

Dr. Fumin Zhang

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APPOINTMENTS

Professor, Georgia Institute of Technology, Atlanta, GA 2017-present

Associate Professor, Georgia Institute of Technology, Atlanta, GA 2013-2016

Tenured position in the School of Electrical and Computer Engineering.

Assistant Professor, Georgia Institute of Technology, Atlanta, GA 2007-2013

Tenure track position in the School of Electrical and Computer Engineering.

Postdoctoral Research Associate and Lecturer, Princeton University, Princeton, NJ 2004-2007

Performed research in the Department of Mechanical and Aerospace Engineering. Taught both undergraduate and graduate courses.

EDUCATION

University of Maryland, College Park	Electrical & Computer Engineering	PhD	2004
Tsinghua University, Beijing, China	Electrical Engineering	MS	1998
Tsinghua University, Beijing, China	Electrical Engineering	BS	1995

HONORS AND AWARDS

Distinguished Lecturer on Cyber-Systems and Control, 2011

Awarded by Zhejiang University, China, for scholarly achievements in cyber-physical systems theory.

Roger P. Webb Outstanding Junior Faculty Award, 2011

Awarded by School of Electrical and Computer Engineering, Georgia Tech, for academic achievements.

ONR Young Investigator Program (YIP) Award, 2010

Awarded by the Office of Naval Research (ONR) for research in marine autonomy and environmental modeling.

Lockheed Inspirational Young Faculty Award, 2010.

Awarded by Georgia Tech for teaching and outreach activities performed at the Savannah Campus.

NSF CAREER Award, 2009

Awarded by the National Science Foundation (NSF) for research in the foundations of cyber-physical systems theory.

GRANTS AND CONTRACTS

[1] ONR: Automation Middleware and Algorithms for Robotic Underwater Sensor Networks. June 1st, 2008-May 30th, 2011, single PI, amount: \$298,979.

[2] NSF SGER: Feasible control tasks on battery powered embedded computers. September 1st, 2008-August 31st, 2009, single PI, amount \$74,998.

- [3] GT FRP: Research Focus Program in Amphibious Robotics. May 1st, 2008-April 30th, 2009, PI, amount \$15,000, total \$30,000.
- [4] ONR: Bio-Inspired Autonomous Control for Optimal Exploration and Exploitation in Marine Environments. July 1st, 2009-June 30th, 2014, PI, amount \$638,791, subcontract from Princeton University.
- [5] NSF CPS: MPSoC based Control and Scheduling Co-design for Battery Powered Cyber-Physical System. September 1st, 2009-August 31st, 2012, PI, amount \$225,000, total \$450,000.
- [6] NSF CAREER: Feasibility of Control Tasks-Towards Control-Computing-Power Co-design. September 1st, 2009-August 31st, 2014, Single PI, amount \$400,000.
- [7] ONR YIP: Generic Environment Models (GEMs) for Agile Marine Autonomy. June 1st, 2010-May 31st, 2013, Single PI, amount \$510,000.
- [8] NSF: Collaborative Research: Mechanisms of Nutrient Input at the Shelf Margin Supporting Persistent Winter Phytoplankton Blooms Downstream of the Charleston Bump. October 15th, 2010-October 14th, 2013, PI, amount \$112,238, subcontract from Skidaway Institute of Oceanography.
- [9] NSF: Collaborative Research: RAPID: Autonomous Control and Sensing Algorithms for Surveying the Impacts of Oil Spills on Coastal Environments. August 15th, 2010-August 14th, 2011, Co-PI, amount \$50,441, total, \$100,000.
- [10] Exelis Inc.: Tools, Languages and Methods for Distributed Systems Coordination. August 16th, 2012-June 30th, 2014, PI, amount \$120,000.
- [11] NASA JPL: Maximization of Data Rate in a Free Space Optical Communication System. November 1st, 2013-June 30th, 2014, PI, amount \$42,028.
- [12] NSF: Collaborative Research: Bio-inspired Collaborative Sensing with Novel Gliding Robotic Fish. June 16th, 2013-June 15th, 2016. Co-PI, amount \$242,676, total, \$500,000.
- [13] NSF: Collaborative Research: Robustness of Networked Model Predictive Control under Scheduling Constraints. Sept 1st, 2014-August 31st, 2017, Co-PI, amount \$280,072, total 500,000.
- [14] ONR: Bio-Inspired Scalable Collaboration of Autonomous Vehicles that Sense, Learn and Decide. July 1st, 2014-June 30th, 2018, Subcontracting from Princeton University, PI, amount \$569,500.
- [15] NSF: Collaborative Research: Collaborative Research: Processes driving Exchange At Cape Hatteras (PEACH). April 1st, 2016-March 31st, 2020, Subcontract from University of Georgia, PI, amount \$224,369.
- [16] ONR: Scanning the Ocean with Motion Tomography. June 1st, 2016-May 30th, 2019, PI, amount \$450,000.
- [17] Southeast Coastal Ocean Observing Regional Association (SECOORA): Regional Glider Observatory NOAA/IOOS. July 1st, 2016-June 30th, 2021, Co-PI, amount (20%) \$103,160.

SCHOLARLY ACCOMPLISHMENTS

Journal Publications:

- [1] F. Zhang and P. S. Krishnaprasad, "Co-ordinated Orbit Transfer of Satellite Clusters," *Astrodynamics, Space Missions, and Chaos, Annals of the New York Academy of Sciences* 1017:112-137, 2004.

- [2] F. Zhang and N. E. Leonard, "Coordinated Patterns of Unit Speed Particles on a Closed Curve," *Systems & Control Letters* 56(6): 397-407, 2007.
- [3] F. Zhang, D. M. Fratantoni, D. Paley, J. Lund and N.E. Leonard, "Control of Coordinated Patterns for Ocean Sampling," *International Journal of Control* 80(7): 1186-1199, 2007.
- [4] D. Paley, F. Zhang, and N. E. Leonard, "Cooperative Control for Ocean Sampling: The Glider Coordinated Control System," *IEEE Transactions on Control Systems Technology*, 16(4): 735-744, 2008.
- [5] J. Kim, F. Zhang, and M. Egerstedt, "Curve Tracking Control for Autonomous Vehicles with Rigidly Mounted Range Sensors," *Journal of Intelligent and Robotic Systems*, 56(1-2): 177-197, 2009.
- [6] F. Zhang and N. E. Leonard, "Cooperative Control and Filtering for Cooperative Exploration," *IEEE Transactions on Automatic Control*, 55(3): 650-663, 2010.
- [7] F. Zhang, "Geometric Cooperative Control of Particle Formations," *IEEE Transactions on Automatic Control*, 55(3): 800-803, 2010.
- [8] J. Kim, F. Zhang, and M. Egerstedt, "A Provably Complete Exploration Strategy by Constructing Voronoi Diagrams," *Autonomous Robots* 29(3): 367-380, 2010.
- [9] N. E. Leonard, D. A. Paley, R. E. Davis, D. M. Fratantoni, F. Lekien, and F. Zhang "Coordinated Control of an Underwater Glider Fleet in an Adaptive Ocean Sampling Field Experiment in Monterey Bay," *Journal of Field Robotics* 27(6): 718-740, 2010.
- [10] W. Wu and F. Zhang, "Cooperative Exploration of Level Surfaces of Three Dimensional Scalar Fields," *Automatica, the IFAC Journal* 47(9): 2044-2051, 2011.
- [11] M. Malisoff, F. Mazenc, and F. Zhang, "Stability and Robustness Analysis for Curve Tracking Control using Input-to-State Stability," *IEEE Transactions on Automatic Control*, 57(5):1320-1326, 2012.
- [12] H. Yang and F. Zhang, "Robust Control of Formation Dynamics for Autonomous Underwater Vehicles in Horizontal Plane," *ASME Journal of Dynamic Systems, Measurement and Control*, 134(3): 031009 (7 pages), 2012.
- [13] W. Wu and F. Zhang, "Robust Cooperative Exploration with a Switching Strategy," *IEEE Transactions on Robotics*, 28(4):828-839, 2012.
- [14] S. Zhang, J. Yu, A. Zhang, and F. Zhang, "Spiraling Motion of Underwater Gliders: Modeling, Analysis, and Experimental Results," *Ocean Engineering*, 60: 1-13, 2013.
- [15] J. Yu, F. Zhang, A. Zhang, W. Jin, and Y. Tian, "Motion Parameter Optimization and Sensor Scheduling for the Sea-Wing Underwater Glider," *IEEE Journal of Oceanic Engineering*, 38(2):243-254, 2013.
- [16] W. Wu and F. Zhang, "A Switching Strategy for Target Tracking by Mobile Sensing Agents," *Journal of Communications*, 8(1):47-54, 2013.
- [17] F. Zhang, Z. Shi, and S. Mukhopadhyay, "Robustness Analysis of Battery Supported Cyber-Physical Systems," *ACM Transactions on Embedded Computing Systems*, 12(3):69.1-27, 2013.
- [18] M. Malisoff and F. Zhang, "Adaptive Control for Curve Tracking under Controller Uncertainty," *Automatica, the IFAC Journal*, 49(5):1411-1418, 2013.
- [19] H. Yang, C. Wang and F. Zhang, "A Decoupled Controller Design Approach for Formation Control of Autonomous Underwater Vehicles with Time Delays," *IET Control Theory & Applications*, 7(15):1950-1958, 2013.

- [20] K. Szwaykowska and F. Zhang, "Trend and Bounds for Error Growth in Controlled Lagrangian Particle Tracking," *IEEE Journal of Oceanic Engineering*, 39(1): 10-25, 2014.
- [21] S. Mukhopadhyay and F. Zhang, "A High-Gain Adaptive Observer for Detecting Li-Ion Battery Terminal Voltage Collapse," *Automatica, the IFAC Journal*, 50(3): 896-902, 2014.
- [22] F. Zhang, Fumin Zhang, and X-B. Tan, "Tail-enabled Spiraling Maneuver for Gliding Robotic Fish," *ASME Journal of Dynamic Systems, Measurement and Control*, 136(4): 041028, 2014.
- [23] C. Wang, F. Zhang, and D. Schaefer, "Dynamic Modeling of an Autonomous Underwater Vehicle," *Springer Journal of Marine Science and Technology*, 20(2):199-212, 2015.
- [24] D. Chang, C. R. Edwards, and F. Zhang, "Real-Time Guidance of Underwater Gliders Assisted by Predictive Ocean Models," *Journal of Atmospheric and Oceanic Technology*, 32(3):562-578, 2015.
- [25] F. Zhang, G. Marani, R. N. Smith, and H. T. Choi, "Future Trends in Marine Robotics," *IEEE Robotics and Automation Magazine*, 22(1):14-122, 2015.
- [26] M. Malisoff and F. Zhang, "Robustness of Adaptive Control under Time Delays for Three-Dimensional Curve Tracking," *SIAM Journal on Control and Optimization*, 53(4):2203-2236, 2015.
- [27] X. Wang, Z. Shi, F. Zhang and Y. Wang, "Dynamic Real-time Scheduling for Human-agent Collaboration Systems Based on Mutual Trust," *Cyber-Physical Systems*, 1(2-4):76-90, 2015.
- [28] W. Wu and F. Zhang, "A Speeding-up and Slowing-down Strategy for Distributed Source Seeking with Robustness Analysis," *IEEE Transactions on Control of Networked Systems*, 3(3):231-240, 2016.
- [29] Z. Chen, J. Yu, A. Zhang, and F. Zhang, "Design and Analysis of Folding Propulsion Mechanism for Hybrid-Driven Underwater Gliders," *Ocean Engineering*, 119:125-134, 2016.
- [30] F. Zhang, "Cyber-Maritime Cycle: Autonomy of Marine Robots for Ocean Sensing", *Foundations and Trends in Robotics*, 5(1): 1-115, 2016.
- [31] M. Malisoff, R. Sizemore, and F. Zhang, "Adaptive Planar Curve Tracking Control and Robustness Analysis under State Constraints and Unknown Curvature," *Automatica*, 75(1):133-143, 2017.
- [32] J. P. Varnell, M. Malisoff and F. Zhang, "Stability and Robustness Analysis for Human Pointing Motions with Acceleration under Feedback Delays," *International Journal of Robust and Nonlinear Control*, 27(5)703-721, 2017.
- [33] D. Chang, W. Wu, C. R. Edwards, and F. Zhang, "Motion Tomography: Mapping Flow Fields Using Autonomous Underwater Vehicles," *International Journal of Robotics Research*, Letter of acceptance received April 6, 2016.
- [34] Z. Shi and F. Zhang, "Model Predictive Control under Timing Constraints induced by Controller Area Networks," *Real Time Systems*, 53(2):196-227, 2017.

Book Chapters

- [1] F. Zhang, E. W. Justh, and P. S. Krishnaprasad, "Boundary Tracking and Obstacle Avoidance Using Gyroscopic Control," *Recent Trends in Dynamical Systems*, Springer Proceedings in Mathematics & Statistics, Volume 35, 417-446, 2013.
- [2] D. Chang, X. Liang, W. Wu, C. R. Edwards, and F. Zhang, "Real-Time Modeling of Ocean Currents for Navigating Underwater Glider Sensing Networks," *Cooperative Robots and Sensor Networks*, Studies in Computational Intelligence, Volume 507, 61-75, 2014.

[3] S. Mukhopadhyay, C. Wang, M. Patterson, M. Malisoff, and F. Zhang, "Collaborative Autonomous Surveys in Marine Environments Affected by Oil Spills," *Cooperative Robots and Sensor Networks*, Studies in Computational Intelligence, Volume 554, 87-113, 2014.

[4] Y. Wang, Z. Shi, C. Wang, and F. Zhang, "Human-Robot Mutual Trust in (Semi)autonomous Underwater Robots," *Cooperative Robots and Sensor Networks*, Studies in Computational Intelligence, Volume 554, 115-137, 2014.

[5] Z. Shi, N. Yao, and F. Zhang, "Scheduling Feasibility of Energy Management in Micro-grids Based on Significant Moment Analysis," in *Cyber-Physical Systems: Foundations, Principles and Applications*, edited by H. Song, D. B. Rawat, S. Jeschke and C. Brecher, 431-450, Elsevier, 2017.

Patents

[1] S. Mukhopadhyay and F. Zhang, "Battery Failure Detection Using Universal Adaptive Stabilization," Provisional patent (61/567,903) filed on December 7th, 2011.

Edited Books

[1] Y. Wang and F. Zhang (edit), *Trends in Control and Decision-Making for Human-Robot Collaboration Systems*, Springer, in print, 2016.

Computer Science Premium Conferences

[1] F. Zhang, K. Szwaykowska, V. Mooney, and W. Wolf, "Task Scheduling for Control Oriented Requirements for Cyber-Physical Systems," in *Proc. of IEEE Real-Time Systems Symposium (RTSS 2008)*, 47-56, 2008.

[2] X. Liang, W. Wu, D. Chang, F. Zhang, "Real-time Modelling of Tidal Current for Navigating Underwater Glider Sensing Networks," *Procedia Computer Science*, 10:1121-1126, 2012.

[3] Z. Shi, and F. Zhang, "An Analytical Model of the CAN Bus for Online Schedulability Test," in *Proc. of the 3rd Analytic Virtual Integration of Cyber-Physical Systems Workshop (AVICPS), held in conjunction with the 33rd IEEE Real-Time Systems Symposium (RTSS2012)*, Puerto Rico, 2012.

[4] Z. Shi and F. Zhang, "Predicting Time-Delays under Real-time Scheduling for Linear Model Predictive Control," in *Proc. 2013 International Conference on Computing, Networking and Communication Workshops: the International Workshop on Cyber-Physical System (CPS) and Its Computing and Network Design*, 205-209, 2012.

[5] W. Wu, D. Chang, and F. Zhang, "Glider CT: Reconstructing Flow Fields from Predicted Motion of Underwater Gliders," in *Proc. the 8th ACM International Conference on Underwater Networks & Systems*, Article no. 47, Kaohsiung, Taiwan, 2013.

[6] S. Liu, J. Yu, A. Zhang and F. Zhang, "Cooperative Path Planning for Networked Gliders under Weak Communication," in *Proc. the 9th ACM International Conference on Underwater Networks & Systems*, Article no. 5, Rome, Italy, 2014.

[7] W. Wu, A. Song, P. Varnell and F. Zhang, "Cooperatively Mapping of the Underwater Acoustic Channel by Robot Swarms," in *Proc. the 9th ACM International Conference on Underwater Networks & Systems*, Article no. 20, Rome, Italy, 2014.

[8] S. Cho, and F. Zhang, "Localization of Autonomous Underwater Vehicles Incorporating Flow Models and Acoustic Detection," in *Proceedings of the 10th ACM International Conference on Underwater Networks and Systems (WuWNet'15)*, Article no. 34, Washington DC, USA, October 22-24, 2015.

[9] S. Cho, and F. Zhang, "An adaptive control law for controlled Lagrangian particle tracking," in *Proceedings of the 11th ACM International Conference on Underwater Networks and Systems (WuWNet'16)*, Article no. 11, Shanghai, China, October 24-26, 2016.

Engineering Conferences

[1] F. Zhang, J. Chen, Z. Wang, and Y. Han, "Fault Recognition of A 20 MVAR Statcom Main Circuit Using Artificial Neural Network," in *Proc. 33rd Intersociety Energy Conversion Engineering Conference (IECEC 98)*-98-1164, 1998.

[2] F. Zhang and P. S. Krishnaprasad, "Coordinated Orbit Transfer of Satellite Clusters," in *Proc. of 41st IEEE Conference on Decision and Control (CDC 2002)*, 4095-4100, 2002.

[3] F. Zhang and P. S. Krishnaprasad, "Formation Dynamics under a Class of Control Laws," in *Proc. of 2002 American Control Conference (ACC 2002)*, 1678-1685, 2002.

[4] F. Zhang, M. Goldgeier, and P. S. Krishnaprasad, "Control of Small Formations using Shape Coordinates," in *Proc. of 2003 IEEE International Conference on Robotics and Automation (ICRA 2003)*, 2510-2515, 2003.

[5] F. Zhang, A. O'Connor, D. Luebke, and P.S. Krishnaprasad, "Experimental Study of Curvature-based Control Laws for Obstacle Avoidance," in *Proc. of 2004 IEEE International Conference on Robotics and Automation (ICRA 2004)*, 3849-3854, 2004.

[6] F. Zhang, E. Justh, and P. S. Krishnaprasad, "Boundary Following using Gyroscopic Control," in *Proc. of 43rd IEEE Conference on Decision and Control (CDC 2004)*, 5204-5209, 2004.

[7] F. Zhang, and N. E. Leonard, "Generating Contour Plots Using Multiple Sensor Platforms," in *Proc. of 2005 IEEE Swarm Intelligence Symposium (SIS 2005)*, 309-316, 2005.

[8] P. Bhatta, E. Fiorelli, F. Lekien, N. E. Leonard, D. A. Paley, F. Zhang, R. Bachmayer, R. E. Davis, D. M. Fratantoni, and R. Sepulchre, "Coordination of an Underwater Glider Fleet for Adaptive Ocean Sampling," in *Proc. Int. Workshop on Underwater Robotics for Sustainable Management of Marine Ecosystems and Environmental Monitoring*, 61-69, 2005.

[9] F. Zhang and N. E. Leonard, "Coordinated Patterns on Smooth Curves," in *Proc. of 2006 IEEE International Conference on Networking, Sensing and Control (ICNSC 2006)*, 434-439, 2006.

[10] F. Zhang, "Curve Tracking Control for Legged Locomotion," in *Proc. of 2007 American Control Conference (ACC 2007)*, 2836-2841, 2007.

[11] F. Zhang, "Cooperative Shape Control of Particle Formations," in *Proc. of 46th IEEE Conference on Decision and Control (CDC 2007)*, 2516-2521, 2007.

[12] F. Zhang, E. Fiorelli, and N. E. Leonard, "Exploring Scalar Fields Using Multiple Sensor Platforms: Tracking Level Curves," in *Proc. of 46th IEEE Conference on Decision and Control (CDC 2007)*, 3579-3584, 2007.

[13] F. Zhang and N. E. Leonard, "A Controller Design Method Under Infrequent, Asynchronous Sensing," *Lecture Notes in Computer Science 4416: 790-794*, Springer, 2007.

[14] F. Zhang and S. Haq, "Boundary Following by Robot Formations without GPS," in *Proc. of 2008 International Conference on Robotics and Automation (ICRA 2008)*, 152-157, 2008.

[15] F. Zhang and N.E. Leonard, "Cooperative Kalman Filters for Cooperative Exploration," in *Proc. of 2008 American Control Conference (ACC 2008)*, 2654-2659, 2008.

- [16] J. Kim, F. Zhang, and M. Egerstedt, "Curve Tracking Control for Autonomous Vehicles with Rigidly Mounted Range Sensors," in *Proc. of 47th IEEE Conference on Decision and Control (CDC 2008)*, 5036-5041, 2008.
- [17] F. Zhang, Z. Shi, and W. Wolf, "A Dynamic Battery Model for Co-design in Cyber-physical systems," in *Proc. of 2nd International Workshop on Cyber-Physical Systems (WCPS 2009)*, 51-56, 2009.
- [18] K. Szwajkowska, F. Zhang, and W. Wolf, "Tracking Performance under Time Delay and Asynchronicity in Distributed Camera Systems," in *Proc. of American Control Conferences (ACC 2009)*, 4886-4891, 2009.
- [19] J. Kim, F. Zhang, and M. Egerstedt, "An Exploration Strategy based on Construction of Voronoi Diagrams," in *Proc. 48th IEEE Conference on Decision and Control (CDC 2009)*, 7024-7029, 2009.
- [20] F. Zhang, and Z. Shi, "Optimal and Adaptive Battery Discharge Strategies for Cyber-Physical Systems," in *Proc. 48th IEEE Conference on Decision and Control (CDC 2009)*, 6232-6237, 2009.
- [21] J. Kim, F. Zhang and M. Egerstedt, "Simultaneous Cooperative Exploration and Networking Based on Voronoi Diagrams," in *Proc. 2009 IFAC Workshop on Networked Robotics*, 1-6, 2009.
- [22] H. Yang and F. Zhang, "Geometric Formation Control for Autonomous Underwater Vehicles," in *Proc. 2010 IEEE Conference on Robotics and Automation (ICRA 2010)*, 4288-4293, 2010.
- [23] W. Wu and F. Zhang, "Curvature Based Cooperative Exploration of Three Dimensional Scalar Fields," in *Proc. 2010 American Control Conferences (ACC 2010)*, 2909-2915, 2010.
- [24] J. Kim, F. Zhang and M. Egerstedt, "Battery Level Estimation for Mobile Agents Under Communication Constraints," in *Proc. 3rd IEEE International Conference on Sensor Networks, Ubiquitous, and Trustworthy Computing (SUTC 2010)*, 291-295, 2010.
- [25] W. Wu and F. Zhang, "A Switching Strategy for Robust Cooperative Exploration," in *Proc. 49th IEEE Conference on Decision and Control (CDC 2010)*, 5493-5498, 2010.
- [26] K. Szwajkowska and F. Zhang, "A Lower Bound for Controlled Lagrangian Particle Tracking Error," in *Proc. 49th IEEE Conference on Decision and Control (CDC 2010)*, 4353-4358, 2010.
- [27] H. Yang and F. Zhang, "Robust Control of Horizontal Formation Dynamics for Autonomous Underwater Vehicles," in *Proc. 2011 IEEE Conference on Robotics and Automation (ICRA 2011)*, 3364-3369, 2011.
- [28] S. Zhang, J. Yu, A. Zhang, and F. Zhang, "Steady Three Dimensional Gliding Motion of an Underwater Glider," in *Proc. 2011 IEEE Conference on Robotics and Automation (ICRA 2011)*, 2392-2397, 2011.
- [29] W. Wu and F. Zhang, "Experimental Validation of Source Seeking with a Switching Strategy," in *Proc. 2011 IEEE Conference on Robotics and Automation (ICRA 2011)*, 3835-3840, 2011.
- [30] M. Malisoff, F. Mazenc, and F. Zhang, "Input-to-State Stability for Curve Tracking Control: A Constructive Approach," in *Proc. 2011 American Control Conference (ACC 2011)*, 1984-1989, 2011.
- [31] D. Chang, F. Zhang, and M. West, "Diagnosis and Prognosis of Scrubber Faults for Underwater Rebreathers based on Stochastic Event Models," in *Proc. 2011 IEEE International Conference on Prognostics and Health Management (PHM 2011)*, 2011.
- [32] K. Szwajkowska and F. Zhang, "A Lower Bound on Navigation Error for Marine Robots Guided by Ocean Circulation Models," in *Proc. 2011 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2011)*, 3583-3588, 2011.

- [33] J. Kim, S. Maxon, M. Egerstedt, and F. Zhang, "Intruder Capturing Game on a Topological Map Assisted by Information Networks," in *Proc. 2011 IEEE International Conference on Decision and Control (CDC 2011)*, 6266-6271, 2011.
- [34] W. Wu and F. Zhang, "Explorability of Noisy Scalar Fields," in *Proc. 50th IEEE International Conference on Decision and Control (CDC 2011)*, 6439-6444, 2011.
- [35] M. Malisoff and F. Zhang, "Adaptive Controllers and Robustness Analysis for Curve Tracking with Unknown Control Gains," in *Proc. 2012 American Control Conference (ACC 2012)*, 344-349, 2012.
- [36] W. Wu, I. D. Couzin, and F. Zhang, "Bio-inspired Source Seeking with no Explicit Gradient Estimation" in *Proc. 3rd IFAC Workshop on Distributed Estimation and Control in Networked Systems (NecSys'12)*, 240-245, 2012.
- [37] F-T. Zhang, F. Zhang, and X-B. Tan, "Steady Spiraling Motion of Gliding Robotic Fish," in *Proc. 2012 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2012)*, 1754-1759, 2012.
- [38] S. Mukhopadhyay, C. Wang, S. Bradshaw, S. Maxon, M. Patterson, and F. Zhang, "Controller Performance of Marine Robots in Reminiscent Oil Surveys," in *Proc. 2012 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2012)*, 1766-1771, 2012.
- [39] W. Wu and F. Zhang, "Coherent Steps of Mobile Sensing Agents in Gaussian Scalar Fields," in *Proc. 51st IEEE International Conference on Decision and Control (CDC 2012)*, 2814-2819, 2012.
- [40] S. Mukhopadhyay and F. Zhang, "Adaptive Detection of Terminal Voltage Collapses for Li-Ion Batteries," in *Proc. 51st IEEE International Conference on Decision and Control (CDC 2012)*, 4799-4804, 2012.
- [41] D. Chang, W. Wu, D. Webster, M. Weissburg, and F. Zhang, "A Bio-inspired Plume Tracking Algorithm for Mobile Sensing Swarms in Turbulent Flow," in *Proc. 2013 IEEE International Conference on Robotics and Automation (ICRA 2013)*, 921-926, May, 2013.
- [42] K. Szwajkowska and F. Zhang, "Controlled Lagrangian Particle Tracking Error Under Biased Flow Prediction," in *Proc. 2013 American Control Conference (ACC 2013)*, 2581-2586, June, 2013.
- [43] H. Yang, C. Wang, and F. Zhang, "Robust Geometric Formation Control of Multiple Autonomous Underwater Vehicles with Time Delays," in *Proc. 2013 American Control Conference (ACC 2013)*, June, 1382-1387, 2013.
- [44] M. Malisoff and F. Zhang, "Robustness of a Class of Three-Dimensional Curve Tracking Control Laws under Time Delays and Polygonal State Constraints," *Proc. 2013 American Control Conference (ACC 2013)*, 5710-5715, June, 2013.
- [45] W. Wu, F. Zhang, and Y. Wardi, "Energy-Information Tradeoffs in Motion and Sensing for Target Localization," *Proc. of 2013 European Control Conference (ECC 2013)*, 1250-1255, July, 2013.
- [46] P. Varnell and F. Zhang, "Dissipativity-Based Teleoperation with Time-Varying Communication Delays," *Proc. 4th IFAC Workshop on Distributed Estimation and Control in Networked Systems (NecSys'13)*, 369-376, Sept, 2013.
- [47] W. Wu, D. Chang, and F. Zhang, "A Bio-inspired 3D Plume Tracking Strategy Using Mobile Sensor Networks", in *Proc. of 52nd IEEE Conference on Decision and Control (CDC 2013)*, 4571-4578, Dec, 2013.
- [48] M. Malisoff and F. Zhang, "An Adaptive Control Design for 3D Curve Tracking based on Robust Forward Invariance," in *Proc. of 52nd IEEE Conference on Decision and Control (CDC 2013)*, 4473-4478, Dec, 2013.

- [49] S. Mukhopadhyay and F. Zhang, "A Path Planning Approach to Compute the Smallest Robust Forward Invariant Sets," in *Proc. of 2014 American Control Conference (ACC 2014)*, 1851-1856, June, 2014.
- [50] H. Zhang, F. Zhang, Q. Hui, "A speed-up and speed-down strategy for swarm optimization," in *Proc. of 2014 conference on Genetic and evolutionary computation (GECCO2014)*, 1481-1482, July, 2014.
- [51] D. Chang, W. Wu, and F. Zhang, "Glider CT: Analysis and Experimental Validation," in *Proc. of the 12th International Symposium on Distributed Autonomous Robotic Systems (DARS 2014)*, 196-209, Nov, 2014.
- [52] W. Wu, F. Zhang, and Y. Wardi, "Target Localization: Energy-Information Trade-offs using Mobile Sensor Networks," in *Proc. of 53rd IEEE Conference on Decision and Control (CDC 2014)*, 2944-2949, Dec, 2014.
- [53] S. Mukhopadhyay, F. Zhang, E. Warren, and C. Payne, "A Model for Controlling the Resting Membrane Potential of Cells using Nanoparticles," in *Proc. of 53rd IEEE Conference on Decision and Control (CDC2014)*, 6017-6022, Dec, 2014.
- [54] X. Wang, Z. Shi, F. Zhang, and Y. Wang, "Mutual Trust Based Scheduling for (Semi)autonomous Multi-agent Systems," in *Proc. of 2015 American Control Conference (ACC2015)*, 459-464, July, 2015.
- [55] Y. Tian, W. Li, and F. Zhang, "Moth-inspired plume tracing via autonomous underwater vehicle with only a pair of separated chemical sensors," in *Proc. of IEEE/MTS Oceans 2015*, (8 pages), Washington D.C., October, 2015.
- [56] J. P. Varnell and F. Zhang, "Characteristics of Human Pointing Motions with Acceleration," in *Proc. of 54th IEEE Conference on Decision and Control (CDC2015)*, 5364-5369, December, 2015.
- [57] J. Sun, S. Liu, J. Yu, A. Zhang and F. Zhang, "Localization of underwater gliders with acoustic travel-time in an observation network," in *Proc. of IEEE/MTS Oceans 2016*, (5 pages), Shanghai, China, April, 2016.
- [58] D. Chang and F. Zhang, "Distributed motion tomography for time-varying flow fields," in *Proc. of IEEE/MTS Oceans 2016*, (7 pages), Shanghai, China, April, 2016.
- [59] S. Fan, W. Xu, Z. Chen, and F. Zhang, "Nonlinear observer design for current estimation based on underwater vehicle dynamic model," in *Proc. of IEEE/MTS Oceans 2016*, (5 pages), Shanghai, China, April, 2016.
- [60] S. Liu, J. Sun, J. Yu, A. Zhang and F. Zhang, "Sampling optimization for networked underwater gliders," in *Proc. of IEEE/MTS Oceans 2016*, (4 pages), Shanghai, China, April, 2016.
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- [70] J. You, Y. Zhang, M. Li, K. Su, F. Zhang and W. Wu, "Cooperative Parameter Identification of Advection-diffusion Processes Using a Mobile Sensor Network," in *Proc. 2017 American Control Conference*, Seattle, WA, 2017.
- [71] C. Young, A. Khan and F. Zhang, "Adaptiveness and Consistency of Expert based Learning Algorithms Selecting Reactions to Human Movements," in *Proc. 2017 American Control Conference*, Seattle, WA, 2017.
- [72] V. Mishra and F. Zhang, "Explorability of a Turbulent Scalar Field," in *Proc. 2017 American Control Conference*, Seattle, WA, 2017.
- [73] N. Yao, M. Malisoff and F. Zhang, "Contention Resolving Optimal Priority Assignment for Event-Triggered Model Predictive Controllers," in *Proc. 2017 American Control Conference*, Seattle, WA, 2017.
- [74] N. Yao, E. Anaya, Q. Tao, S. Cho, H. Zheng and F. Zhang, "Monocular Vision-based Human Following on Miniature Robotic Blimp," in *Proc. 2017 IEEE International Conference on Robotics and Automation*, Singapore, 2017

INVITED TALKS

Keynote Speech

- [1] "Control and Sensing Co-Design for Maritime Robotic Sensor Networks," *4th International Workshop on Wireless Networking and Control for Unmanned Autonomous Vehicles*, December 9th, 2013.

Recent Seminars (Since 2015)

- [1] "Cyber Physical Systems," School of Electrical Engineering, Sichuan University, China, Oct, 2015.
- [2] "Bio-Inspired Autonomy" School of Mechanical Engineering, Shenzhen University, China, Oct, 2015.
- [3] "Bio-Inspired Marine Autonomy" School of Electrical Engineering, Zhejiang Oceanic University, China, Oct, 2015.
- [4] "Bio-Inspired Autonomy" School of Electrical Engineering, South China University of Science and Technology, China, Oct, 2015.
- [5] "Motion Tomography and Collective Mobile Sensing in the Ocean," School of Electrical and Computer Engineering, University of Alabama, Nov. 2016.
- [6] "Networked Mobile Sensing in Marine Environments," Full day tutorial at IEEE/MTS Oceans 16, Shanghai, China, April 10th, 2016.

EDUCATIONAL ACCOMPLISHMENTS

Individual Student Guidance

1. Graduated 7 Ph.D. and 5 Masters. Advising 11 Ph.D. students.
2. Individual guidance for 50 undergraduate students who have received BS degrees.
Advising 15 undergraduate students for research projects.

Courses Taught

ECE4560 Introduction to Automation and Robotics (undergraduate).
ECE6558 Stochastic Systems and Control (graduate).
ECE3085 Introduction to Systems and Control (undergraduate).
ECE6562 Control of Robotic Systems (graduate)
ECE6559 Advanced Linear Systems (graduate)

SERVICE

Professional Contributions

1. *Chair* for Technical Committee on Control and Robotics, IEEE Control Systems Society 2012-2016.
Associate Chair for Marine Robotics Technical Committee, IEEE Robotics and Automation Society 2010-present.
2. *Local Arrangements Chair* for 2010 IEEE Conference on Decision and Control (CDC 2010) in Atlanta.
Publication Chair for 2014 American Control Conference (ACC 2014) in Portland.
Program Chair for 9th ACM International Conference on Underwater Networks & Systems (WuWNet'14) in Rome, Italy.
3. *Deputy Editor in Chief* for Cyber Physical Systems Journal
Associate Editor for Robotic and Automation Letters
Associate Editor for Conference Editorial Board of IEEE Control Systems Society.
Associate Editors for IEEE International Conference on Robotics and Automation (ICRA 2010-2016), and IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2011).
4. *Program committee*: Robosense 2012, 2013, IEEE ICNC 2013 CPS workshop, American Control Conference (since 2012), IEEE CDC (since 2013). ACM/IEEE ICCPS (since 2013).

Campus Contributions

1. Member of the ECE Student-Faculty Committee, 2008-2010.
2. Member of the ECE Faculty Honor Committee, 2010-2011.
3. Member of the Advanced Center for Embedded Systems (ACES), 2008-present.
4. Member of the Interdisciplinary Robotics PhD Program, 2008-present.
5. PhD proposal committees and thesis defense committees for a number PhD students.