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

Best Paper Award, WUWNet 2018
13th ACM International Conference on Underwater Networks and Systems (WUWNet'18), Article no. 5, Shenzhen, China, December 3-5, 2018.

Hesburgh Award Teaching Fellow, 2017
Awarded by Georgia Institute of Technology for Excellence in Teaching.

Roger P. Webb ECE Outreach Award, 2017
Awarded by School of Electrical and Computer Engineering, Georgia Tech, for significant participation of outreach activities.

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 $103,160.

[18] NRL: Communications Architecture for Distributed Multi-Agent Control. Nov. 4th, 2016-Dec. 1sth, 2018, PI, $153,669.

[19] NRL: Coherence and Decoherence of Patterns in Swarms with Potential Collisions. October 1st, 2018-September 30th, 2019, PI, amount $175,000.

[20] NSF: I-Corps: Autonomous Indoor Blimps as Data Terminal for Internet of Things, April 15th, 2018-Dec. 31st, 2018, PI, amount $50,000.

[21] NSF: MRI: Development of an Underwater Mobile Testbed using a Software-Defined Networking Architecture, Sept. 1st, 2018-Aug. 31st, 2021, Co-PI, amount $54,000.

[22] ONR: Stochastic Distributed Optimal Dual Control: A Unified Framework for Decentralized Multi-agent Perception and Planning (SDODC) , July 15th, 2018-July 14th, 2022, total $1,855,876, PI amount, $600,000.

[23] NSF: SAS: Goal-Driven Marine Autonomy with Application to Fisheries Science and Management, Jan 1st, 2019-Dec. 31st, 2022, PI amount, $225,000.

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 Filters and Control 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 Planar 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,*36(3): 320-336, 2017.

[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.

[35] K. Szwaykowska and F. Zhang, "Controlled Lagrangian Particle Tracking: Error Growth Under Feedback Control," *IEEE Transactions on Control Systems Technology*, 26(3): 874-889, 2018.

[36] S. Liu, J. Sun, J. Yu, A. Zhang, and F. Zhang, "Distributed Traversability Analysis of Flow Field Under Communication Constraints," *IEEE Journal of Oceanic Engineering*, 44(3):683-692, 2019.

[37] Q. Tao, Y. Zhou, F. Tong, A. Song, and F. Zhang, "Evaluating Acoustic Communication Performance of Micro Autonomous Underwater Vehicles in Confined Space," *Frontiers of Information Technology & Electronic Engineering*, Springer, 19(8):1013-1023, 2018.

[38] W. Xu, Y.-L. Ma, F. Zhang, D. Rouseff, F. Ji, J.-H. Cui, H. Yahia, "Marine information technology: the best is yet to come," *Frontiers of Information Technology & Electronic Engineering*, Springer, 19(8):947-950, 2018.

[39] S. Al-Abri, W. Wu and F. Zhang, "A Gradient-Free 3-dimensional Source Seeking Strategy with Robustness Analysis," *IEEE Transactions on Automatic Control*, 64(8):3439-3446, 2019.

[40] D. Chang, C. R. Edwards, F. Zhang, and J. Sun, "A data assimilation framework for data-driven flow models enabled by motion tomography," *International Journal of Intelligent Robotics and Applications,* 3(2):158-177, 2019.

[41] N. Yao, Q. Tao, W. Liu, Z. Liu, Y. Tian, P. Wang, T. Li, F. Zhang, "Autonomous flying blimp interaction with human in an indoor space," *Frontiers of Information Technology & Electronic Engineering*, 20(1): 45-59, 2019.

[42] S. Zheng, F. Tong, B. Li, Q. Tao, A. Song, and F. Zhang, "Design and evaluation of an acoustic modem for a small autonomous unmanned vehicle," *Sensors*, 19(13) 2923, 2019.

[43] S. Li, S. Wang, F. Zhang, and Y. Wang. "Constructing the three-dimensional structure of an anticyclonic eddy in the south china sea using multiple underwater gliders," *Journal of Atmospheric and Oceanic Technology*, 36(12):2449 2470, 2019.

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, Elseiver, 2017.

[6] C. Young and F. Zhang, "A Learning Algorithm to Select Consistent Reactions to Human Movements," in *Trends in Control and Decision-Making for Human–Robot Collaboration Systems*, edited by Y. Wang and F. Zhang, 111-130, Springer, 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.

[2] Q, Tao, J. Cha, X. Chen, S. Maxon, C. Qin, L. Sequin, H. Xie, J. Y. Zheng, F. Zhang, "Miniature Underwater Robot for Research and Education," Provisional patent (62/669,571) filed on May 10, 2018.

[3] F. Zhang, Q. Tao, T. J. Tan, P. S. T. Cheng, S. Cho, V. Mishra and J. P Varnell, "Miniature Autonomous Robotic Blimp", US Patent Pending (US16/280,579), Filed Feb 20, 2019.

[4] M. Malisoff, J. P. Varnell, and F. Zhang, "Control Method for Pointer Acceleration for Computer Mice or Other Interfaces," US Patent 10,579,166, issued 03/03/2020.

Edited Books

[1] Y. Wang and F. Zhang (edit), *Trends in Control and Decision-Making for Human–Robot Collaboration Systems*, Springer, 2017. https://doi.org/10.1007/978-3-319-40533-9.

[2] Y. Wang, E. Garcia, F. Zhang and D. Casbeer (edit), *Cooperative Control of Multi-Agent Systems: Theory and Applications*, Wiley, 2017.

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.

[10] S. Cho, F. Zhang and C.E. Edwards, "Detecting Abnormal Speed of Marine Robots using Controlled Lagrangian Particle Tracking Methods," in *Proceedings of the 12th ACM International Conference on Underwater Networks and Systems (WuWNet'17),* Article no. 11, Halifax, Canada, November 6-8, 2017.

[11] X. Wang, S. Zheng, Q. Tao, F. Zhang, A. Song, and F. Tong, "Doppler Correction of Mobile Acoustic Communication via Adjustable AD Sampling Rate," in *Proceedings of the 13th ACM International Conference on Underwater Networks and Systems (WuWNet'18),* Article no. 3, Shenzhen, China, December 3-5, 2018.

[12] J. Sun, J. Yu, A. Zhang, A. Song, and F. Zhang, "Underwater Acoustic Intensity Field Reconstruction by Kriged Compressive Sensing," in *Proceedings of the 13th ACM International Conference on Underwater Networks and Systems (WuWNet'18),* Article no. 5, Shenzhen, China, December 3-5, 2018.

[13] Z. Zhang, M. Hou, F. Zhang, and C. R. Edwards, "An LSTM based Kalman Filter for Spatio-Temporal Ocean Currents Assimilation," in *14th International Conference on Underwater Networks Systems (WUWNET'19),* article no. 28, Atlanta, USA, October 2019.

[14] D. Chen, B. Li, F. Tong, Q. Tao and F. Zhang, "Research and Development of a Low-Complexity OFDM Modem for Micro-AUV," in *14th International Conference on Underwater Networks Systems (WUWNET'19),* article no. 34, Atlanta, USA, October 2019.

[15] Q. Fu, A. Song, Q. Tao, F. Zhang and M. Pan, "Virtual MIMO for Multiuser Underwater Acoustic Communications with Moving Platforms," in 1*4th International Conference on Underwater Networks Systems (WUWNET'19),* article no. 31, Atlanta, USA, October 2019.

[16] Q. Tao, J. Lobley, Y. Yu, M. Y. Aung, F. Zhang, Y. Zhou, F. Tong and A. Song, "Omnidirectional Surface Vehicle for Evaluating Underwater Acoustic Communication Performance in Confined Space," in *14th International Conference on Underwater Networks Systems (WUWNET'19),* article no. 11, Atlanta, USA, October 2019.

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-I164, 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. Szwaykowska, 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. Szwaykowska 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.

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[89] N. Yao and F. Zhang, "Resolving Contentions for Intelligent Traffic Intersections Using Optimal Priority Assignment and Model Predictive Control," in *Proc. 2018 IEEE Conference on Control Technology and Applications (CCTA)*, 632 - 637, Aug 21-24, Copenhagen, Denmark, 2018.

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INVITED TALKS
Keynote Speeches

[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.

[2] "Learning and Predicting Human Intentions Through Interactions," *3rd International Conference on Automation, Control and Robotics Engineering (CACRE 2018)*, Chengdu, China, July 20th, 2018.

[3] "Bio-Inspired Autonomy for Mobile Sensor Networks in Aquatic Environment, " *8th IEEE International Conference on Underwater System & Technology (USYS2018)*, Wuhan, China, December 2nd, 2018.

[4]"Mobile Data Collection in an Aquatic Environment: Cyber Maritime Cycles for Distributed Autonomy," *13th ACM International Conference on Underwater Networks and Systems (WuWNet'18)*, Shenzhen, China, December 5th, 2018.

[5] "Motion Tomography and Collective Mobile Sensing in the Ocean," *OceanTech International Symposium*, Zhoushan, China, May 16th, 2019.

[6] "Maritime Robotic Sensor Networks," *12th World Sailing Robotics Competition (WSRC) & International Robotic Sailing Conference (IRSC)*, Ningbo, China, August 30th, 2019.

Recent Seminars (Since 2017)

[1] "Bio-Inspired Autonomy for Mobile Sensor Networks," Department of Aerospace Engineering, Iowa State University, April 5th, 2017.

[2] "Learning and Predicting Human Intentions Through Interactions," Department of Mechanical Engineering, Huazhong University of Science and Technology, July 5th, 2017.

[3] "Learning and Predicting Human Intentions Through Interactions," School of EEE, Nanyang Technological University, Singapore, September 6th, 2017.

[4] "Bio-Inspired Autonomy for Mobile Sensor Networks," Department of Electrical Engineering, Cornell University, October 31st, 2017.

[5] "Learning and Predicting Human Intentions Through Interactions," Department of Electrical and Computer Engineering, University of Maryland, November 3rd, 2017.

[6] "Maritime Robotic Sensor Networks," Australian Maritime College, Tasmania, Australia, December 7th, 2017.

[7] "Bio-Inspired Autonomy for Mobile Sensor Networks in Aquatic Environment, " Guangdong University of Industrial Technology, China, November 29th, 2018

[8] "Learning and Predicting Human Intentions Through Interactions," Southern University of Science and Technology, China, December 6th, 2018

[9] "Resolving Contentions Through Realtime Control and Scheduling," Beijing Jiaotong University, China, December 7th, 2018.

[10] "Mobile Data Collection in an Aquatic Environment: Cyber Maritime Cycles for Distributed Autonomy," Shanghai Jiaotong University, China, December 12th, 2018.

[11] "Mobile Data Collection in an Aquatic Environment: Cyber Maritime Cycles for Distributed Autonomy," Xiamen University, September 1st, 2019.

[12] "Bio-Inspired Autonomy for Mobile Sensor Networks in Aquatic Environment, " Chinese University of Hong Kong, Hong Kong, China, September 26th, 2019.

[13] "Bio-Inspired Autonomy for Mobile Sensor Networks in Aquatic Environment, " Huazhong University of Science and Technology, China, November 1st, 2019.

[14] "Learning and Predicting Human Intentions Through Interactions," Tsinghua University, China, November 12th, 2019.

[15] "Bio-Inspired Autonomy for Mobile Sensor Networks in Aquatic Environment, " Beijing University, China, November 13th, 2019.

EDUCATIONAL ACCOMPLISHMENTS

Individual Student Guidance

1. Graduated 9 Ph.D. and 7 Masters. Advising 10 Ph.D. students.

2. Individual guidance for about 60 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).
ECE3085/3550 Introduction to Systems and Control (undergraduate).
ECE6562 Control of Robotic Systems (graduate)
ECE6559 Advanced Linear Systems (graduate)
ECE6552 Nonlinear 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. *Registration Chair* for 2017 American Control Conference in Seattle (ACC 2017). *Workshop chair* for 2018 IEEE conference on control technology and applications (CCTA 2018) in Copenhagen. *Vice Program Chair* for 2018 IEEE Conference on Decision and Control (CDC 2018) in Miami. *General Chair* for 2019 ACM International Conference on Underwater Networks & Systems (WuWNet'19) in Atlanta.

3. *Deputy Editor in Chief* for Cyber Physical Systems Journal 2015-2019
   Associate Editor for IEEE Journal of Oceanic Engineering since 2016
   Associate Editor for IEEE Transactions on Automatic Control since 2017
   Associate Editor for IEEE Transactions on Control of Networked Systems since 2017
   Associate Editor for Robotic and Automation Letters since 2015
   Associate Editor for Conference Editorial Board of IEEE Control Systems Society, 2009-2016
   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 (2013-2017). ACM/IEEE ICCPS (2013-2017).

Campus Contributions

1. Member of the ECE Student-Faculty Committee. 2008-2010. Member of the ECE Faculty Honor Committee, 2010-2011. Member of the ECE Faculty Recruitment Committee, 2018-2019.

2. Member of the Interdisciplinary Robotics PhD Program, 2008-present.

3. PhD proposal committees and thesis defense committees for a number of PhD students.