

Xiaobo Tan

Department of Electrical & Computer Engineering
Department of Mechanical Engineering (by courtesy)
Michigan State University (MSU), East Lansing, MI 48824
Tel: 517-432-5671, Fax: 517-353-1980, Email: xbtan@egr.msu.edu
Web: <http://www.egr.msu.edu/~xbtan>

PROFESSIONAL PREPARATION

Tsinghua University, Beijing, China	Automatic Control	B.E., 1995
Tsinghua University, Beijing, China	Automatic Control	M.E., 1998
University of Maryland at College Park	Electrical Engineering	Ph.D., 2002
University of Maryland at College Park	Controls	Postdoc, 2002-2004

APPOINTMENTS

MSU Foundation Professor (January 2016 - present), *Professor* (2015 - present), *Associate Professor* (2010 - 2015), *Assistant Professor* (2004 - 2010), Department of Electrical & Computer Engineering, Michigan State University, East Lansing, MI

Professor (2015 - present), *Associate Professor* (2011 - 2015), Department of Mechanical Engineering (by courtesy), Michigan State University, East Lansing, MI

Postdoctoral Research Associate (2002 - 2004), Institute for Systems Research, University of Maryland, College Park, MD

Graduate Research Assistant (1998 - 2002), Department of Electrical & Computer Engineering, University of Maryland, College Park, MD

HONORS AND AWARDS

1. Named **Fellow**, the Institute of Electrical and Electronics Engineers (IEEE), 2017, “*for contributions to modeling and control of smart materials and underwater robots.*”
2. Named **MSU Foundation Professor**, 2016. Title awarded to “*individuals who combine externally recognized, exemplary scholarly accomplishment and/or potential, with clear professional relevance to specific areas of MSU scholarly need, disciplinary development, or research or creative emphasis.*”
3. **Teacher-Scholar Award**, Michigan State University, 2010. Awarded to up to 6 faculty members per year “*who early in their careers have earned the respect of students and colleagues for their devotion to and skill in teaching.*”
4. **Faculty Early Career Development Award (CAREER)**, the National Science Foundation, 2006.
5. Systems Fellow, Institute for Systems Research, University of Maryland, January 1998 - August 2002.
6. Graduate and Undergraduate Scholarships, Tsinghua University: Siemens Prize (1997), Outstanding Automation Graduate Prize (1995), Yu-Chi Ho Scholarship (1994), 12.9 Scholarship (1991 & 1992).
7. Best Paper Awards
 - Best Paper Award (with Hong Lei), Symposium on Modeling, Simulation and Control of Adaptive Systems, ASME 2014 Conference on Smart Materials, Adaptive Structures and Intelligent Systems (SMASIS 2014), for paper “A novel tubular thin-wall IPMC sensor capable of two-dimensional sensing: Fabrication, characterization and modeling.”
 - Best Conference Paper in Applications Award (with Jun Zhang, Emmanuelle Merced, and Nelson Sepulveda), 2013 ASME Dynamic Systems and Control Conference (DSCC 2013), for paper “Optimal compression of a generalized Prandtl-Ishlinskii operator in hysteresis modeling.”

- Best Paper Award in Behavior and Intelligence (with Anthony Clark, Jared Moore, Jianxun Wang, and Philip K. McKinley), 13th International Conference on the Simulation and Synthesis of Living Systems (Alife XIII), 2012, for paper “Evolutionary design and experimental validation of a flexible caudal fin for robotic fish.”
 - 2008 DSCD Best Mechatronics Paper Award (with Yang Fang), ASME Dynamic Systems and Control Division (DSCD), 2009, for paper “Design and modeling of a petal-shape, conjugated polymer-actuated micropump.”
8. Finalist, Best Paper Awards
- Runner-up, Best Conference Paper Award (Information Processing Track, with Y. Wang, R. Tan, G. Xing, J. Wang, X. Liu, and X. Chang), 2014, 13th ACM/IEEE International Conference on Information Processing in Sensor Networks (IPSN 2014), for paper “Aquatic debris monitoring using smartphone-based robotic sensors.”
 - Finalist, Best Conference Paper Award (with E. Merced, J. Zhang, and N. Sepulveda), 2013 IEEE/ASME International Conference on Advanced Intelligent Mechatronics (AIM 2013), for paper “Robust control of VO₂-coated microactuators based on self-sensing feedback.”
 - Finalist, Best Student Paper Award, the 41st IEEE Conference on Decision and Control, 2002, for paper “Modeling and control of a magnetostrictive actuator.”
9. Best Student Paper Awards/Finalists (as advisor)
- Sanaz Behbahani, Finalist for Best Student Paper Award, ASME 2014 Dynamic Systems and Control Conference (DSCC 2014), for paper “Design and dynamic modeling of a flexible feathering joint for robotic fish pectoral fins.”
 - Hong Lei, Finalist for Best Student Paper Award, ASME 2014 Conference on Smart Materials, Adaptive Structures and Intelligent Systems (SMASIS 2014), for paper “A novel tubular thin-wall IPMC sensor capable of two-dimensional sensing: Fabrication, characterization, and modeling.”
 - Jun Zhang, Student Best Paper Competition Award, ASME 2012 Conference on Smart Materials, Adaptive Structures and Intelligent Systems (SMASIS 2012), for paper “Modeling of non-monotonic hysteresis behavior in VO₂-based MEMS actuators.”

TEACHING

1. EGR 100 (Member of instructional team), *Introduction to Engineering Design* (Fall 2007 - Spring 2011)
2. ECE 313, *Control Systems* (Fall of 2004 – 2007, 2009, Spring of 2009, 2011 – 2014, 2016)
3. ECE 480 (Facilitator), *Senior Design* (Fall 2005, Spring 2006, Spring 2012 [First Place in Design Day competition], Spring 2016, Spring 2017, Fall 2017)
4. ECE 819, *Smart Material Sensors and Actuators* (Fall 2011, Fall 2014, Fall 2017); also offered as ECE 802-602 (Spring 2008) and ECE 802-603 (Spring 2005, *Smart Sensors and Actuators in Micro and Nanosystems*) [A course developed by X. Tan]
5. ECE/ME 856, *Adaptive Control* (Fall 2008, Fall 2010, Fall 2013, Fall 2016); also offered as ECE 960A (Spring 2006)
6. ECE 960C, *Networked and Embedded Control Systems* (Spring 2010, Fall 2015); also offered as ECE 802-603 (Spring 2007) [A course developed by X. Tan]

RESEARCH AND EDUCATIONAL GRANTS

Extramural Funding

1. PI (at MSU), “RI: Small: Collaborative Research: Information-driven Autonomous Exploration in Uncertain Underwater Environments,” National Science Foundation, \$265,000, 9/1/2017 - 8/31/2020 (Collaborator: T. Murphey from Northwestern University)
2. Co-PI, “NRI: FND: A Framework for Human-Team-Supervised Autonomy with Application to Underwater Search and Rescue,” National Science Foundation, \$749,997, 8/15/2017 - 7/31/2020 (PI: V. Srivastava)
3. Senior personnel (33% credit), “RET Site: Smart Sensors and Sensing Systems,” National Science Foundation, \$600,000, 2/15/2016 - 1/31/2019 (PI: W. Li; Co-PI: A. Kim)
4. PI (at MSU), “Bio-inspired Underwater Sensing and Control with Mechanosensitive Hairs,” Office of Naval Research/University of Maryland (prime), \$337,000, 5/1/2015 - 4/30/2018 (Collaborators: D. Paley (project lead) from University of Maryland, and M. McHenry from University of California, Irvine)
5. PI, “CPS: Synergy: Tracking Fish Movement with a School of Gliding Robotic Fish,” National Science Foundation, \$1,000,000, 11/1/2014 - 10/31/2018 (Co-PIs: C. Krueger and G. Xing)
6. PI (at MSU), “Development of a Cost-effective Multi-modal Underwater Robot for Fisheries Research & Environmental Monitoring,” U.S. Geological Survey/Great Lakes Fishery Commission (prime), \$52,500, 10/1/2014 - 9/30/2015 (Collaborators: D. Hondorp (project lead), C. Holbrook, and C. Krueger)
7. PI, “A Gliding Robotic Fish-based Mobile Receiver Platform for Acoustic Telemetry in Fishery Research,” Great Lakes Fishery Commission, \$63,000, 5/16/2014 - 5/31/2017 (Collaborators: C. Holbrook, D. Hondorp, and C. Krueger)
8. PI, “CyberSEES: Type 2: Towards Sustainable Aquatic Ecosystems: A New Adaptive Sampling and Data-Enabled Monitoring and Modeling Framework,” National Science Foundation, \$800,000, 10/1/2013 - 9/30/2016 (Co-PIs: E. Litchman, M. Phanikumar, H. Radha, and G. Xing)
9. PI, “AIR Option 1: Technology Translation: Gliding Robotic Fish for Long-duration Sensing in Aquatic Environments,” National Science Foundation, \$154,359, 9/15/2013 - 2/29/2016
10. PI, “RI: Small: Collaborative Research: Bio-inspired Collaborative Sensing with Novel Gliding Robotic Fish,” National Science Foundation, \$257,315, 8/1/2013 - 7/31/2017 (Collaborator: F. Zhang from Georgia Tech)
11. PI, “Novel Vanadium Dioxide-based Self-Sensing Microactuators: Modeling, Control, and Application to Micromanipulation,” National Science Foundation, \$300,000, 6/1/2013 - 5/31/2017 (Co-PI: N. Sepulveda)
12. PI, “RET in Engineering and Computer Science Site: Robotics Engineering for Better Life and Sustainable Future,” National Science Foundation, \$500,000, 4/1/2013 - 3/31/2016 (Co-PI: A. Kim)
13. PI (at MSU), “Bio-inspired Flow Sensing and Control for Autonomous Underwater Vehicles,” Office of Naval Research/University of Maryland (prime), \$180,000, 1/1/2012 - 12/31/2014 (Collaborators: D. Paley (project lead) and J. S. Humbert from University of Maryland, and S. Coombs from Bowling Green State University)
14. Co-PI, “II-EN: Evolution Park - An Evolutionary Robotics Habitat for the Study of Crawling, Swimming and Flying Creatures,” National Science Foundation, \$305,000, 4/1/2011 - 3/31/2014 (PI: P. McKinley; Other Co-PI: J. Boughman)
15. PI, “RAPID: Monitoring of Gulf Oil Spill with Gliding Robotic Fish,” National Science Foundation, \$110,000, 9/15/2010 - 2/28/2013

16. Co-PI, "Exploiting Mobility-assisted Collaboration for Adaptive Aquatic Sensor Networks," National Science Foundation, \$360,000, 9/15/2010 - 8/31/2013 (PI: G. Xing)
17. PI, "RI: Small: AquaSWARM: Small Wireless Autonomous Robots for Monitoring of Aquatic Environments," National Science Foundation, \$433,999, 9/1/2009 - 8/31/2014 (Co-PI: E. Litchman)
18. PI, "RET Site on Bio-Inspired Technology and Systems (BITS)," National Science Foundation, \$500,000, 9/1/2009 - 8/31/2012 (Co-PIs: E. Alcocilja, A. Kim)
19. PI, "Nonlinear and Adaptive Control of Smart Material-Actuated Systems with Application to Nanopositioning," National Science Foundation, \$216,000, 8/15/2008 - 7/31/2012 (Co-PI: H. K. Khalil)
20. Co-PI, "ORCHID: Harnessing Digital Evolution to Design High-Assurance Adaptive Systems," National Science Foundation, \$600,000, 7/1/2008 - 6/30/2013 (PI: B. H. Cheng; Other Co-PIs: P. K. McKenley, and C. A. Ofria)
21. PI, "Highly Maneuverable Robotic Fish Based on Biological Principles and Biomimetic Materials," Office of Naval Research, \$379,748, 6/1/2008 - 12/31/2011
22. Co-PI, "CRI: IAD - A Testbed for Evolving Adaptive and Cooperative Behavior Among Autonomous Systems," National Science Foundation, \$188,110, 5/1/2008 - 4/30/2010 (PI: P. K. McKinley; Other Co-PIs: B. H. Cheng, C. A. Ofria, and R. T. Pennock)
23. PI, "Modeling and Control of Self-sensing Artificial Muscles," US Civilian Research & Development Foundation, \$9,400, 1/1/2008 - 12/31/2009
24. PI, "CAREER: Dexterous Biomimetic Micromanipulation Using Artificial Muscles: Modeling, Sensing, and Control," National Science Foundation, \$625,687, 3/1/2006 - 2/28/2013
25. PI, "SGER: A Control-Oriented Model for Ionic Polymer-Metal Composite Actuators," National Science Foundation, \$27,084, 9/15/2005 - 5/31/2006
26. PI, Educational Grant in Optical Science and Engineering, The International Society for Optical Engineering, \$2,000, 8/29/2005 - 8/28/2006

Internal Funding

1. PI, "Soft Robotic Systems for Safe and Accurate Medical Diagnosis and Intervention," MSU Foundation, \$400,000, 7/1/2017 - 6/30/2020 (Co-PIs: T. Gao, J. Kruger, C. Qian, and C. Wang)
2. PI, "Gliding Robotic Fish for Underwater Sensing," MSU Foundation/Spartan Innovations, \$66,723, 8/16/2013 - 12/31/2014
3. Co-PI, "Brain-Body Coupling in Soft Robotics," MSU Discretionary Funding Initiative, \$45,286, 11/14/2013 - 6/30/2015 (PI: P. McKinley)
4. PI, "Robotic Fish Patent Scope," MSU-TSGTD, \$7,000, 7/1/2013 - 10/31/2013 (Co-PI: R. DeVito)
5. Co-PI, "Reliable Detection of Objects with a Collection of Artificial Lateral Lines," BEACON Center (an NSF Science and Technology Center headquartered at MSU), \$59,320, 8/16/2015 - 8/15/2016 (PI: K. Deb)
6. PI, "Robust Multi-objective Evolutionary Design of Artificial Lateral Line Systems," BEACON Center (an NSF Science and Technology Center headquartered at MSU), \$87,866, 5/16/2014 - 5/15/2015 (Co-PI: K. Deb)
7. PI, "Evolutionary Design of Artificial Lateral Line Systems," BEACON Center (an NSF Science and Technology Center headquartered at MSU), \$88,618, 8/16/2013 - 5/15/2014 (Co-PI: K. Deb)
8. PI, "Understanding and Synthesizing Collective Behavior with Mixed Robotic and Live Fish Schools," BEACON Center (an NSF Science and Technology Center headquartered at MSU), \$169,923, 5/16/2012 - 8/15/2013 (Co-PIs: P. McKinley and J. Boughman)

9. PI, “Exploiting Robot-Fish Interactions and Evolutionary Computing to Understand and Synthesize Complex Collective Behavior,” BEACON Center (an NSF Science and Technology Center headquartered at MSU), \$75,684, 5/16/2011- 5/15/2012 (Co-PIs: P. McKinley and J. Boughman)
10. PI, “Evolving Robotic Fish toward Autonomous Schools,” BEACON Center (an NSF Science and Technology Center headquartered at MSU), funded one graduate research assistant + \$3,000 for an hourly undergrad, 8/16/2010 - 5/15/2011 (Co-PIs: P. McKinley and J. Boughman)
11. Co-PI, “Development of An Autonomous Robotic Fish-based Sensor to Detect Harmful Algal Blooms (HABs),” Biogeochemistry Environmental Research Initiative (BERI) at MSU, \$10,000, Spring 2009 (PI: E. Litchman)
12. PI, “Integrated Sensory Feedback for Artificial Muscles,” Michigan State University Intramural Research Grants Program, \$50,000, 12/15/2005 - 12/31/2007

PUBLICATIONS

Books:

- [B-1] K. J. Kim, **X. Tan**, H. R. Choi, and D. Pugal, *Biomimetic Robotic Artificial Muscles*, World Scientific Publishing, 2013

Book Chapters:

- [BC-1] K. Kim, V. Palmre, D. Pugal, T. Stalbaum, Z. Chen, **X. Tan**, and M. Yamakita, “IPMCs as EAPs: Models,” F. Carpi, editor, *Electromechanically Active Polymers: A Concise Reference*, pp. 171-190, Chapter 8, Springer International Publishing, Cham, Switzerland, 2016
- [BC-2] H. Lei and **X. Tan**, “Modeling of environment-dependent IPMC actuation and sensing dynamics,” M. Shahinpoor, editor, *Ionic Polymer Metal Composites (IPMCs): Smart Multi-Functional Materials and Artificial Muscles*, pp. 334-353, Chapter 10, Royal Society of Chemistry, Cambridge, UK, 2015
- [BC-3] Z. Chen, H. Bart-Smith, and **X. Tan**, “IPMC-actuated robotic fish,” R. Du, Z. Li, K. Youcef-Toumi, P. V. Alvarado, editors, *Robot Fish: Bio-inspired Fishlike Underwater Robots*, pp. 219-253, Chapter 8, Springer-Verlag, Berlin, Heidelberg, 2015
- [BC-4] **X. Tan** and J. S. Baras, “Optimal control of hysteresis in smart actuators: A viscosity solutions approach,” C. J. Tomlin, M. R. Greenstreet, editors, *the Springer series Lecture Notes in Computer Science (LNCS) Vol. 2289, Proceedings of the 5th International Workshop on Hybrid Systems: Computation and Control*, pp. 451-464, Springer-Verlag, Berlin, Heidelberg, 2002

Journal Papers:

- [J-1] F. Zhang, O. Ennasr, and **X. Tan**, “Gliding robotic fish: An underwater sensing platform and its spiral-based tracking in 3D space,” *Marine Technology Society Journal*, under review
- [J-2] P. Solanki, M. Al-Rubaiai, and **X. Tan**, “Extended Kalman filter-based active alignment control for LED optical communication,” *IEEE/ASME Transactions on Mechatronics*, under review
- [J-3] L. Fang, J. Wang, and **X. Tan**, “An incremental harmonic balance-based approach for harmonic analysis of closed-loop systems with Prandtl-Ishlinskii operator,” *Automatica*, to appear
- [J-4] Y. Cao, D. Torres, T. Wang, **X. Tan**, and N. Sepulveda, “Enabling tunable micromechanical bandpass filters through phase-change materials,” *Smart Materials and Structures*, vol. 26, no. 8, p. 085032 (12 pp), 2017

- [J-5] S. B. Behbahani and **X. Tan**, “Design and dynamic modeling of electrorheological fluid-based variable-stiffness fin for robotic fish,” *Smart Materials and Structures*, vol. 26, no. 8, p. 085014 (15 pp), 2017
- [J-6] S. B. Behbahani and **X. Tan**, “Role of pectoral fin flexibility in robotic fish performance,” *Journal of Nonlinear Science*, vol. 27, no. 4, pp. 1155-1181, 2017
- [J-7] A. Ahrari, H. Lei, M. A. Sharif, K. Deb, and **X. Tan**, “Reliable underwater dipole source characterization in three-dimensional space by an optimally designed artificial lateral line system,” *Bioinspiration & Biomimetics*, vol. 12, no. 3, p. 036010 (14 pp), 2017
- [J-8] **X. Tan**, K. K. Leang, Z. Yin, “Guest editorial: Focused Section on Advances in Soft Robotics,” *International Journal of Intelligent Robotics and Applications*, vol. 1, no. 2, pp. 121-123, 2017
- [J-9] T. Pinto, L. Cai, C. Wang, and **X. Tan**, “CNT-based sensor arrays for local strain measurements in soft pneumatic bending actuators,” *International Journal of Intelligent Robotics and Applications*, vol. 1, no. 2, pp. 157-166, 2017
- [J-10] D. Torres, J. Zhang, S. Dooley, **X. Tan**, and N. Sepulveda, “Modeling of MEMS mirrors actuated by phase-change mechanism,” (**Invited paper** for special issue on MEMS Mirrors), *Micromachines*, vol. 8, no. 5, p. 138 (17 pp), 2017
- [J-11] A. Ahrari, H. Lei, M. Sharif, K. Deb, and **X. Tan**, “Design optimization of an artificial lateral line system incorporating flow and sensor uncertainties,” *Engineering Optimization*, vol. 49, no. 2, pp. 328-344, 2017
- [J-12] F. Lei, J. Wang, and **X. Tan**, “Analysis and compensation of oscillations induced by control valve stiction,” *IEEE/ASME Transactions on Mechatronics*, vol. 21, no. 6, pp. 2773-2783, 2016
- [J-13] S. B. Behbahani and **X. Tan**, “Design and modeling of flexible passive rowing joints for robotic fish pectoral fins,” *IEEE Transactions on Robotics*, vol. 32, no. 5, pp. 1119-1132, 2016
- [J-14] D. Torres, T. Wang, J. Zhang, X. Zhang, S. Dooley, **X. Tan**, H. Xie, and N. Sepulveda, “VO₂-based MEMS mirrors,” *Journal of Microelectromechanical Systems*, vol. 25, no. 4, pp. 780-787, 2016
- [J-15] J. Zhang, D. Torres, J. Ebel, N. Sepulveda, and **X. Tan**, “A composite hysteresis model in self-sensing feedback control of fully integrated VO₂ microactuators,” *IEEE/ASME Transactions on Mechatronics*, vol. 21, no. 5, pp. 2405-2417, 2016
- [J-16] Y. Wang, R. Tan, G. Xing, J. Wang, **X. Tan**, and X. Liu, “Energy-efficient aquatic environment monitoring using smartphone-based robots,” *ACM Transactions on Sensor Networks*, vol. 12, no. 3, Article 25 (28 pp), 2016
- [J-17] J. Zhang, D. Torres, N. Sepulveda, and **X. Tan**, “A compressive sensing-based approach for Preisach hysteresis model identification,” *Smart Materials and Structures*, vol. 27, no. 7, p. 075008 (12 pp), 2016
- [J-18] F. Zhang, O. Ennasr, E. Litchman, and **X. Tan**, “Autonomous sampling of water columns using gliding robotic fish: Algorithms and harmful-algae-sampling experiments,” (**Invited paper** for special issue on Cyber-innovated Environmental Sensing, Monitoring and Modeling for Sustainability), *IEEE Systems Journal*, vol. 10, no. 3, pp. 1271-1281, 2016
- [J-19] A. Hunt, Z. Chen, **X. Tan**, and M. Kruusmaa, “An integrated electroactive polymer sensor-actuator: Design, model-based control, and performance characterization,” *Smart Materials and Structures*, vol. 25, no. 3, p. 035016 (16 pp), 2016
- [J-20] Y. Wang, R. Tan, G. Xing, J. Wang, **X. Tan**, X. Liu, and X. Chang, “Monitoring aquatic debris using smartphone-based robots,” *IEEE Transactions on Mobile Computing*, vol. 15, no. 6, pp. 1412-1426, 2016
- [J-21] S. B. Behbahani and **X. Tan**, “Bio-inspired flexible joints with passive feathering for robotic fish pectoral fins,” *Bioinspiration & Biomimetics*, vol. 11, no. 3, p. 036009 (14 pp), 2016 [**Featured article**]

- [J-22] F. Zhang, F. D. Lagor, H. Lei, **X. Tan**, and D. A. Paley, “Robotic fish: Flow-relative control behaviors using distributed flow sensing,” *ASME Dynamic Systems and Control Magazine*, pp. S2-S5, March 2016 issue (insert of *Mechanical Engineering* magazine, vol. 138, no. 3), 2016
- [J-23] H. Lei, M. Sharif, and **X. Tan**, “Dynamics of omnidirectional IPMC sensor: Experimental characterization and physical modeling,” *IEEE/ASME Transactions on Mechatronics*, vol. 21, no. 2, pp. 601-612, 2016
- [J-24] M. Al Janaideh, M. Rakotondrabe, and **X. Tan**, “Guest editorial: Focused section on Hysteresis in Smart Mechatronic Systems: Modeling, identification, and control,” *IEEE/ASME Transactions on Mechatronics*, vol. 21, no. 1, pp. 1-3, 2016
- [J-25] A. J. Clark, **X. Tan**, and P. K. McKinley, “Evolutionary multiobjective design of a flexible caudal fin for robotic fish,” (**Invited paper** for special issue on Soft Robotics), *Bioinspiration & Biomimetics*, vol. 10, no. 6, p. 065006 (17 pp), 2015
- [J-26] G. Berselli, **X. Tan**, and R. Vertechy, “Soft mechatronics: An emerging paradigm for the conception of intrinsically compliant electro-mechanical systems” (guest editorial), *Meccanica*, vol. 50, no. 11, pp. 2661-2662, 2015
- [J-27] H. Lei, C. Lim, and **X. Tan**, “Humidity-dependence of IPMC sensing dynamics: Characterization and modeling from a physical perspective,” (**Invited paper** for special issue on Soft Mechatronics: Mechanics and Multi-physics of Compliant Transducers), *Meccanica*, vol. 50, no. 11, pp. 2663-2673, 2015
- [J-28] J. Wang and **X. Tan**, “Averaging of tail-actuated robotic fish dynamics through force and moment scaling,” *IEEE Transactions on Robotics*, vol. 31, no. 4, pp. 906-917, 2015
- [J-29] J. Zhang, E. Merced, N. Sepulveda, and **X. Tan**, “Optimal compression of generalized Prandtl-Ishlinskii hysteresis models,” *Automatica*, vol. 57, no. 7, pp. 170-179, 2015
- [J-30] F. Zhang and **X. Tan**, “Passivity-based stabilization of underwater gliders with a control surface,” *Journal of Dynamic Systems, Measurement and Control*, vol. 137, no. 6, p. 061006 (13 pp), 2015
- [J-31] L. DeVries, F. Lagor, H. Lei, **X. Tan**, and D. Paley, “Distributed flow estimation and closed-loop control of an underwater vehicle with a multi-modal artificial lateral line,” (**Invited paper** for special issue on Hybrid and Multi-modal Locomotion), *Bioinspiration & Biomimetics*, vol. 10, no. 2, p. 025002 (15 pp), 2015
- [J-32] M. Edardar, **X. Tan**, and H. K. Khalil, “Design and analysis of sliding mode controller under approximate hysteresis compensation,” *IEEE Transactions on Control Systems Technology*, vol. 23, no. 2, pp. 598-608, 2015
- [J-33] E. Merced, D. Torres, **X. Tan**, and Nelson Sepulveda, “An electrothermally actuated VO₂-based MEMS using self-sensing feedback control,” *Journal of Microelectromechanical Systems*, vol. 24, no. 1, pp. 100-107, 2015
- [J-34] J. Wang, P. K. McKinley, and **X. Tan**, “Dynamic modeling of robotic fish with a base-actuated flexible tail,” *Journal of Dynamic Systems, Measurement, and Control*, vol. 137, no. 1, p. 011004 (11 pp), 2015
- [J-35] J. Zhang, E. Merced, N. Sepulveda, and **X. Tan**, “Modeling and inverse compensation of hysteresis in vanadium dioxide using an extended generalized Prandtl-Ishlinskii model,” *Smart Materials and Structures*, vol. 23, no. 12, p. 125017 (10 pp), 2014
- [J-36] E. Merced, **X. Tan**, and N. Sepulveda, “Closed-loop tracking of large displacements in electrothermally actuated VO₂-based MEMS,” *Journal of Microelectromechanical Systems*, vol. 23, no. 5, pp. 1073-1083, 2014

- [J-37] H. Lei, W. Li, and **X. Tan**, “Encapsulation of ionic polymer-metal composite (IPMC) sensors with thick parylene: Fabrication process and characterization results,” *Sensors and Actuators A: Physical*, vol. 217, pp. 1-12, 2014
- [J-38] Y. Wang, R. Tan, G. Xing, **X. Tan**, J. Wang, and R. Zhou, “Spatiotemporal aquatic field reconstruction using cyber-physical robotic sensor systems,” *ACM Transactions on Sensor Networks*, vol. 10, no. 4, Article 57 (27 pp), 2014
- [J-39] F. Zhang, F. Zhang, and **X. Tan**, “Tail-enabled spiraling maneuver for gliding robotic fish,” *ASME Journal of Dynamic Systems, Measurement and Control*, vol. 136, no. 4, p. 041028 (8 pp), 2014
- [J-40] M. Edardar, **X. Tan**, and H. K. Khalil, “Tracking error analysis for feedback systems with hysteresis inversion and fast linear dynamics,” *Journal of Dynamic Systems, Measurement and Control*, vol. 136, no. 4, p. 041010 (12 pp), 2014
- [J-41] E. Merced, J. Zhang, **X. Tan**, and N. Sepulveda, “Robust control of VO₂-coated micro-benders using self-sensing feedback,” *IEEE/ASME Transactions on Mechatronics*, vol. 19, no. 5, pp. 1583-1592, 2014
- [J-42] A. Esbrook, **X. Tan**, and H. K. Khalil, “Inversion-free stabilization and regulation of systems with hysteresis via integral action,” *Automatica*, vol. 50, no. 4, pp. 1017-1025, 2014
- [J-43] Y. Wang, R. Tan, G. Xing, J. Wang, and **X. Tan**, “Profiling aquatic diffusion process using robotic sensor networks,” *IEEE Transactions on Mobile Computing*, vol. 13, no. 4, pp. 880-893, 2014
- [J-44] A. Esbrook, **X. Tan**, and H. K. Khalil, “Self-excited limit cycles in an integral-controlled system with backlash,” *IEEE Transactions on Automatic Control*, vol. 59, no. 4, pp. 1020-1025, 2014
- [J-45] J. Zhang, E. Merced, N. Sepulveda, and **X. Tan**, “Modeling and inverse compensation of non-monotonic hysteresis in VO₂-coated microactuators,” *IEEE/ASME Transactions on Mechatronics*, vol. 19, no. 2, pp. 579-588, 2014
- [J-46] F. Zhang, J. Thon, C. Thon, and **X. Tan**, “Miniature underwater glider: Design and experimental results,” *IEEE/ASME Transactions on Mechatronics*, vol. 19, no. 1, pp. 394-399, 2014
- [J-47] X. Wang, G. Alici, and **X. Tan**, “Modeling and inverse feedforward control for conducting polymer actuator with hysteresis,” *Smart Materials and Structures*, vol. 23, no. 2, p. 025015 (9 pp), 2014
- [J-48] M. Kruusma, **X. Tan**, C. Laschi, P. Fioroni, and R. Madhavan, “Guest editorial: New boundaries for robotics,” *Robotics and Autonomous Systems*, vol. 62, no. 1, pp. 1-2, 2014
- [J-49] J. Wang and **X. Tan**, “A dynamic model for tail-actuated robotic fish with drag coefficient adaptation,” *Mechatronics*, vol. 23, no. 6, pp. 659-668, 2013
- [J-50] H. Lei, C. Lim, and **X. Tan**, “Modeling and inverse compensation of dynamics of base-excited ionic polymer-metal composite sensors,” *Journal of Intelligent Material Systems and Structures*, vol. 24, no. 13, pp. 1557-1571, 2013
- [J-51] E. Merced, **X. Tan**, and N. Sepulveda, “Strain energy density of VO₂-based microactuators,” *Sensors and Actuators A*, vol. 196, pp. 30-37, 2013
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Other Conference Presentations:

1. **X. Tan**, “Hydrodynamic object localization and tracking with an IPMC artificial lateral line” (Invited talk), Symposium 3: Modeling, Simulation, and Control of Adaptive Systems, ASME 2014 Conference on Smart Materials, Adaptive Structures and Intelligent Systems, Newport, Rhode Island, 2014
2. **X. Tan**, “Parylene-encapsulated IPMC sensors and application to flow sensing in underwater robots,” Invited talk at *Workshop on Soft Robotics/Active Skins and Related Technologies*, University of Nevada, Las Vegas, 2014
3. F. Zhang (presenter) and **X. Tan**, “Gliding robotic fish: A highly maneuverable and energy-efficient platform for aquatic sensing” (**Invited**), oral presentation at *the 2013 SIAM Conference on Control and Its Applications*, San Diego, CA, 2013
4. **X. Tan**, “Soft actuation materials capable of complex deformation,” Invited talk at *Workshop on Biologically-Inspired Actuation*, at *the 2011 IEEE International Conference on Robotics and Automation*, Shanghai, China, 2011
5. **X. Tan**, “Linking university research to K-12 education,” oral presentation at *the 3rd Annual Internationalizing Michigan Education Conference: Where Globalization Meets School Improvement: Linking and Learning with Schools around the World*, East Lansing, MI, 2009
6. **X. Tan** (presenter) and O. Bennani, “Embedded inverse compensation of hysteresis in smart material actuators” (**Invited**), oral presentation at *the 13th International Symposium on Applied Electromagnetics and Mechanics*, East Lansing, MI, 2007
7. Y. Fang, **X. Tan** (presenter), and G. Alici, “Robust adaptive control of conjugated polymer actuators” (**Invited**), oral presentation at *the SIAM Conference on Control and Its Applications*, San Francisco, CA, 2007

8. Z. Chen and **X. Tan**, “A dynamic sensing model for ionic polymer metal composites,” poster presentation at *Red Raider Mini-Symposium Series: Mathematical Modeling of Novel Materials and Devices*, Department of Mathematics and Statistics, Texas Tech University, Lubbock, TX, 2006
9. **X. Tan**, “Almost symplectic Runge-Kutta schemes for Hamiltonian systems” (**Invited**), oral presentation at *the 6th SIAM Conference on Control and Its Applications*, New Orleans, LA, 2005
10. **X. Tan**, “Preisach operator-based modeling and control of hysteresis in magnetostrictive actuators” (**Invited**), oral presentation at *the 6th SIAM Conference on Control and Its Applications*, New Orleans, LA, 2005
11. R. V. Iyer (presenter), **X. Tan**, and P. S. Krishnaprasad, “Approximate inversion of the Preisach hysteresis operator with application to control of smart actuators,” oral presentation at *the AMS 2005 Spring Central Section Meeting*, Lubbock, TX, 2005
12. M. Khbeis, **X. Tan (presenter)**, G. Metze, and R. Ghodssi, “Microfabrication of a pressure sensor array using 3D integration technology,” oral presentation at *the American Vacuum Society’s 50th International Symposium*, Baltimore, MD, 2003
13. M. Khbeis and **X. Tan**, “Microfabrication of a pressure sensor array using 3D integration technology”, (**Best Poster Award**), poster presentation at *MEMS Alliance Special Topics Symposium: Materials and Fabrication Technologies for MEMS and NEMS*, College Park, MD, 2003
14. N. Ghalichechian, M. Khbeis, Z. Ma, S. Moghaddam, and **X. Tan**, “A piezoresistive pressure sensor cluster”, poster presentation at *MEMS Alliance Special Topics Symposium: MEMS Technologies in Biotech and Commercial Applications*, The Johns Hopkins University Applied Physics Laboratory, 2002
15. P. S. Krishnaprasad (presenter) and **X. Tan**, “Cayley Transforms in Magnetism,” oral presentation at *the 5th SIAM Conference on Control and Its Applications*, San Diego, CA, 2001
16. **X. Tan (presenter)**, J. S. Baras, and P. S. Krishnaprasad, “Computational micromagnetics for magnetostrictive actuators,” oral presentation at *the 3rd SIAM Conference on Mathematical Aspects of Materials Science*, Philadelphia, PA, 2000

INVENTIONS

1. **X. Tan**, F. Zhang, J. Wang, and J. Thon, “Gliding robotic fish navigation and propulsion,” U.S. Patent 9,718,523 B2, issued on August 1, 2017
2. G. Zhu, **X. Tan**, and L. D. Hung, “Electroactive polymer-based flow sensor,” U.S. Patent pending, 2012
3. **X. Tan**, N. Xi, Z. Chen, and Y. Shen, “Integrated actuator sensor structure,” U.S. Patent 7,982,375, issued on July 19, 2011
4. Invention Disclosures
 - I. Xagorarakis, **X. Tan**, P. Mantha, and H. Radha, “Robotic sampler for early detection of waterborne outbreaks,” Invention disclosure to MSU Technologies (Reference Code TEC2017-0051), 2016
 - **X. Tan**, F. Zhang, J. Wang, and J. Thon, “Gliding robotic fish,” Invention disclosure to MSU Technologies (Reference Code TEC2013-0091), 2013
 - **X. Tan**, “Gliding robotic fish,” Invention disclosure to MSU Technologies (Reference Code TEC2010-0003), 2009

- **X. Tan** and O. Bennani, “FPGA-based embedded compensation and adaptation of hysteresis in smart material actuators,” Invention disclosure to MSU Office of Intellectual Property (ID# 08-008F), 2007
- **X. Tan** and D. Kim, “Wireless, mobile sensing platform based on biomimetic robotic fish,” Invention disclosure to MSU Office of Intellectual Property (ID# 07-143F), 2007

INVITED FULL-HOUR TALKS

1. “Underwater sensing with gliding robotic fish,” Department of Electrical & Computer Engineering, University of Windsor, Windsor, Canada, November 4, 2016
2. “‘Falling with style’ – Gliding robotic fish patrol waters with ease,” College of Engineering, Peking University, Beijing, China, April 24, 2015
3. “‘Falling with style’ – Gliding robotic fish patrol waters with ease,” Department of Automation, Tsinghua University, Beijing, China, April 23, 2015
4. “‘Falling with style’ – Gliding robotic fish patrol waters with ease,” Frontiers in Control Science and Engineering Seminar Series, Tongji University, Shanghai, China, April 21, 2015
5. “‘Falling with style’ – Gliding robotic fish patrol waters with ease,” School of Automation, Nanjing University of Posts and Telecommunications, Nanjing, China, April 17, 2015
6. “Soft sensing and actuation materials: A systems perspective to bridge material physics and applications,” School of Mechanical Engineering, Purdue University, West Lafayette, IN, March 2, 2015
7. “‘Falling with style’ – Gliding robotic fish patrol waters with ease,” Department of Mechanical Engineering, Virginia Tech, Blacksburg, VA, February 23, 2015
8. “(Gliding) robotic fish: Swim or not swim,” Control Seminar Series, University of Michigan, Ann Arbor, MI, February 13, 2015
9. “(Gliding) robotic fish: Swim or not swim,” Systems and Control Seminar Series, Georgia Tech, Atlanta, GA, November 18, 2014
10. “(Gliding) robotic fish: Swim or not swim,” Maryland Robotics Center Seminar Series, University of Maryland, College Park, MD, September 10, 2014
11. “Toward autonomous robotic fish schools: Challenges and potential solutions,” CSE Lecture Series, Department of Computer Science and Engineering, Michigan State University, East Lansing, MI, April 22, 2011
12. “Soft sensing and actuation materials: A systems perspective,” Workshop on Future Directions in Applied Mathematics, Center for Research in Scientific Computation, North Carolina State University, Raleigh, NC, March 10, 2011
13. “Conjugated polymer actuators: Modeling, control, and device applications,” Control Theory Seminar Series, Department of Applied Mathematics, University of Waterloo, Canada, October 15, 2010
14. “Robotic fish: From bio-inspired design to environmental monitoring,” Harvard University, Cambridge, MA, September 13, 2010
15. “Robotic fish: From bio-inspired design to environmental monitoring,” Institute for Bio-inspired Structure and Surface Engineering, Nanjing University of Aeronautics and Astronautics, Nanjing, China, June 10, 2010
16. “Robotic fish: Bio-inspired design, modeling, and applications,” Engineering Alliance Seminar Series, Georgia Tech, Savannah, GA, March 3, 2010

17. "Electroactive polymers as artificial muscles and sensors: A systems perspective," Cymer Center for Control Systems and Dynamics, University of California, San Diego, CA, March 13, 2009
18. "Electroactive polymers as artificial muscles and sensors: A systems perspective," Department of Mechanical Engineering, Ohio State University, Columbus, OH, January 9, 2009
19. "Electroactive polymers as artificial muscles and sensors: A systems perspective," Robotics, Controls and Mechatronics Colloquium, University of Washington, Seattle, WA, October 31, 2008
20. "Adaptive embedded compensation of hysteresis in smart material actuators," Servo Technology, Western Digital Corporation, Lake Forest, CA, March 11, 2008
21. "Control of hysteresis nonlinearity in smart material systems," Control Science Center of Excellence, Air Force Research Laboratory, Wright-Patterson AFB, OH, July 2, 2007 [Joint presentation with Prof. H. K. Khalil]
22. "Electroactive polymers as artificial muscles and sensors: Modeling, control, and robotic applications," Institute of Modern Agriculture Science and Engineering, Tongji University, Shanghai, China, May 29, 2007
23. "Electroactive polymers as artificial muscles and sensors: A control systems perspective," Department of Civil and Environmental Engineering, University of Michigan, Ann Arbor, MI, December 1, 2006
24. "Electroactive polymers as artificial muscles and sensors: A control systems perspective," Red Raider Mini-Symposium Series (**Outstanding Early-Career Speaker**), Department of Mathematics and Statistics, Texas Tech University, Lubbock, TX, November 10, 2006
25. "Electroactive polymers as artificial muscles and sensors: A control systems perspective," Center for Information and Systems Engineering, Boston University, Boston, MA, November 3, 2006
26. "Electroactive polymers as artificial muscles and sensors: A control systems perspective," Department of Mechanical Engineering, Michigan State University, East Lansing, MI, October 24, 2006,
27. "Modeling and control of hysteresis in smart materials," Beijing University of Aeronautics and Astronautics, Beijing, China, October 12, 2006
28. "Electroactive polymers as artificial muscles and sensors: A control systems perspective," Beijing University of Aeronautics and Astronautics, Beijing, China, October 12, 2006
29. "Modeling and control of smart material actuators," Mechanical Engineering Department Seminar, University of Nevada, Reno, NV, April 14, 2006
30. "Modeling and control of hysteresis in smart materials," Center for Advanced Control Technologies Seminar, Cleveland State University, Cleveland, OH, October 28, 2005
31. "Modeling and control of hysteresis in smart materials," Applied Mathematics Seminar, Michigan State University, East Lansing, MI, April 7, 2005
32. "Almost symplectic Runge-Kutta schemes for Hamiltonian systems," Applied and Interdisciplinary Mathematics Seminar, University of Michigan, Ann Arbor, MI, March 18, 2005
33. "Modeling and control of hysteresis in smart materials," Control Seminar Series, University of Michigan, Ann Arbor, MI, November 12, 2004
34. "Modeling and control of hysteresis in smart materials," Small Smart Systems Center, University of Maryland, College Park, MD, February 20, 2004
35. "Modeling and control of hysteresis in smart materials," Department of Electrical and Computer Engineering, Michigan State University, East Lansing, MI, February 9, 2004
36. "Structure-preserving numerical integrators for Hamiltonian systems," ISR Student-Faculty Colloquium, Institute for Systems Research, University of Maryland, College Park, MD, May 13, 2003

MEDIA COVERAGE OF RESEARCH & EDUCATION

1. “MSU uses grant to improve search-and-rescue missions with humans and robots,” *MSU Today*, by Ally Hamzey and Patricia Mroczek, <http://msutoday.msu.edu/news/2017/msu-uses-grant-to-improve-search-and-rescue-missions-with-humans-and-robots/>, September 8, 2017
2. “Interdisciplinary panel dives into underwater robotics,” AAAS, by Juwon Song, <https://www.aaas.org/news/interdisciplinary-panel-dives-underwater-robotics>, June 22, 2017
3. “Great Lakes scientists team up to track fish with GLATOS,” *Great Lakes Echo*, by Max Johnston, <http://greatlakesecho.org/2017/05/03/great-lakes-scientists-team-up-to-track-fish-with-glatos/>, May 3, 2017
4. “To track down bloodsucking lampreys, this robot swims like a fish,” *Motherboard*, by David Thaler, <http://motherboard.vice.com/read/to-track-down-bloodsucking-lampreys-this-robot-swims-like-a-fish>, October 26, 2016
5. “MSU Science Festival draws community crowd,” *the State News*, by Diamond Henry, <http://statenews.com/article/2016/04/msu-science-festival-2016>, April 20, 2016
6. “MSU Night at the Museums makes splash with robotic fish,” *Lansing State Journal*, by R. J. Wolcott, <http://www.lansingstatejournal.com/story/news/local/2016/04/14/msu-museums-open-doors-science-festival/82936252/>, April 14, 2016
7. “Michigan State robotic fish dive deep,” *BTN LiveBIG*, <https://youtu.be/bagzkrz8YVQ>, January 13, 2016
8. “Robofish gets a new mission: finding Nemo,” *MSU Today*, by Tom Oswald, <http://msutoday.msu.edu/news/2014/robofish-gets-a-new-mission-finding-nemo/>, September 24, 2014

Related coverage:

- “MSU’s robofish is getting an upgrade,” *WILX News 10*, by Ann Pierret, <http://www.wilx.com/news/headlines/MSUs-Robofish-is-Getting-an-Upgrade--277002771.html>, September 24, 2014
 - “Move over, Robocop. Robotic fish is here,” *Michigan Radio*, by Tracy Samilton, <http://michiganradio.org/post/move-over-robocop-robofish-here>, September 24, 2014
 - “US aids Michigan State to build better robofish,” *the Associated Press*, http://hosted2.ap.org/APDEFAULT/EnvironmentandNature/Article_2014-09-28-MI--Robofish-MichiganState/id-a6c6c835a2404a8eabb5187f694d4710, September 28, 2014
 - “MSU spawns ‘robofish’ to monitor Great Lakes,” *WKAR Radio*, <http://wkar.org/post/msu-spawns-robofish-monitor-great-lakes>, October 17, 2014
9. “Faculty Voice: Xiaobo Tan: Robofish “Grace” takes a road trip,” *MSU Today*, by Xiaobo Tan, <http://msutoday.msu.edu/360/2013/faculty-voice-xiaobo-tan-robofish-grace-takes-a-road-trip-1/>, July 26, 2013
 10. “Robotics-themed program takes aim at science teaching,” *MSU Today*, by Tom Oswald, msutoday.msu.edu/news/2013/robotics-themed-program-takes-aim-at-science-teaching/, March 21, 2013

11. "Robofish GRACE glides with the greatest of ease," *MSU Today*, by Tom Oswald, msutoday.msu.edu/news/2013/robofish-grace-glides-with-the-greatest-of-ease/, January 14, 2013
 Related coverage:
 - "Robo fish can glide (almost) forever," *NBC News*, by John Roach, <http://www.nbcnews.com/technology/futureoftech/robo-fish-can-glide-almost-forever-1B7987620>, January 15, 2013
 - "Submersible robotic fishoplane can swim for hundreds of kilometers," *IEEE Spectrum*, by Evan Ackerman, <http://spectrum.ieee.org/automaton/robotics/industrial-robots/submersible-robotic-fishoplane-can-swim-for-hundreds-of-kilometers>, January 17, 2013
 - "A robotic fish to test our dirty waters," *Scientific American*, by Ben Schiller, <http://www.scientificamerican.com/article.cfm?id=a-robotic-fish-to-test-our-dirty-wa-2013-01>, January 24, 2013
 - "Face time: Xiaobo Tan, Robotic fish developer," *the State News*, by Alex McClung, <http://statenews.com/article/2013/01/face-time-xiaobo-tan>, January 17, 2013
 - Story covered by other media, such as *German Public Radio*, *Science Daily*, *FastCompany*, *Gizmag*, *Engadget*, and *Futurity*.
12. "Robotic fish patrol waters for pollutants," *LiveScience*, by Xiaobo Tan, <http://www.livescience.com/21081-robot-fish-patrol-nsf-ria.html>, June 20, 2012
13. "Robotic fish search water for pollutants," *Bloomberg TV* and *Planet Forward*, <http://www.bloomberg.com/video/94078211-robotic-fish-search-water-for-pollutants.html>, June 4, 2012
14. "Water-monitoring robofish almost ready to patrol Great Lakes," *Great Lakes Echo*, by Jennifer Kalish, <http://greatlakesecho.org/2012/05/29/water-monitoring-robofish-almost-ready-to-patrol-great-lakes/>, May 29, 2012
15. "Back to school: Robotic fish make a splash," *Environmental Monitor*, by Kelly Blumenschein, <http://www.fondriest.com/news/back-to-school-robotic-fish-make-a-splash.htm>, April 3, 2012
16. "Robotic fish could monitor water quality," NSF Highlights at *Science, Engineering, and Education Innovation (SEE Innovation)*, <http://bit.ly/GGfJKL>, 2012
17. "A journey into Evolution Park: A new dimension," *Currents Magazine*, by Laura Seeley, pp. 10-17, 2011-2012 issue
http://www.egr.msu.edu/files_egr/publications/CurrentsMagazine2011-2012.pdf
18. "New robotic fish detect harmful pollutants," *The State News*, by Kelsie Thompson, http://www.statenews.com/index.php/article/2011/09/new_robotic_fish_detect_harmful_pollutants, September 22, 2011
19. "Synchronized swimming: Patrolling for pollution with robotic fish," *Scientific American* guest blog, by Robin Smith, <http://blogs.scientificamerican.com/guest-blog/2011/09/19/synchronized-swimming-patrolling-for-pollution-with-robotic-fish/>, September 19, 2011

20. “Robofish wonder,” *Big Ten Network: MSU Today*, http://www.youtube.com/watch?v=cAE15_QK-IEo&feature=player_embedded, November 4 and 12, 2010
21. “MSU pushing robot development,” *the State News*, http://www.stateneews.com/index.php/article/2010/02/msu_pushing_robot_development, February 4, 2010
22. “Michigan State collaboration spawns robotic fish to monitor water quality,” *MSU News*, <http://news.msu.edu/story/7057/>, November 2, 2009

Related coverage:

- “MSU receives grant to develop robot fish,” *the State News*, http://www.stateneews.com/index.php/article/2009/11/msu_receives_grant_to_develop_robot_fish, November 3, 2009
 - “NEMO’s new mission: Find toxic algae blooms,” *Capital News Service, MSU School of Journalism*, <http://capitalnewsservice.wordpress.com/2009/11/06/nemos-new-mission-find-toxic-algae-blooms/>, November 6, 2009
 - “Robotic fish a step forward for zoologists: MSU-developed Tool Monitors Oxygen, Temperature in Water,” *Lansing State Journal*, <http://www.lansingstatejournal.com/apps/pbcs.dll/article?AID=2009912260315>, December 26, 2009
 - Story covered by online media: *US News and World Report, Scientific American, Science Daily, Great Lakes IT Report, Great Lakes Echo, Science 360 News Service*, and many others.
23. “Grant to expose teachers to research, translate excitement to classroom,” *MSU News*, <http://news.msu.edu/story/6664/>, August 6, 2009

Related coverage:

- “MSU assistant professor develops teacher-training program,” *the State News*, http://www.stateneews.com/index.php/article/2009/08/msu_assistant_professor_develops_teacher_training_program, August 10, 2009
 - “MSU gets grant for unique engineering program,” *Great Lakes IT Report*, <http://www.wwj.com/pages/4963659.php>, August 7, 2009
24. “Making waves: Research explores uses for robotic fish,” Cover story on *Networks* (MSU ECE magazine), Winter 2008/2009 issue
 25. “Magnet brings toys to class,” *the State News*, http://www.stateneews.com/index.php/article/2007/07/magnet_brings_toys_to_class, July 17, 2007
 26. “Career plan links teaching, research,” *MSU Today*, Summer 2006 issue

PROFESSIONAL MEMBERSHIP AND SERVICE

1. Professional membership

- Fellow, Institute of Electrical and Electronics Engineers (IEEE)
- Member, American Society of Mechanical Engineers (ASME)

2. Service to professional societies

- Treasurer, ASME Dynamic Systems and Control Division, 2015 -
- Member, IEEE Control Systems Society Video Clip Contest Jury, 2015

- Liaison, IEEE Control Systems Society to IEEE Nanotechnology Council, 2012 - 2014
- Awards Chair (2015), Chair (2014), Vice Chair (2013), Conference Activities Chair (2012), Secretary (2011), ASME DSCD Technical Committee on Mechatronics

3. Editorship

- Associate Editor, Automatica, April 2008 - present
- Associate Editor, International Journal of Advanced Robotic Systems, December 2013 - July 2016
- Technical Editor, IEEE/ASME Transactions on Mechatronics, February 2012 - July 2015
- Lead Guest Editor (with Drs. K. K. Leang and Z. Yin), International Journal of Intelligent Robotics and Applications, focused section on Advances in Soft Robotics (target issue: May 2017)
- Guest Editor (with Drs. G. Berselli and R. Verthey), Meccanica, special issue on Soft Mechatronics: Mechanics and Multi-physics of Compliant Transducers (November 2015 issue)
- Guest Editor (with Drs. M. Al Janaideh and M. Rakotondrabe), IEEE/ASME Transactions on Mechatronics, focused section on Hysteresis in Smart Mechatronic Systems: Modeling, Identification, and Control (December 2015 issue)
- Guest Editor (with Drs. M. Kruusmaa, P. Fiorini, R. Madhavan, C. Laschi), Robotics and Autonomous Systems, special issue for selected papers from 15th International Conference on Advanced Robotics, 2011
- Lead Guest Editor (with Dr. R. V. Iyer), IEEE Control Systems Magazine, special section on Modeling and Control of Hysteresis (February 2009 issue)
- Member, ASME Dynamic Systems and Control Division (DSCD) Conference Editorial Board, 2011 - 2013
- Member, IEEE Control Systems Society Conference Editorial Board, 2007 - 2010
- Member, Editorial Board of International Journal of Applied Electromagnetics and Mechanics, for special issue of Proceedings of 13th International Symposium on Applied Electromagnetics and Mechanics (ISEM'2007)
- Associate Editor, ISA Conference Editorial Board for American Control Conference (ACC'2005, 2006)

4. Operating committees of conferences

- Registration Chair, 2016 IEEE/ASME International Conference on Advanced Intelligent Mechatronics (AIM'2016)
- Finance Chair, 2015 American Control Conference (ACC'2015)
- Program Chair, the 15th International Conference on Advanced Robotics (ICAR'2011)

5. Conference program committees and organizing committees

- Program committee member, Robotics: Science and Systems 2017 (RSS 2017)
- Associate Editor, IEEE International Conference on Advanced Intelligent Mechatronics (AIM' 16, AIM' 17)
- Mechatronics Track Chair, 2014 ASME Dynamic Systems and Control Conference (DSCC' 14)
- Program committee member/Associate Editor, 2014 IEEE/ASME International Conference on Advanced Intelligent Mechatronics (AIM' 14)

- Program Co-chair/Associate Editor, 2013 IEEE/ASME International Conference on Advanced Intelligent Mechatronics (AIM'13)
- Technical program committee member, 7th ACM International Conference on Underwater Networks & Systems (WUWNet'12)
- International program committee member, 2012 International Conference on Intelligent Robotics and Applications (ICIRA'2012)
- Focused Session Chair, 2010 IEEE/ASME International Conference on Advanced Intelligent Mechatronics (AIM'2010)
- Program committee member, World Congress on Intelligent Control and Automation (WCICA'10, WCICA'12)
- Program committee member, the 6th International Conference on Informatics in Control, Automation and Robotics (ICINCO'09)
- Local Arrangement Chair, IEEE Nanotechnology Materials and Devices Conference (NMDC'09)
- Organizing committee member and co-chair for poster sessions, 2009 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS'2009)
- International program committee member, 2009 International Symposium on Intelligent Control (ISIC'2009)
- Program committee member, American Control Conference (ACC'2008, ACC'2010, ACC'2016)
- International program committee member, ASME/IEEE International Conference on Mechatronic and Embedded Systems and Applications (MESA'2007, MESA'2008, MESA'2010)
- Organizing committee member and co-chair for poster sessions, IEEE International Conference on Robotics and Biomimetics (ROBIO'2008)
- Organizing committee member, International Symposium on Applied Electromagnetics and Mechanics (ISEM'2007)
- Program committee member, IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS'2006)
- Organizing committee member & Co-chair for local arrangements and awards, IEEE International Conference on Electro/Information Technology (EIT'2006)
- Program committee member, IEEE/ASME International Conference on Advanced Intelligent Mechatronics (AIM'2005, AIM'2007, AIM'2011)

6. Conference panels, workshops, and special sessions

- Organizer (with Drs. Mohammad Al Janaideh and Micky Rakotondrabe), invited session on "Control of Systems with Hysteresis," American Control Conference, Boston, MA, 2016
- Co-organizer (with Drs. Mohammad Al Janaideh and Micky Rakotondrabe), invited session on "Modeling and Control of Smart Material Systems," American Control Conference, Chicago, IL, 2015
- Organizer (with Dr. Mohammad Al Janaideh), invited session on "Modeling, Analysis, and Control of Systems with Hysteresis," American Control Conference, Portland, OR, 2014
- Co-organizer (with Dr. Bayu Jayawardhana and Dr. David Naso), invited session on "Analysis and Control of Systems with Hysteresis," 52nd IEEE Conference on Decision and Control, Florence, Italy, 2013
- Co-organizer (with Dr. Michael Malisoff), minisymposium on "Marine Robotic Controls," SIAM Conference on Control and Its Applications, San Diego, CA, 2013

- Organizer (with Dr. Ram V. Iyer), invited session on “Modeling, Analysis, and Control of Systems with Hysteresis,” American Control Conference, Washington, DC, 2013
- Panelist, panel “Mechatronics for Bio-Systems and Health Care,” IEEE/ASME International Conference on Advanced Intelligent Mechatronics, Montreal, Canada, 2010
- Organizer, invited session on “Electroactive Polymer Actuators and Sensors,” IEEE/ASME International Conference on Advanced Intelligent Mechatronics, Montreal, Canada, 2010
- Co-organizer (with Dr. Maurizio Porfiri), invited session on “Ionic Polymer-Metal Composite (IPMC) Sensors and Actuators,” 2nd Annual ASME Dynamic Systems and Control Conference, Hollywood, CA, 2009
- Organizer, invited session on “Smart Materials”, International Symposium on Applied Electromagnetics and Mechanics, East Lansing, MI, 2007
- Organizer (with Dr. Kwang J. Kim), invited session on “Electroactive Polymer Sensors and Actuators”, World Forum on Smart Materials and Smart Structures Technology, Chongqin & Nanjing, China, 2007
- Organizer (with Dr. Ram V. Iyer), special session on “Modeling, Analysis and Control of Systems with Hysteresis”, American Control Conference, New York, NY, 2007
- Invited instructor, tutorial on “Electro-Active Polymer Actuators and Sensors in Robotics”, IEEE/RSJ International Conference on Intelligent Robots and Systems, Beijing, China, 2006
- Panelist, NSF/ARO/AACC session “Early Career Development”, American Control Conference, Minneapolis, MN, 2006

7. Conference session chair/co-chair

- IEEE Conference on Decision and Control, Las Vegas, NV (2016, Session TuA02)
- ASME Dynamic Systems and Control Conference, Minneapolis, MN (2016, Session 14-2)
- IEEE International Conference on Advanced Intelligent Robotics, Banff, Canada (2016, Session WeAT5)
- American Control Conference, Boston, MA (2016, Session WeA19)
- American Control Conference, Chicago, IL (2015, Session ThA17)
- IEEE/ASME International Conference on Advanced Intelligent Mechatronics, Wollongong, Australia (2013, Sessions WeCT5, ThAT3, FrBT5)
- American Control Conference, Washington, DC (2013, Session TuB16)
- The 15th International Conference on Advanced Robotics, Tallinn, Estonia (2011, Session WeB2)
- IEEE International Conference on Robotics and Automation, Shanghai, China (2011, Sessions WeA107, WeP111)
- IEEE/ASME International Conference on Advanced Intelligent Mechatronics, Montreal, Canada (2010, Session WeA5)
- IEEE/RSJ International Conference on Intelligent Robots and Systems, St. Louis, MO (2009, Sessions MoIIT6, TuIT2, TuIIT13)
- American Control Conference, St. Louis, MO (2009, Session FrA18)
- IEEE International Conference on Robotics and Automation, Kobe, Japan (2009, Session FrC11)
- 16th SPIE Annual International Symposium on Smart Structures and Materials & Nondestructive Evaluation and Health Monitoring: Electroactive Polymer Actuators and Devices (EAPAD XI), San Diego, CA (2009, Session 8)

- American Control Conference, Seattle, WA (2008, Session WeC03)
- International Symposium on Applied Electromagnetics and Mechanics, East Lansing, MI (2007, Session M-PM-2)
- American Control Conference, New York, NY (2007, Session FrA03)
- World Forum on Smart Materials and Smart Structures Technology, Chongqing & Nanjing, China (2007, Session S27)
- IEEE/RSJ International Conference on Intelligent Robots and Systems, Beijing, China (2006, Session FP1-13)
- Nanomedicine Conference, East Lansing, MI (2006, Hot Topic Session in Symposium II)
- American Control Conference, Portland, OR (2005, Session FrA03)
- American Control Conference, Denver, CO (2003, Session FM11)
- Third SIAM Conference on Mathematical Aspects of Materials Science, Philadelphia, PA (2000, Session CP11)

8. Reviewer for government agencies and other proposal programs

- Panelist, NSF, 2004; 2006 (twice); 2008; 2009 (four times); 2010 (twice); 2011 (twice); 2012 (twice); 2013 (twice); 2014 (twice); 2015 (four times);
- Reviewer, Hong Kong RGC, 2016
- Reviewer, Deutsche Forschungsgemeinschaft (DFG), Germany, 2015
- Reviewer, King Abdullah University of Science and Technology (KAUST), Kingdom of Saudi Arabia, 2015
- Ad hoc reviewer, NSF, 2005, 2011, 2014, 2017
- Reviewer, NASA, 2010, 2011
- Reviewer, Army Research Office, 2010

9. Reviewer for archival journals (Total: 45)

- ASME Journal of Dynamic Systems, Measurement and Control
- Automatica
- Bioinspiration and Biomimetics
- Chaos: An Interdisciplinary Journal of Nonlinear Science
- Continuum Mechanics and Thermodynamics
- Discrete and Continuous Dynamical Systems
- European Journal of Control
- IEEE Control Systems Magazine
- IEEE/ASME Journal of Microelectromechanical Systems
- IEEE Signal Processing Letters
- IEEE Transactions on Automatic Control
- IEEE Transactions on Control Systems Technology
- IEEE Transactions on Industrial Electronics
- IEEE Transactions on Industrial Informatics
- IEEE Transactions on Magnetics

- IEEE/ASME Transactions on Mechatronics
- IEEE Transactions on Neural Networks
- IEEE Transactions on Robotics
- IEEE Transactions on Systems, Man, and Cybernetics: Systems
- IEEE Transactions on Systems, Man, and Cybernetics C
- International Journal for Numerical Analysis and Modeling
- International Journal on Mechatronics
- International Journal of Advanced Robotic Systems
- International Journal of Control
- International Journal of Modelling and Simulation
- International Journal of Smart and Nano Materials
- Journal of Applied Physics
- Journal of Bionic Engineering
- Journal of Computational and Applied Mathematics
- Journal of Fluids and Structures
- Journal of Intelligent Material Systems and Structures
- Journal of Magnetism and Magnetic Materials
- Journal of Mechanisms and Robotics
- Journal of Nanoscience and Nanotechnology
- Journal of Nonlinear Science
- Journal of Vacuum Science and Technology A
- Journal of Zhejiang University Science A
- Materials Science and Engineering: C
- Optimal Control, Applications and Methods
- Physica B
- Polymer International
- Proceedings of the Royal Society A
- Scientific Reports
- Sensors and Actuators A: Physical
- SIAM Journal on Applied Mathematics
- SIAM Journal on Control and Optimization
- Smart Materials and Structures
- Systems and Control Letters

10. Reviewer for publishers

- Elsevier, 2014, 2015, 2016, 2017
- Princeton University Press, 2010
- Pan Stanford Publishing, Singapore, 2008
- McGraw-Hill Companies, 2007

- Springer, 2006

11. Reviewer for conferences

- ACM International Conference on Underwater Networks and Systems (WUWNet 2012)
- American Control Conference (ACC 2004, 2005, 2007 - 2012, 2014, 2017)
- ASME Dynamic Systems and Control Conference (DSCC 2009, 2010, 2015, 2017)
- European Control Conference (ECC 2007, 2009)
- IEEE Conference on Control Applications (CCA 2004, 2006)
- IEEE Conference on Decision and Control (CDC 2004 - 2007, 2011, 2016, 2017)
- IEEE Conference on Robotics and Automation (ICRA 2008, 2011-2014, 2017)
- IEEE International Conference on Electro/Information Technology (EIT 2006)
- IEEE International Conference on Networks (ICON 2004)
- IEEE International Conference on Robotics and Biomimetics (ROBIO 2008)
- IEEE/ASME International Conference on Advanced Intelligent Mechatronics (AIM 2005, 2007, 2011, 2012, 2017)
- IEEE/ASME International Conference on Mechatronic and Embedded Systems and Applications (MESA 2008)
- IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2006, 2008, 2010, 2011, 2012, 2014)
- IFAC Symposium on Mechatronic Systems (2010)
- IFAC Workshop on Fractional Derivatives and Applications (FDA 2010, 2013)
- IFAC World Congress (2005, 2008, 2011, 2014, 2017)
- The 1st International Conference on Applied Bionics and Biomechanics (ICABB 2010)
- International Conference on Intelligent Robots and Applications (ICIRA 2012)
- Joint International Symposium on Intelligent Control & 13th Mediterranean Conference on Control and Automation (ISIC-MED 2005)
- The 8th World Congress on Intelligent Control and Automation (WCICA 2010)

ADVISING

1. Ph.D. student advisees (Total: 20)

- Demetris Coleman, Ph.D. program, August 2017 - present. Topic: Soft robotics.
- Mohammed Al-Rubaiai, Ph.D. program, August 2016 - present. Topic: Soft robotics.
- Hongyang Shi, Ph.D. program, August 2016 - present. Topic: Soft robotics.
- Maria Castano, Ph.D. program, August 2014 - present. Topic: Control of robotic fish.
- Pratap Solanki, Ph.D. program, August 2014 - present. Topic: Development and control of underwater robotic systems.
- Thassy Pinto (Co-advisor: Dr. Chris Adami), Ph.D. program, August 2014 - present. Topic: Soft robotics.
- Osama En-Nasr, Ph.D. program, August 2013 - present. Topic: Adaptive sampling with gliding robotic fish.

- Jason Greenberg, Ph.D. program, August 2013 - present. Topic: Underwater sensing and navigation.
- Montassar Sharif, Ph.D. program, August 2013 - present. Topic: Artificial lateral line systems for flow sensing.
- Sanaz Behbahani, Ph.D. program, August 2011 - December 2016. Dissertation: *Role of flexibility in robotic fish*. Currently Innovation R&D Engineer with ABB.
- Jun Zhang, Ph.D. program, August 2011 - December 2015. Dissertation: *Modeling, identification, and control of hysteretic systems with application to vanadium dioxide microactuators*. Currently postdoc at University of California, San Diego.
- Hong Lei, Ph.D., August 2009 - May 2015. Dissertation: *Modeling and fabrication of ionic polymer-metal composite (IPMC) sensors*. Currently with Schweitzer Engineering Laboratories (SEL).
- Jianxun Wang, Ph.D., August 2009 - August 2014. Dissertation: *Robotic fish: Development, modeling, and application to mobile sensing*. Currently Mechatronic Engineer at Apple Inc.
- Feitian Zhang, Ph.D., August 2009 - August 2014. Dissertation: *Modeling, design and control of gliding robotic fish*. Currently Assistant Professor at George Mason University.
- Mohamed Edardar (Principal advisor: Dr. Hassan Khalil), Ph.D., August 2008 - August 2013. Dissertation: *Robust Control of Systems with Piecewise Linear Hysteresis*. Currently Assistant Professor at University of Tripoli, Libya.
- Alex Esbrook (Co-advisor: Dr. Hassan Khalil), Ph.D., January 2009 - December 2012. Dissertation: *Control of Systems with Hysteresis Using Servocompensators*. Currently with Williams International.
- Ahmad T. Abdulsadda, Ph.D., February 2010 - August 2012. Dissertation: *Artificial Lateral Line Systems for Feedback Control of Underwater Robots*. Currently faculty member and Associate Dean of Al Najaf Technical College and Al Furat Al Wast University, Iraq.
- Zheng Chen, Ph.D., January 2005 - August 2009. Dissertation: *Ionic Polymer-Metal Composite Artificial Muscles and Sensors: A Control Systems Perspective*. Currently Bill Cook Assistant Professor at University of Houston.
- Yang Fang, Ph.D., August 2005 - August 2009. Dissertation: *Conjugated Polymer Actuators and Sensors: Modeling, Control, and Applications*. Currently Senior Embedded System Engineer at Thoratec Corporation.
- Jeff Ahrens (Principal advisor: Dr. Hassan Khalil), Ph.D., January 2005 - December 2006. Dissertation: *Design and Performance Tradeoffs of High-Gain Observers with Applications to Smart Material Actuated Systems*. Currently Advanced Controls Innovation Manager at Corning Incorporated.

2. M.S. student advisees (Total: 7)

- Hussein Hasan, M.S. program in Mechanical Engineering, September 2013 - August 2015. Thesis: *Design, Development, and Modeling of a Wirelessly Charged Robotic Fish*. Currently Assistant Lecturer at University of Baghdad, Iraq.
- Ali Abul, M.S. program in Mechanical Engineering, August 2013 - August 2015. Thesis: *Microbial Fuel Cells: Design, Control-oriented Modeling, and Experimental Results*. Currently Project Engineer at DDI Engineering Inc.
- Mohammed Al-Rubaiai, M.S. program, September 2013 - August 2015. Thesis: *Design and Development of an LED-based Optical Communication System*. Currently Ph.D. student at Michigan State University.

- Freddie Alequin-Ramos, M.S., August 2011. Currently with Dart Container.
 - Dawn Hedgepeth, M.S., August 2010. Joined Lockheed Martin upon graduation.
 - Stephan Shatara, M.S., August 2006 - December 2008. Thesis: *Development of Small Biomimetic Robotic Fish with Onboard Fine-Grained Localization*. Currently Senior Systems Engineer at Motorola Solutions.
 - Nathan Usher, M.S., January 2006 - August 2007. Thesis: *Digital Low-Level Radio Frequency Control and Microphonics Mitigation of Superconducting Cavities*. Currently RF Engineer with Ionetix Corporation.
3. Postdoctoral advisees
- Dr. Hong Lei, June 2015 - March 2016. Topic: Design and fabrication of electroactive polymer-based artificial lateral lines.
 - Dr. Mart Anton, August 2008 - June 2009. Topic: Computational fluid dynamics (CFD) modeling of robotic fish.
4. Exchange student advisees (Total: 7)
- Lei Fang, Peking University, China, September 2014 - September 2015. Topic: Analysis and control of systems with hysteresis.
 - Yannick Kengne-Fotsing, University of Kaiserslautern, Germany, January 2011 - July 2011. Master's thesis: *Modeling and Control of Nonlinear Behavior of IPMC Actuators*.
 - Andres Hunt, Tartu University, Estonia, February 2008 - July 2008. Topic: Self-sensing ionic polymer-metal composite actuators.
 - Qingsong Hu, Tongji University, China, October 2007 - October 2008. Topic: Modeling of turning for robotic fish.
 - Stephan Henneberger, University of Kaiserslautern, Germany, August 2007 - February 2008. Study thesis: *A Sliding Discrete Fourier Transform (SDFT)-based Localization System for Small Fish Robots*.
 - Ernest Mbemmo, University of Kaiserslautern, Germany, January 2007 - September 2007. Master's thesis: *Design and Modeling of Biomimetic Robotic Fish Propelled by an IPMC*.
 - Alex Will, University of Kaiserslautern, Germany, May 2006 - September 2006. Study thesis: *Dynamic Sensing Model for Ionic Polymer Metal Composites*.
5. Visiting scholar advisees
- Prof. Fengyu Xu, Nanjing University of Posts and Telecommunications, China, May 2016 - May 2017. Topic: Soft robotics.
 - Prof. Zhibin Li, Shenzhen Polytechnic University, China, August 2012 - February 2013. Topic: Dynamics and control of nanotube-based linear actuators.
 - Prof. Yan Shen, Chengdu University of Information Technology, China, August 2012 - August 2013. Topic: Coordination of robotic fish sensor networks subject to energy constraints.
 - Prof. Songlin Chen, Harbin Institute of Technology, China, February 2012 - February 2013. Topic: Design of nonlinear controllers for tail-actuated robotic fish.
6. Undergraduate research advisees (Total: 50)
- Brendan Luecker, September 2017 - present. Topic: Gliding robotic fish development.

- Robin Onsay, September 2017 - present. Topic: Underwater imaging with robots.
- Ruoxuan Jiang, July 2017 - August 2017. Topic: Robot Operating System (ROS) for gliding robotic fish.
- Edwin J. A. Ortega, May 2017 - July 2017. Topic: Integration of cellular data module with robots.
- Andres Aleman, May 2017 - July 2017. Topic: Circuit design for gliding robotic fish.
- Thamer Yousef Alsgan, May 2017 - July 2017. Topic: Computer vision.
- Paul Schulman, January 2017 - present. Topic: Manufacturing of underwater robots.
- Camille Emig, September 2016 - present. Topic: Graphical user interface for gliding robotic fish.
- Lucas Wolfe, May 2016 - present. Topic: 3D printing of shape memory polymers, design of wave energy harvesters, and development of gliding robotic fish.
- Sunho Choi, May 2016 - May 2017. Topic: Development of sample collection modules for underwater robots.
- Hanish Mehta, May 2016 - August 2017. Topic: Development of remotely operated vehicles (ROV).
- Yue Chen, May 2016 - December 2016. Topic: 3D printing of shape memory polymers.
- Demetris Coleman, May 2016 - July 2016. Topic: Soft actuators.
- Amin Almozal, May 2016 - July 2016. Topic: LED communication in 3D space.
- James P. Staley, February 2016 - April 2016. Topic: Programming of a quadrotor drone.
- Hanchen Xie, January 2016 - May 2017. Topic: Development of underwater robots.
- Ryan Johnson, August 2014 - present. Topic: Embedded programming of robots.
- Tingyuan Zhang, May 2014 - April 2016. Topic: Design and fabrication of mechanical parts in gliding robotic fish.
- Anthonios Doliotis, May 2015 - August 2015. Topic: Underwater acoustic communication with WHOI micromodems.
- Yujie Hao, May 2014 - August 2014. Topic: Assembly, programming, and extension of an OpenROV platform.
- Linghan Zeng, August 2014 - August 2014. Topic: Design and assembly of mechanical structures.
- Suriya M. Pachaimuthu, May 2014 - July 2014. Topic: Design of wireless charging system for robotic fish.
- Patrick Munoz, May 2014 - July 2014. Topic: Embedded programming of underwater robots.
- Scott O'Connor, May 2013 - August 2014. Topic: Solar energy-harvesting systems for underwater robots.
- Victoria Kane, May 2013 - July 2013. Topic: Design of passive joints for pectoral fins of robotic fish.
- Mark Velez, July 2012 - December 2012. Topic: CAD design of robotic fish.
- Zain Bhatti, May 2012 - July 2012. Topic: Rapid prototyping of robotic fish using 3D printing.
- Juan Castro, May 2012 - July 2012. Topic: Graphical user interface for robotic fish systems.
- Joseph Graves, May 2012 - July 2012. Topic: Limit cycles in dynamic hysteretic systems.
- Kasra Dabiran, May 2012 - August 2012. Topic: Mechanical design of robotic fish.

- Cody Thon, August 2011 - May 2016. Topic: Design and development of robotic fish and wave generators.
- ChaiYong Lim, May 2011 - July 2012. Topic: Modeling of ionic polymer-metal composite sensors.
- Osama En-Nasr, May 2011 - May 2013. Topic: Embedded systems for robotic fish.
- Bin Tian, May 2011 - May 2013. Topic: Embedded system and optical communication for underwater robots.
- Stephen England, November 2010 - May 2011. Topic: Embedded systems for robotic fish.
- Felix Adisaputra, May 2010 - August 2010. Topic: Graphical user interface for robotic fish.
- Michael Carpenter, May 2009 - October 2009. Topic: Robotic fish.
- Matt Guibord, May 2009 - August 2009 . Topic: Nanopositioning control.
- Thomas Ganley, May 2009 - February 2010. Topic: Ionic polymer-metal composite sensors.
- Alex Esbrook, May 2008 - December 2008. Topic: Collaborative control of multi-agent systems.
- Chris Gliniecki, May 2008 - December 2008. Topic: Robotic fish.
- Andrew Temme, October 2006 - April 2008. Topic: Electroactive polymer sensors.
- Ki-Yong Kwon, August 2006 - December 2007. Topic: Integrated sensory feedback for ionic polymer-metal composite actuators.
- Nate Gingery, May 2007 - August 2007. Topic: Localization of robotic fish.
- Omar Bennani, January 2006 - December 2007. Topic: Embedded control of hysteretic systems.
- Bryan Thomas, August 2006 - April 2007. Topic: Localization of robotic fish.
- Roy Dong, August 2006 - April 2007, Topic: Robotic fish educational kit; January 2010 - May 2011, Topic: Modeling and control of ionic polymer-metal composite actuators.
- Daniel Laboy, August 2005 - December 2006. Topic: Electroactive polymer-based robots.
- Jason Malinak, May 2005 - March 2006. Topic: Integrated sensory feedback for ionic polymer-metal composite actuators.
- Christopher Ziel, May 2005 - March 2006. Topic: Electroactive polymer sensors.

7. K-12 teacher advisees

- Lisa VanOrder (Perry Middle School, Perry, MI), June 2017 - August 2017. Topic: Solar charging system for gliding robotic fish.
- Randall Heck (J. W. Sexton High School, Lansing, MI), June 2016 - July 2016. Topic: Fabrication of soft pneumatic actuators.
- Dean Buggia (Okemos High School, Okemos, MI), June 2015 - July 2015. Topic: Solar cell systems for gliding robotic fish.
- Sonya Ross (Cass Tech High School, Detroit, MI), June 2014 - August 2014, Topic: Simulation and experiments on robotic fish with pectoral fins. June 2015 - July 2015, Topic: Design and prototyping of electro-rheological fluids-based flexible fin with tunable stiffness.
- John Thon (Holt Junior High School, Holt, MI), May 2008 - present. Topic: Research on robotic fish and related curriculum development.

8. High-school student advisees

- Ari Bozann, July 2017 - present. Topic: Robotics.

- Jack Sparrow, June 2017 - August 2017. Topic: Underwater robotics.
- Andrew Kim, June 2017 - August 2017. Topic: 3D-printed strain gauges.
- Lexie Roberts, May 2015 - August 2017. Topic: Graphical user interface for robotic fish exhibit and gliding robotic fish; programming of a quadrotor drone.
- Cody Thon, September 2009 - July 2011. Topic: Robotic fish.

9. Member of PhD dissertation committees (completed) (Total: 21)

- Ali Ahrari (Advisor: Dr. Kalyanmoy Deb/ECE), Ph.D., 2016
- Anthony Clark (Advisor: Dr. Philip McKinley/CSE), Ph.D., 2016
- Bo Song (Advisor: Drs. Ning Xi & Lixin Dong/ECE), Ph.D., 2016
- Chad Byers (Advisor: Dr. Betty Cheng/CSE), Ph.D., 2015
- Jianguo Zhao (Advisor: Dr. Ning Xi/ECE), Ph.D., 2015
- Randy Olson (Advisor: Dr. Chris Adami/MMG, CSE), Ph.D., 2015
- Jared Moore (Advisor: Dr. Philip K. McKinley/CSE), Ph.D., 2015.
- Yu Wang (Advisor: Dr. Guoliang Xing/CSE), Ph.D., 2015
- Erik Fredericks (Advisor: Dr. Betty Cheng/CSE), Ph.D., 2015
- Emmanuelle Merced (Advisor: Dr. Nelson Sepulveda/ECE), Ph.D., 2014
- Erick Nieves (Advisor: Dr. Ning Xi/ECE), Ph.D., 2013
- Almuatazbellah M. Boker (Advisor: Dr. Hassan Khalil/ECE), Ph.D., 2013
- Andres Ramirez (Advisor: Dr. Betty Cheng/CSE), Ph.D., 2013
- Brendan Vidmar (Advisor: Dr. Steve Shaw/ME), Ph.D., 2012
- Chi Zhang (Advisor: Dr. Ning Xi/ECE), Ph.D., 2012
- Stephen Pace (Advisor: Dr. Guoming Zhu/ME), Ph.D., 2011
- Yunfei Xu (Advisor: Dr. Jongeun Choi/ME), Ph.D., 2011
- Alexis Ball (Advisor: Dr. Hassan K. Khalil/ECE), Ph.D., 2011
- Shahid Nazrulla (Advisor: Dr. Hassan K. Khalil/ECE), Ph.D., 2010
- Hua Deng (Advisor: Dr. Thomas Pence/ME), Ph.D., 2009
- Attaullah Memon (Advisor: Dr. Hassan K. Khalil/ECE), Ph.D., 2009
- Li Sun (Advisor: Dr. Patrick Kwon/ME), Ph.D., 2009

10. Member of M.S. thesis committees (completed) (Total: 13)

- Charles S. Boling (Advisor: Andrew Mason/ECE), M.S., 2016
- Abdullah Alfehaid (Advisor: Dr. Hassan K. Khalil/ECE), M.S., 2015
- Steven Chao (Advisor: Dr. Daniel Morris/ECE), M.S., 2015
- Stephanie Priess (Advisor: Dr. Hassan K. Khalil/ECE), M.S., 2014
- Dagmara Wehr (Advisor: Dr. Guoming Zhu/ME-ECE), M.S., 2014
- Huan Lin (Advisor: Dr. Ning Xi/ECE), M.S., 2012
- Rachel Bou Serhal (Advisor: Dr. Hassan K. Khalil/ECE), M.S., 2011
- Erin Bosch (Advisor: Dr. Randy Showerman/Department of Community, Agriculture, Recreation and Resource Studies), M.S., 2011

- John Gregory (Advisor: Dr. Ning Xi/ECE), M.S., 2010
- Rui Zhang (Advisor: Dr. Ning Xi/ECE), M.S., 2010
- James Reynolds (Advisor: Dr. Hassan K. Khalil/ECE), M.S., 2007
- Luma Vasiljevic (Advisor: Dr. Hassan K. Khalil/ECE), M.S., 2007
- Tarik H. Kandil (Advisor: Dr. Hassan K. Khalil/ECE), M.S., 2005

UNIVERSITY/COLLEGE/DEPARTMENT SERVICE

1. University committees (MSU)

- MSU Water Science Network Advisory Committee, July 2016 - present
- All-University Awards Committee, Fall 2010
- University Jurisdictional Appeals Panel, 2010
- University Appeals Board, March 2007 - February 2009

2. Departmental committees

- Promotion and Tenure Committee, Summer 2016 - present
- Chair of Dennis P. Nyquist Endowed Professorship in Electromagnetics Search Committee, June 2017
- Advisory Committee of ECE Department (Member: Fall 2008 - Spring 2010, Fall 2012 - Spring 2013, Fall 2016 - Spring 2017; Chair: Fall 2011 - Spring 2012, Fall 2015 - Spring 2016)
- ECE Department Research Task Force, Fall 2010 - Spring 2015
- Graduate Recruitment Coordinator, Fall 2012 - Fall 2014
- Graduate Admissions Recruiting & Financial Aids Committee (GARFAC) (Member: Fall 2005 - Spring 2006, Fall 2009 - Spring 2010, Fall 2015 - current; Chair: Fall 2010 - Spring 2012)
- Awards Committee, Fall 2010 - Spring 2011
- ECE Seminar Series Coordinator, Fall 2006 - Spring 2008
- Graduate Studies Committee (Member: Fall 2005 - Spring 2006; Chair: Fall 2017 - present)

3. Ad hoc committees/services

- Member, Research Integrity Investigative Committee, December 2016 - May 2017
- Chair, Faculty Search Committee (robotics and controls), October 2015 - May 2016
- Chair, Department Chair Search Committee, October 2014 - July 2015
- Search Committee for Director for the Engineering Residential Experience and Cornerstone Engineering Program, College of Engineering, Michigan State University, 2011
- Search Committee for BEACON Center Education Director, Michigan State University, 2010
- Connector Faculty for engineering freshmen, 2009 - 2011
- The ECE Department Strategic Planning Committee, 2009
- College of Engineering Web Design Committee, 2007
- Search Committee for Recruitment and Retention Coordinator, Diversity Programs Office, College of Engineering, Michigan State University, 2005 - 2006
- Faculty Advisor, Undergraduate Research Program, Diversity Programs Office, Michigan State University, 2005

4. Outreach and community service

- Curator, exhibit “Robofish rendezvous”, MSU Museum, April 2016 - January 2017
- Presenter and panelist, Next Generation STEM Learning for All: A Forum Supported by NSF, Washington, DC, November 9, 2015
- Director, NSF-funded Research Experiences for Teachers (RET) Site on Robotics Engineering for Better Life and Sustainable Future, MSU, 2013 - present
- Director, NSF-funded Research Experiences for Teachers (RET) Site on Bio-Inspired Technology and Systems (BITS), MSU, 2009 - 2012
- Represented NSF (with 15 other teams) at the second US Science and Engineering Festival Expo and presented exhibit “Robotic Fish Patrolling Waters”, April 27-29, 2012
- Represented NSF (with 14 other teams) at the first US Science and Engineering Festival Expo and presented exhibit “Swimming with Robotic Fish”, October 23-24, 2010
- Held a 5-hour Frontiers in Sciences workshop for the graduate program for science teachers, offered by the MSU College of Natural Resources, Division of Science and Mathematics Education, March 26, 2011
- Representing MSU in advocating for national science funding at the 14th Annual Coalition for National Science Funding (CNSF) Exhibition and Reception, Capitol Hill, June 25, 2008
- Conducting interactive lectures and lab tours for various outreach programs, such as MSU Science Festival, Detroit-Area Pre-College Engineering Program (DAPCEP), WIMS for Teens Program, Women in Engineering Program, Grandparents University Program, High School Engineering Institute, BEACON High School Program, and Engineering Preview Day, 2005 - present
- Engineering faculty representative, Career Day at Chippewa Middle School Okemos, MI, 2006, 2007
- Smart Microsystems Lab is a designated Engineering Tour stop for prospective students and their parents (2008 - present)

CONSULTING SERVICE

1. Lear Corporation, 2005