

16. **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”
15. **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”
14. **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”
13. **Robert Holgate**, Mechanical Engineering, Spring 2016 – Summer 2017
 - **Graduated:** Summer 2017
 - Ph.D. Thesis: “Advanced Prosthetics and Joint Mechanisms”
12. **Kangjin Kim**, Computer Science, Fall 2014 – Present
11. **Bryan Whitsell**, Mechanical Engineering, Fall 2015 – Present
10. **Fangbo Zhang**, Mathematics, Fall 2015 – Present
 - *Home institution:* University of California, Los Angeles
9. **Daehan Wi**, Mechanical Engineering, Spring 2016 – Present
8. **Justin Echols**, Electrical Engineering, Summer 2016 – Present
7. **Andrew Thoesen**, Mechanical Engineering, Summer 2016 – Present
6. **Masood Nevisipour**, Mechanical Engineering, Fall 2016 – Present
5. **Andrew Burchill**, Animal Behavior and Ethology, Spring 2017 – Present
4. **Marziye Rahimitouranposhti**, Mechanical Engineering, Spring 2017 – Present
3. **Pengchao Song**, Mechanical Engineering, Spring 2017 – Present
2. **Hosain Bagheri**, Mechanical Engineering, Summer 2017 – Present
1. **Mahdi Ilami**, Mechanical Engineering, Summer 2017 – Present

M.S. Students Advised as Chair

9. **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”
 - **Current position:** Ph.D. student in Prof. Berman’s lab (see **Ph.D. Students Advised as Chair**)
8. **Jared Duensing**, Aerospace Engineering, Spring 2015 – Summer 2015
 - **Graduated:** Summer 2015
 - M.S. Applied Project: “Visual Feedback of Quadrotor Systems”
 - **Current position:** Control Systems Engineer at Honeywell Aerospace, Tempe, AZ
7. **Yuan Gao**, Mechanical Engineering, Fall 2015 – Summer 2016
 - **Graduated:** Summer 2016
 - M.S. Applied Project: “Keyboard Playing Mobile Robot”
 - **Current position:** Robotics Engineer at Diverse Automation, Inc., Greer, SC
6. **Vincent Velarde**, Mechanical Engineering, Spring 2016 – Summer 2016
 - **Graduated:** Summer 2016
 - M.S. Applied Project: “Modeling, Control, and Navigation of a Quadrotor”
 - **Current position:** Instructor at Pimentel Academic Services, Phoenix, AZ
5. **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 On-site Engineer, K&A
4. **Vaibhav Deshmukh***, Mechanical Engineering, Fall 2015 – Present
 - M.S. degree expected in Summer 2017
3. **Zz Mae Haggerty***, Mechanical Engineering, Spring 2017 – Present
 - M.S. degree expected in Spring 2018
 - Undergraduate student supervised by Prof. Berman, Summer 2015–Fall 2016 (see **Undergraduate Students Advised as Chair**)
2. **Sri Ram Prasath Ramasubramaniyan**, Aerospace Engineering, Fall 2016 – Present
 - M.S. degree expected in Spring 2018
1. **Rakshith Subramanyam**, Electrical Engineering, Spring 2017 – Present
 - M.S. degree expected in Spring 2018

M.S. Students Advised as Co-Chair

4. **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)
3. **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)
2. **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)
1. **Nirangkush Das**, Mechanical Engineering, Fall 2016 – Present
 - M.S. Committee Co-chair and Primary Advisor: Prof. Armando Rodriguez (ECEE)

M.S. Students Advised as Committee Member

15. **Harshil Patel**, Mechanical Engineering, Spring 2013
 - **Graduated:** Spring 2013
 - M.S. Thesis: “Control of 3D Human Arm Impedance”
14. **Shiba Biswal**, Mechanical Engineering, Summer 2013 – Spring 2015
 - **Graduated:** Spring 2015
 - M.S. Thesis: “Modeling and Control of Flapping Wing Micro Aerial Vehicles”
13. **Aniket Shirsat**, Mechanical Engineering, Summer 2014 – Spring 2015
 - **Graduated:** Spring 2015
 - M.S. Applied Project: “Modeling And Control of a Quadrotor Aircraft UAV”
12. **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”

11. **Daniel Larsson**, Mechanical Engineering, Spring 2016
 - **Graduated:** Spring 2016
 - M.S. Thesis: “Dynamics, Modeling, Simulation and Control of Mid-Flight Coupling of Quadrotors”
10. **Zhichao Li**, Electrical Engineering, Summer 2016
 - **Graduated:** Summer 2016
 - M.S. Thesis: “Modeling and Control of a Longitudinal Platoon of Ground Robotic Vehicles”
9. **Jesus Aldaco Lopez**, Electrical Engineering, Summer 2016
 - **Graduated:** Summer 2016
 - M.S. Thesis: “Image Processing Based Control of Mobile Robotics”
8. **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”
7. **Evgeny Meyer**, Aerospace Engineering, Spring 2015 – Summer 2016
 - **Graduated:** Summer 2016
 - M.S. Thesis: “A Convex Approach for Stability Analysis of Partial Differential Equations”
6. **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”
5. **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”
4. **Yatiraj Shetty**, Mechanical Engineering, Fall 2015 – Fall 2016
 - **Graduated:** Fall 2016
 - M.S. Thesis: “Robust Human Motion Tracking Using Low-Cost Inertial Sensors”
3. **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”
2. **Georgios Konstantinos Karavas**, Mechanical Engineering, Spring 2017 – Summer 2017
 - **Graduated:** Summer 2017
 - M.S. Thesis: “Brain Computer Interfaces for the Control of Robotic Swarms”

1. **Nikhilesh Ravishankar**, Electrical Engineering, Spring 2017 – Summer 2017
 - **Graduated:** Summer 2017
 - **M.S. Thesis:** “Autonomous Quadrotor Navigation by Detecting Vanishing Points in Indoor Environments”

Undergraduate Students Advised as Chair
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12. **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)
11. **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)
10. **Xinyu Wang**, Mechanical Engineering, Fall 2015
 - **Graduated:** Spring 2016
 - **Award:** Fulton Undergraduate Research Initiative research award (Fall 2015)
9. **Zz Mae Haggerty**, Mechanical Engineering, Summer 2015 – Fall 2016
 - **Graduated:** Fall 2016
 - Research volunteer
8. **Zemichael Hailu**, Mechanical Engineering, Spring 2016
 - **Graduated:** Fall 2016
 - Research volunteer
7. **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”
6. **Caleb Peckham**, Mechanical and Aerospace Engineering, Summer 2015
 - **Graduated:** Spring 2017
 - *Home institution:* Princeton University, Princeton, NJ
 - Research volunteer

5. **Felipe Riveros**, Mechanical Engineering, Fall 2016 – Spring 2017
 - **Graduated:** Spring 2017
 - **Award:** Fulton Undergraduate Research Initiative research award (Spring 2017)
 - Research volunteer (Fall 2016)
4. **Anna Lynn Martin**, Mechanical Engineering, Fall 2015 – Present
 - **Award:** NASA Space Grant Undergraduate Fellowships (Fall 2015 - Spring 2016, Fall 2016 - Spring 2017)
3. **Jordan Gisch**, Aeronautical Engineering, Summer 2016 – Present
 - ASU Grand Challenge Scholar
 - Research volunteer
2. **Juan Bahena**, Mechanical Engineering, Fall 2016 – Present
 - **Award:** Fulton Undergraduate Research Initiative research awards (Spring 2017, Fall 2017)
 - Research volunteer (Fall 2016)
1. **Kevin Sidbon**, Software Engineering, Summer 2017 – Present
 - **Award:** Fulton Undergraduate Research Initiative research award (Summer 2017)

Undergraduate Students Advised as Committee Member

3. **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”
2. **Elena Whitton**, Mechanical Engineering, Fall 2014 – Spring 2015
 - **Graduated:** Spring 2015
 - **Barrett Honors Thesis** (Fall 2014 - Spring 2015): “Human Perception of Swarm Behavior”
1. **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”

High School Students Advised

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

Research Staff Advised

2. **Ganesh Peruvemba Kumar***, Assistant Research Scientist, Summer 2016 – Fall 2016
1. **Ruben Gameros***, Research Specialist, Spring 2015 – Fall 2016
 - M.S. student in Mechanical Engineering supervised by Prof. Berman, Summer 2013 – Spring 2015

Teaching

<p><u>Summary of Teaching:</u></p> <p>Undergraduate Courses Taught, including New Course Development: 2</p> <p>Graduate Courses Taught, including New Course Development: 2</p> <p>Average Teaching Evaluation Score for Undergraduate Courses taught at ASU: 4.24 / 5.0</p> <p>Average Teaching Evaluation Score for Graduate Courses taught at ASU: 4.27 / 5.0</p>

- | | |
|-------------|--|
| 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"> • Description: <u>Co-developing a new seminar course</u> that will cover the growing applications of artificial intelligence and study the legal, ethical, and policy implications of these applications. |
| Fall 2017 | <p><i>Instructor, “MAE 318: System Dynamics and Control”</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. |
| Spring 2017 | <p><i>Instructor, “MAE 318: System Dynamics and Control”</i>
Mechanical and Aerospace Engineering, Arizona State University, Tempe, AZ</p> <ul style="list-style-type: none"> • Students registered: 82 • Teaching evaluation score for the instructor (Part 2): 4.56 / 5.0 |
| Fall 2016 | <p><i>Instructor, “MAE 598 - Topic: Multi-Robot Systems”</i>
Mechanical and Aerospace Engineering, Arizona State University, Tempe, AZ</p> <ul style="list-style-type: none"> • Description: <u>Developed a new graduate course</u> 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 | <p><i>Instructor, “ASU 101-MEE: The ASU Experience”</i>
Mechanical 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 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

24. **Development** of a new open-source, open-hardware robot “Pheeno,” Summer 2013 - Present
 - 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 are creating ROS software packages for running both 3D simulations and physical experiments with multiple Pheeno robots.
 - The Pheeno code, design files, circuit board schematics, list of components, and user guides to assembly, calibration, and programming of the robot are available at: <https://acslaboratory.github.io/>
23. **Host**, ACS Lab visit, Arizona State University, scheduled for July 2017
 - Will describe 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 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

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

- 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.
- 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.
- 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.
- 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.

- 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–
Aug.'17
- 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.
- 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.