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Minghui Zheng

Assistant Professor
Department of Mechanical and Aerospace Engineering
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Departmental Profile **Google Scholar** **Lab Website**

RESEARCH INTEREST

Dr. Minghui Zheng's primary area is **control and robotics**. One of her research directions is task sequence and robotic motion planning in a human-robot collaborative environment. She is particularly interested in such developments to improve the efficiency and effectiveness of the disassembly, recycling, and remanufacturing of end-of-use products such as e-wastes. Another research direction is learning-based control to enable learning among heterogeneous drones toward their mass customization and application. Her research interests also include collaborative estimation using connected vehicles, optimization and control for power and energy storage systems, as well as iterative learning control for high-precision systems.

EDUCATION

University of California, Berkeley — California, USA
Ph.D. in Mechanical Engineering — 05/2017
Advisor: Prof. Masayoshi Tomizuka

Beihang University — Beijing, China
M.S. in Control Science and Engineering — 03/2011

Beihang University — Beijing, China
B.S. in Engineering Mechanics — 07/2008

PROFESSIONAL EXPERIENCE

Assistant Professor — 08/2017 – present
Department of Mechanical and Aerospace Engineering
University at Buffalo

MAJOR AWARDS

CAREER Award, National Science Foundation (NSF) — 2021
SEAS Early Career Researcher of the Year, University at Buffalo (UB) — 2021

GRANTS

Summary of Research Funding:

Role as PI or UB PI	My Share
$6,542,298	$2,133,199

Dr. Zheng's research has been supported by part of an approximate **$6.5M** total funding of which she is the PI or university PI. So far her share of the research funding is more than **$2M**. She has been working on **six** NSF grants as the PI. In particular, she is leading a **$3M** NSF-funded project on human-robot

partnerships in e-waste disassembly. She also got the **CAREER** award on learning-based control.

Federal Funding

1. **[NSF]** CAREER: Facilitating Autonomy of Robots Through Learning-Based Control, 09/01/2021-08/31/2026, $571,087 (my role and share: PI, $562,520).
2. **[NSF]** NRI/Collaborative Research: Robotic Disassembly of High-Precision Electronics, 02/01/2022-01/31/2025, $864,913 with a UB portion of $564,913 (my role and share: PI, $282,456.5).
3. **[NSF]** FW-HTF-RL: Collaborative Research: The Future of Remanufacturing: Human-Robot Collaboration for Disassembly of End-of-Use Products, 10/01/2020-09/30/2024, $3,000,000 with a UB portion of $1,485,803 (my role and share: PI, $594,321).
4. **[NSF]** Collaborative Research: Road Information Discovery through Privacy-Preserved Collaborative Estimation in Connected Vehicles, 09/01/2020-08/31/2023, $569,917 with a UB portion of $288,508 (my role and share: PI, $288,508).
5. **[NSF]** FW-HTF-P: Human-Robot Collaboration in Disassembly for Future Remanufacturing, 09/01/2019-08/31/2021, $149,950 (my role and share: PI, $50,983).
6. **[NSF]** Collaborative Research: A Holistic Human-in-the-Loop-Framework for Optimizing A Personalized Prosthetic Arm, 09/01/2022-08/31/2025, $406,431 with a UB portion of $249,852 (my role: PI; former PI: Jiyeon Kang; my share: inheriting $208,210 from former UB PI).
7. **[DOE-REMADE]** Improving Recycling Efficiency of Portable Electronics by Automating Battery Disassembly, Department of Energy through REMADE Institute, 11/01/2022 (expected)-10/31/2024, $890,000 (including a $450,000 costshare) with a UB portion of $220,000 (my role and share: UB PI, $110,000 including a $57,500 costshare).

Other Funding

8. Robotic Systems for Future Pandemics, 04/2022-09/2023, Buffalo Blue Sky, University at Buffalo, $10,000 (my role and share: Co-PI, $5,000).
9. A Scalable and Customizable Framework for Multi-Agent Collaboration in Smart Manufacturing, 10/01/2019-12/31/2020, Sustainable Manufacturing and Advanced Robotic Technologies, University at Buffalo, $25,000 (my role and share: PI, $12,500).
10. Towards Greater Sustainability and Autonomy: Human-Robot Collaboration for Disassembly in Future Manufacturing, 09/01/2018-08/31/2019, Sustainable Manufacturing and Advanced Robotic Technologies, University at Buffalo, $25,000 (my role and share: PI, $8,500).
11. Smart 2D Material Synthesis: Data and Knowledge Driven MoS2 Growth, Experimental Design, Modeling, and Control, 01/31/2018-01/31/2019, Innovative Micro-Programs Accelerating Collaboration in Themes, University at Buffalo, $30,000 (my role and share: PI, $10,000).

PUBLICATIONS

Refereed Journal Articles

Dr. Zheng has authored/co-authored 34 journal articles, 26 of which are based on the work conducted after she joined the University at Buffalo. She has published papers in major journals in her field, such as IEEE Transactions on Systems, Man, and Cybernetics: Systems, IEEE/ASME Transactions on Mechatronics, IEEE Transactions on Robotics, IEEE Transactions on Automatic Control, IEEE Robotics and Automation Letters, and Robotics and Computer-Integrated Manufacturing. These publications documented discoveries and insights in learning, planning, and control algorithms for collaborative robots, drones, high-precision data and energy storage systems, etc.

[34] Z. Chen, C. Liu, H. Su, X. Liang, and **M. Zheng**, "A hybrid disturbance observer for delivery drone's oscillation suppression," *Mechatronics*, accepted.

[33] R. Adlakha, W. Liu, S. Chowdhury, **M. Zheng**, and M. Nouh, "Integration of acoustic compliance in indoor path planning for drones in human-robot collaborative environments," *Journal of Vibration and Control*, accepted.

[32] M. Lee, W. Liu, S. Behdad, X. Liang, and **M. Zheng**, "Robot-assisted disassembly sequence planning with real-time human motion prediction," *IEEE Transactions on Systems, Man, and Cybernetics: Systems*, 2022, early access.

[31] M. Hajidavalloo, Z. li, X. Xia, **M. Zheng**, and W. Zhuang, "Cloud-assisted collaborative road information discovery with Gaussian process: Application to Road Profile Estimation," *IEEE Transactions on Intelligent Transportation Systems*, 2022, early access.

[30] W. Liu, X. Liang, and **M. Zheng**, "Dynamic model informed human motion prediction based on unscented Kalman filter," *IEEE/ASME Transactions on Mechatronics*, 2022, early access.

[29] Z. Chen, M. Hajidavalloo, Z. li, and **M. Zheng**, "A cascaded learning framework for road profile estimation using multiple heterogeneous vehicles," *ASME Journal of Dynamic Systems, Measurement and Control*, 2022; 144(10): 104501.

[28] T. Huang, S. Zhang, S. Yu, M. MacLean, J. Zhu, A.D. Lallo, C. Jiao, T. Bulea, **M. Zheng**, and H. Su, "Modeling and stiffness-based continuous torque control of lightweight quasi-direct-drive knee exoskeletons for versatile walking assistance," *IEEE Transactions on Robotics*, vol. 38, no. 3, pp. 1442-1459, 2022.

[27] M. Lee, S. Behdad, X. Liang, and **M. Zheng**, "Task allocation and planning for product disassembly with human-robot collaboration," *Robotics and Computer-Integrated Manufacturing*, vol 76, pp. 102306, 2022.

[26] S.O. Sajedi, W. Liu, K. Eltouny, **M. Zheng**, and X. Liang, "Uncertainty-assisted image-processing for human-robot close collaboration," *IEEE Robotics and Automation Letters*, vol. 7, no. 2, pp. 4236-4243, 2022.

[25] Z. Xia, M. Su, Z. Liu, **M. Zheng**, X. Zhang and P. Wang, "Feasible power-flow solution analysis of DC microgrid considering distributed generations under MPPT control," *IEEE Transactions on Smart Grid*, vol. 13, no. 1, pp. 139-148, 2022.

[24] Z. Liu, M. Su, Y. Sun, X. Zhang, X. Liang, and **M. Zheng**, "A comprehensive study on existence and stability of equilibria of DC distribution with constant power loads," *IEEE*

Transactions on Automatic Control, vol. 67, no. 4, pp. 1988-1995, 2022.

[23] Z. Chen, X. Liang, and **M. Zheng**, "Iterative learning for heterogeneous systems," *IEEE/ASME Transactions on Mechatronics*, vol. 27, no. 3, pp. 1510-1521, 2022.

[22] R. Adlakha and **M. Zheng**, "A two-step optimization-based iterative learning control for UAVs," *Journal of Dynamic Systems, Measurement, and Control*, 143(7): 071006, 2021.

[21] **M. Zheng**, X. Lv, X. Liang, and F. Zhang, "A generalized design method for learning-based disturbance observer," *IEEE/ASME Transactions on Mechatronics*, vol. 26, no. 1, pp. 45-54, 2021.

[20] G. Shi, H. Han, Y. Sun, Z. Liu, **M. Zheng**, and X. Hou, "A decentralized SOC balancing method for cascaded-type energy storage system," *IEEE Transactions on Industrial Electronics*, vol. 68, no. 3, pp. 2321-2333, 2021.

[19] Z. Chen, X. Liang and **M. Zheng**, "Knowledge transfer between different UAVs for trajectory tracking," *IEEE Robotics and Automation Letters*, vol 5, no. 3, pp. 4939-4946, 2020.

[18] F. Zhang and **M. Zheng**, "Automatic kinematic calibration of multi-axis gimbal systems," *IEEE/ASME Transactions on Mechatronics*, vol. 25, no. 6, pp. 2858-2869, 2020.

[17] **M. Zheng** and M. Tomizuka, "A frequency-shaping methodology for discrete-time sliding mode control," *International Journal of Control*, vol. 92, no. 7, pp. 1662-1671, 2019.

[16] J. Alcaina, A. Cuenca, J. Salt, **M. Zheng**, and M. Tomizuka, "Energy-efficient control for an unmanned ground vehicle in a wireless sensor network," *Journal of Sensors*, vol. 2019, pp.1-16, 2019.

[15] H. Wang, Y. Zhang, Y. Sun, **M. Zheng**, X. Liang, G. Zhang, K. Tan, and J. Feng, "Topology and control method of a single-cell matrix-type solid state transformer," *IEEE Journal of Emerging and Selected Topics in Power Electronics*, vol. 8, no. 3, pp. 2302-2312, 2019.

[14] L. Li, Y. Sun, H. Han, G. Shi, M. Su, and **M. Zheng**, "A decentralized control for cascaded inverters in grid-connected applications," *IEEE Transactions on Industrial Electronics*, vol. 67, no. 9, pp. 8064-8071, 2019.

[13] Z. Liu, M. Su, Y. Sun, L. Li, H. Han, X. Zhang, and **M. Zheng**, "Optimal criterion and global/sub-optimal control schemes of decentralized economical dispatch for ac microgrid," *International Journal of Electrical Power & Energy Systems*, vol. 104, pp. 38-42, 2019.

[12] Y. Liu, L. Guan, C. Hou, H. Han, Z. Liu, Y. Sun, and **M. Zheng**, "Wind power short-term prediction based on LSTM and discrete wavelet transform," *Applied Sciences*, vol. 9, no. 6, p. 1108, 2019.

[11] J. Xu, J. Yang, G. Xu, T. Jiang, M. Su, Y. Sun, H. Wang, and **M. Zheng**, "PWM modulation and control strategy for LLC-DCX converter to achieve bidirectional power flow in facing with resonant parameters variation," *IEEE Access*, vol. 7, pp. 54693-54704, 2019.

[10] Y. Liu, M. Su, F. Liu, **M. Zheng**, X. Liang, G. Xu, and Y. Sun, "Single-phase inverter with wide input voltage and power decoupling capability," *IEEE Access*, vol. 7, pp. 16870-16879, 2019.

[9] **M. Zheng**, F. Zhang, and X. Liang, "A systematic design framework for iterative learning control with current feedback," *IFAC Journal of Systems and Control*, vol. 5, pp. 1-10, 2018.

[8] X. Liang, **M. Zheng**, and F. Zhang, "A scalable model-based learning algorithm with application to UAVs," *IEEE Control Systems Letters*, vol. 2, no. 4, pp. 839-844, 2018.

[7] Á. Cuenca, **M. Zheng**, M. Tomizuka, and S. Sánchez, "Non-uniform multi-rate estimator based periodic event-triggered control for resource saving," *Information Sciences*, vol. 459, pp. 86-102, 2018.

[6] C. Wang, **M. Zheng**, Z. Wang, C. Peng, and M. Tomizuka, "Robust iterative learning control for vibration suppression of industrial robot manipulators," *Journal of Dynamic Systems, Measurement, and Control*, vol. 140, no. 1, p. 011003, 2018.

[5] L. Li, Y. Sun, Z. Liu, X. Yuan, M. Su, X. Hou, and **M. Zheng**, "A series-parallel PV-storage independent microgrid and its decentralized control," *International Transactions on Electrical Energy Systems*, e2715, 2018.

[4] Y. Liu, Q. Liu, C. Lv, **M. Zheng**, and X. Ji, "A study on objective evaluation of vehicle steering comfort based on driver's electromyogram and movement trajectory," *IEEE Transactions on Human-Machine Systems*, vol. 48, no. 1, pp. 41-49, 2018.

[3] B. Ma, C. Lv, Y. Liu, **M. Zheng**, Y. Yang, and X. Ji, "Estimation of road adhesion coefficient based on tire aligning torque distribution," *Journal of Dynamic Systems, Measurement, and Control*, vol. 140, no. 5, p. 051010, 2018.

[2] **M. Zheng**, C. Wang, L. Sun, and M. Tomizuka, "Design of arbitrary-order robust iterative learning control based on robust control theory," *Mechatronics*, vol. 47, pp. 67-76, 2017.

[1] **M. Zheng**, Q. Zhan, J. Liu, and Y. Cai, "Control of a spherical robot: Path following based on nonholonomic kinematics and dynamics," *Chinese Journal of Aeronautics*, vol. 24, no. 3, pp. 337-345, 2011.

Editorial

[1] J. Tang, X. Chen, Y. Gu, **M. Zheng**, "Introduction to the focused section on machine learning, estimation and control for intelligent robotics," *International Journal of Intelligent Robotics and Applications*, vol. 4, no. 4, pp. 375-377, 2020.

Refereed Conference Proceedings

Dr. Zheng has authored/co-authored 36 peer-reviewed conference papers, of which 2 are selected among the best conference (student) paper finalists, 1 is selected as the best student paper on vibrations of the ASME Dynamic Systems and Control Division, and 19 are based on the work conducted after she joined the University at Buffalo.

[36] S. Tian, X. Liang, and **M. Zheng**, "An Optimization-Based Human Behavior Modeling and Prediction for Human-Robot Collaborative Disassembly," *American Control Conference* 2023, accepted.

[35] Z. Chen, X. Liang, and **M. Zheng**, "A new iterative learning control algorithm for final error reduction," *Modeling, Estimation and Control Conference* (MECC), Jersey City, NJ, 2022.

[34] C. Liu, W. Liu, X. Liang, and **M. Zheng**, "A deep-ConvLSTM collision prediction model for manipulators in dynamic environment," The joint *9th IFAC Symposium on*

Mechatronic Systems and *16th International Conference on Motion and Vibration Control* (MoViC), Los Angeles, CA, 2022.

[33] H. Liao, **M. Zheng**, B. Hu, S. Behdad, "Human hand motion prediction in disassembly operations," *International Design Engineering Technical Conferences and Computers and Information in Engineering Conference* (IDETC-CIE), St. Louis, Missouri, 2022.

[32] X. Wei, K. Xu, W. Liu, E. Mountain, X. Liang, and **M. Zheng**, "A novel lightweight cable-driven integrated-finger robotic hand for dexterous manipulation," *American Control Conference* (ACC), Atlanta, GA, 2022.

[31] S. Sivashangaran and **M. Zheng**, "Intelligent autonomous navigation of car-like unmanned ground vehicle via deep reinforcement learning," *Modeling, Estimation and Control Conference* (MECC), Austin, UT, 2021.

[30] S. Hu, X. Zhang, H. Liao, X. Liang, **M. Zheng**, and S. Behdad "Deep learning and machine learning techniques to classify electrical and electronic equipment," *International Design Engineering Technical Conferences & Computers and Information in Engineering Conference* (IDETC-CIE), 2021.

[29] Z. Chen, X. Liang, and **M. Zheng**, "Deep iterative learning control for quadrotor's trajectory tracking," *American Control Conference* (ACC), New Orleans, LA, 2021.

[28] V. Suresh, W. Liu, **M. Zheng**, and B. Li, "High-resolution structured light 3D vision for fine-scale characterization to assist robotic assembly," *Dimensional Optical Metrology and Inspection for Practical Applications X*, vol. 11732, p. 1173203, 2021.

[27] Z. Chen, X. Liang, and **M. Zheng**, "Including image-based perception in disturbance observer for warehouse drones," *Dynamic Systems and Control Conference* (DSCC), Pittsburgh, PA, 2020.(**Best student paper in vibrations, ASME Dynamic Systems and Control Division*)

[26] M. Lee, S. Behdad, X. Liang, and **M. Zheng**, "Disasembly sequence planning consider human-robot collaboration," *A real-time receding horizon sequence planner for disassembly in a human-robot collaboration setting* (ISFA), Chicago, IL, 2020.

[25] W. Liu, Z. Chen, and **M. Zheng**, "An audio-based fault diagnosis method for quadrotors using convolutional neural network and transfer learning," *American Control Conference* (ACC), Denver, CO, 2020.

[24] W. Liu, D. Luo, C. Wu, and **M. Zheng**, "Vehicle-human interactive behaviors in emergency: data extraction and analysis from traffic accident videos," *American Control Conference* (ACC), Denver, CO, 2020.

[23] R. Adlakha and **M. Zheng**, "An optimization-based iterative learning control design method for UAVs' trajectory tracking," *American Control Conference* (ACC), Denver, CO, 2020.

[22] M. Lee, S. Behdad, X. Liang, and **M. Zheng**, "Disassembly sequence planning consider human-robot collaboration," *American Control Conference* (ACC), Denver, CO, 2020.

[21] **M. Zheng**, Z. Chen, and X. Liang, "A preliminary study on a physical model oriented learning algorithm with application to UAVs," in *Dynamic System and Control Conference* (DSCC), Park City, Utah, 2019.

[20] Z. Li, **M. Zheng**, and H. Zhang, "Optimization-based unknown input observer for road profile estimation with experimental validation on a suspension station," *American*

Control Conference (ACC), Philadelphia, PA, 2019.

[19] X. Liang and **M. Zheng**, "Estimation of rail vertical profile using an H-infinity based optimization with learning," *ASME Joint Rail Conference* (JRC), Snowbird, UT, 2019.

[18] H. Nejadkhaki, J. Hall, **M. Zheng**, T. Wu, "Integrative modeling platform to study design and control of an adaptive wind turbine blade," *Dynamics and Control Systems Conference* (DSCC), Atlanta, GA, 2018.

[17] S. Zhou, **M. Zheng**, F. Zhang, and M. Tomizuka†, "Synthesized disturbance observer for vehicle lateral disturbance rejection," *American Control Conference* (ACC), Milwaukee, WI, 2018.

[16] X. Lyu, **M. Zheng**, and F. Zhang, "H-infinity based disturbance observer design for non-minimum phase systems with application to UAV attitude control," *American Control Conference* (ACC), Milwaukee, WI, 2018.

[15] Y. Fan, L. Sun, **M. Zheng**, W. Gao, and M. Tomizuka, "Robust dexterous manipulation under object dynamics uncertainties," *IEEE International Conference on Advanced Intelligent Mechatronics* (AIM), Munich, Germany, 2017. (**Best conference paper finalist*)

[14] S. Zhou, **M. Zheng**, X. Chen, and M. Tomizuka, "Control of dual-stage HDDs with enhanced repetitive disturbance rejection," *ASME Conference on Information Storage and Processing Systems* (ISPS), San Francisco, CA, 2017.

[13] S. Zhou, Y. Wang, **M. Zheng**, and M. Tomizuka, "A hierarchical planning and control framework for structured highway driving," *20th World Congress of the International Federation of Automatic Control*, Toulouse, France, 2017.

[12] **M. Zheng**, S. Zhou, and M. Tomizuka, "Identification of resonance frequencies in dual-stage hard disk drives: A practical strategy," *ASME Dynamic Systems and Control Conference* (DSCC), Virginia, USA, 2017.

[11] **M. Zheng**, S. Zhou, and M. Tomizuka, "A design methodology for disturbance observer with application to precision motion control: an H-infinity based approach," *American Control Conference* (ACC), Seattle, WA, 2017.

[10] C. Wang, **M. Zheng**, W. Zining, and M. Tomizuka, "Robust two-degree-of-freedom iterative learning control for flexibility compensation of industrial robot manipulators," *International Conference on Robotics and Automation* (ICRA), Stockholm, Sweden, 2016.

[9] **M. Zheng**, C. Wang, L. Sun, and M. Tomizuka, "Arbitrary-order iterative learning control considering H-infinity synthesis," *ASME Dynamic Systems and Control Conference* (DSCC), Minneapolis, MN, 2016. (**Best student paper finalist*).

[8] **M. Zheng** and M. Tomizuka, "Discrete-time H-infinity synthesis of frequency-shaped sliding mode control for suppression of vibration with multiple peak frequencies," *ASME Dynamic Systems and Control Conference* (DSCC), Minneapolis, MN, 2016.

[7] S. Zhou, **M. Zheng**, and M. Tomizuka, "A generalized anti-windup scheme considering amplitude and rate saturations," *ASME Dynamic Systems and Control Conference* (DSCC), Minneapolis, MN, 2016.

[6] **M. Zheng** and M. Tomizuka, "Adaptive frequency-shaped sliding mode control for narrow-band disturbance rejection," *IEEE International Conference on Advanced*

Intelligent Mechatronics (AIM), Alberta, Canada, 2016.

[5] **M. Zheng**, X. Chen, and M. Tomizuka, "Extended state observer with phase compensation to estimate and suppress high-frequency disturbances," *American Control Conference* (ACC), Boston, MA, 2016.

[4] **M. Zheng**, L. Sun, and M. Tomizuka, "Multi-rate observer based sliding mode control with frequency shaping for vibration suppression beyond nyquist frequency," *7th IFAC Symposium on Mechatronic Systems* (MECHATRONICS), Leicestershire, UK, 2016.

[3] **M. Zheng**, X. Chen, and M. Tomizuka, "Discrete-time frequency-shaped sliding mode control for audio vibration rejection in hard disk drives," *19th World Congress of the International Federation of Automatic Control*, Cape Town, South Africa, 2014.

[2] **M. Zheng**, X. Chen, and M. Tomizuka, "A nonlinear feedback control scheme for transient performance enhancement in hard disk drives," *ASME Conference on Information Storage and Processing Systems* (ISPS), Santa Clara, CA, 2014.

[1] **M. Zheng**, Q. Zhan, J. Liu, and C. Yao, "Trajectory tracking of a spherical robot based on an RBF neural network," *Advanced Materials Research*, vol. 390, pp. 631-637, 2011.

Patents

[2] **M. Zheng**, M. Tomizuka, X. Chen, W. Xi, and G. Guo, "Data storage devices and methods with frequency-shaped sliding mode control," US Patent US9,542,966, Jan. 2017.

[1] **M. Zheng**, X. Chen, H. Wang, Y.-H. Kim, W. Xi, and K.-Y. Tu, "Data storage device comprising slew rate anti-windup compensation for microactuator," US Patent US9,007,714, Apr. 2015.

TECHNICAL PRESENTATIONS

Invited Talks

1. "Human-Robot Collaboration for Future Remanufacturing,"
   International Conference on Robotics and Automation 2022 Workshop, PA. 05/2022
2. "Learning-Based Control for Robotic Systems,"
   Mechanical Engineering (virtual), University of Kansas, KS. 04/2022
3. "Learning-Based Control for Robotic Systems,"
   Mechanical and Aerospace Engineering (virtual), Binghamton University, NY. 11/2020
4. "Toward Mass Customization: Learning-Based Control for Robotic Systems,"
   Aerospace Engineering (virtual), University of Texas at Austin, TX. 03/2020
5. "Toward Mass Customization: Learning-Based Control for Robotic Systems,"
   Mechanical Engineering, Purdue University, IN. 02/2020
6. "Toward Mass Customization: Learning-Based Control for Robotic Systems,"
   Mechanical and Aerospace Engineering, Case Western Reserve University, OH. 12/2019
7. "Intersection of Data-driven and Physics-based Learning for Robotic Systems,"
   Center for Cognitive Science, University at Buffalo, NY. 10/2019
8. "Reasoning from Physics: A Learning-Based Control Strategy for Robotic Systems,"
   Mechanical Engineering, City College of New York, NY. 09/2019
9. "Human-Robot Collaboration in Remanufacturing,"
   Communities of Excellence, University at Buffalo, NY. 09/2019
10. "Robust iterative learning control considering uncertainties,"
    Autonomous Systems Laboratory, Stanford University, CA. 09/2016

11. "Frequency-shaped sliding mode control and root locus analysis,"
Western Digital Corporation, Irvine, CA. 07/2014

GRADUATE STUDENTS

Ph.D. Dissertations Directed

1. Meng-Lun Lee, Ph.D., Spring 2019 – Summer 2022
   - Dissertation: Task Allocation and Disassembly Sequence Planning for End-of-Use Products Considering Human-Robot Collaboration (sole advisor).
2. Zhu Chen, Ph.D., Fall 2018 – Fall 2022
   - Dissertation: Learning-Based Control and Trajectory Generation for Drones (primary advisor).

Ph.D. Dissertations in Progress

1. Wansong Liu, Ph.D., Spring 2020 – present
   - Passed qualifying exam in May 2021
   - Degree expected in Fall 2023 (sole advisor)
2. Sibo Tian, Ph.D., Fall 2021 – present
   - Passed qualifying exam in May 2022
   - Degree expected Spring 2025 (primary advisor)
3. Eric Mountain, Ph.D., Fall 2021 – present,
   - Degree expected Spring 2026 (sole advisor)
4. Harsh Jashvantbhai Modi, Ph.D., Fall 2022 – present
   - Degree expected Spring 2026 (sole advisor)

M.S. Theses Directed

1. Shathushan Sivashangaran, Fall 2018 – Fall 2020
   - Thesis: Application of deep reinforcement learning for intelligent autonomous navigation of car-like mobile robot.
2. Chang Liu, Fall 2019 – Fall 2020
   - Thesis: Image based ConvLSTM model for manipulator trajectory prediction in obstacle avoidance
3. Wansong Liu, Fall 2017 – Fall 2019
   - Thesis: An audio-based fault diagnosis method for quadrotors using convolutional neural network and transfer learning.
4. Revant Adlakha , Fall 2017 – Summer 2019
   - Thesis: Design and implementation of iterative learning control for quad-rotor UAV's tracking.

M.S. Projects Directed

1. Chen Zhu, Fall 2020 – Spring 2021
   - Project: Two dimensional manipulator path planning in configuration space with moving obstacles
2. Vincenzo Carr, Fall 2018 – Fall 2020
   - Project: Safe autonomous vehicle maneuver generation for navigation of a traffic circle.
3. Nimish Mishra, Fall 2017 – Spring 2019
   - Project: Disturbance observer and filter design for Intel Aero UAVs.
4. Aditya Jagdish Shirurkar, Fall 2017 – Spring 2019
   - Project: Linear disturbance observer-based control for UAVs.

5. Swapneel Bhavesh Mehta, Fall 2017 – Fall 2018
   - Project: Path planning and motion control for autonomous mobile robots.

PROFESSIONAL ACTIVITIES

Leadership

Vibrations Technical Committee of Dynamic Systems and Control Division (DSCD) in ASME

1. Award Chair 2021 – 2022
2. Chair 2020 – 2021
3. Vice Chair 2019 – 2020
4. Secretary 2018 – 2019
5. Publicity Chair 2017 – 2018

Conference Representative of DSCD 2021 – 2022

Leading DSCD Young Members and Students Initiative 2022

Dr. Zheng has applied for $17,400 from Dynamic Systems and Control Division, ASME, to support the Young Members and Students Activities for in-person conferences.

Proposal Panelist/Reviewer

Dr. Zheng has served on NSF panels for many times spanning nine different divisions/solicitations. Due to confidentiality issue, the panel information such as time/month/year has been removed.

1. NSF, Future of Work at the Human-Technology Frontier (FW-HTF), Panelist
2. NSF, National Robotics Initiative (NRI) 3.0, Panelist
3. NSF, Established Program to Stimulate Competitive Research (EPSCoR), Panelist
4. NSF, Major Research Instrumentation (MRI), Panelist
5. NSF, Future Manufacturing (FM), Panelist
6. NSF, Foundational Research in Robotics (FRR), Panelist
7. NSF, Emerging Frontiers and Multidisciplinary Activities (EFMA), Panelist
8. NSF, Division of Information and Intelligent Systems (IIS), Panelist
9. NSF, Division of Civil, Mechanical and Manufacturing Innovation (CMMI), Panelist
10. Canada Foundation for Innovation, External Reviewer
11. Natural Sciences and Engineering Research Council of Canada, External Reviewer

Technical Committee

1. IFAC Technical Committee in Control Design 2017 – Present
2. ASME DSCD Mechatronics Technical Committee 2017 – Present
3. ASME DSCD Bio-Systems and Health Care Technical Committee 2017 – Present

Conference Service

1. **Conference Organizing Committee**
   Publicity Chair, Modeling, Estimation and Control Conference 2021
2. **Associate Editor (AE) and/or Program Committee (PC)**
   PC, American Control Conference 2023
   International PC, IFAC Symposium on Nonlinear Control Systems 2022
   PC, Modeling, Estimation and Control Conference 2022
   AE, International Conference on Ubiquitous Robots 2020
   AE, American Control Conference 2019 & 2020
   AE, International Symposium on Flexible Automation 2018 & 2020
   AE, International Conference on Control, Automation, Robotics and Vision 2018

AE, International Conference on Autonomic and Autonomous Systems 2018
AE, Dynamic Systems and Control Conference 2018, 2019, & 2020

3. **Special Session Panelist**
Panelist, Systems and Technologies for Remote Sensing Applications Through Unmanned Aerial Systems (STRATUS) Conference 2021

4. **Session Chair, Co-Chair, and Organizer**
Session chair, International Conference on Intelligent Robots and Systems, 2020
Session chair, Dynamic Systems and Control Conference, 2020
Organizer of Vibration Invited Session, Dynamic Systems and Control Conference, 2020
Session chair and co-chair, American Control Conference, 2020
Session co-chair, Dynamic Systems and Control Conference, 2019
Session organizer, Information Storage and Processing Systems 2019
Session co-chair, IEEE Conference on Decision and Control, 2018.
Session chair, American Control Conference, 2018
Organizer of Invited Session in Vibrations, American Control Conference, 2018

Workshop Organization

1. **Lead-organizer** 08/2022
The Future of Human-Robot Partnerships in Remanufacturing (virtual)
2. **Co-organizer** 04/2021
Advances in AI-Powered Collaborative Robots (virtual)

Associate/Guest Editor

1. **Associate Editor**
IFAC Mechatronics journal since 2021
2. **Guest Editor**
International Journal of Intelligent Robotics and Applications 2020

Reviewer

1. **Journal Reviewer**
Aerospace Science and Technology
ASME Journal of Dynamics Systems, Measurement and Control
ASME Journal of Vibration and Acoustics
Chaos: An Interdisciplinary Journal of Nonlinear Science
Control Engineering Practice
IEEE Access
IEEE/ASME Transactions on Mechatronics
IEEE Control Systems Letters
IEEE Robotics and Automation Letters
IEEE Transactions on Control Systems Technology
IEEE Transactions on Human-Machine Systems
IEEE Transactions on Industrial Informatics
IEEE Transactions on Network Science and Engineering
IEEE Transactions on Systems, Man and Cybernetics: Systems
Information Sciences
International Journal of Control
International Journal of Intelligent Robotics and Applications
International Journal of Precision Engineering and Manufacturing
Journal of Aerospace Engineering

Mechanism and Machine Theory
Mechatronics
Microsystem Technologies
Precision Engineering
Robotics and Computer-Integrated Manufacturing

2. **Conference Reviewer**
International Conference on Robotics and Automation (ICRA) 2022 – 2023
American Control Conference (ACC) 2016 – 2023
Advanced Intelligent Mechatronics (AIM) 2016 – 2019
ASME Conference on Dynamic System and Control Conference (DSCC) 2015 – 2020
ASME Conference on Information Storage and Processing Systems (ISPS) 2019
IEEE Conference on Decision and Control (CDC) 2020
IFAC Symposium on Mechatronic Systems (MECHATRONICS) 2019
International Conference on Control, Automation, Robotics and Vision (ICARCV) 2018
International Conference on Intelligent Robots and Systems (IROS) 2020 & 2022
International Federation of Automatic Control (IFAC) World Congress 2017 & 20
Modeling, Estimation and Control Conference (MECC) 2021 & 2022

University Service

University

1. Roundtable Panelist for UB NSF CAREER Award — 04/2021

School of Engineering and Applied Sciences

1. Volunteer for "Science is Elementary"
Outreach activities at Westminster Charter School — 04/2019
2. Robotics Day at University at Buffalo — 10/2018
Demonstration of robotic techniques to faculty, students, and local community
3. SMART Design Camp 2018 — 08/2018
SMART Automation Sandbox lab tour
4. CSExplore Camp 2018 & 2022 — 07/2018 & 07/2022
Control and Automation lab tour

Department of Mechanical and Aerospace Engineering (MAE)

1. MAE Graduate Studies Committee — Fall 2022 – Spring 2025 (expected)
2. Business Analyst Search Committee — Spring 2021
3. MAE Seminar Series Coordinator Committee — 08/2019 – 05/2021
4. 2018 MAE Poster Competition Judging — 03/2018

TEACHING

University at Buffalo

1. Instructor, MAE 571, Systems Analysis — Fall 2022, 2019, 2018, and 2017
2. Instructor, MAE 340, Dynamic Systems, Section A — Fall 2022, 2020, and 2019
3. Instructor, MAE 526/505, Advanced Control Systems — Spring 2021, 2019, and 2018

University of California, Berkeley

1. Graduate Student Instructor, ME132, Dynamic Systems & Feedback
Spring 2017, 2016, and Summer 2015
2. Graduate Student Instructor, ME234, Multivariable Control System Design — Fall 2016

OTHER AWARDS

Individual Awards

1. **Individual Development Award**, United University Professions Union 2021-2022

Conference Awards

1. Supervisor of Best Student Paper in Applications
   Vibration Technical Committee, ASME Dynamic Systems and Control Division
   Student Author: Zhu Chen
2. Finalist (co-author) of Best Paper, AIM 2017 2017
3. Finalist (1st author) of Best Student Paper, DSCC 2016 2016
4. Winner of Best Collaboration Idea, Competition at Postgraduate Workshop
   Mechatronics 2016 2016

University of California, Berkeley

1. Graduate Division Block Grant Award 2016
2. Fellowship of "Otto and Herta F. Kornei Endowment Fund" 2014
3. J.K. Zee Fellowship 2012
4. Graduate Division NRST Award 2012

Beihang University

1. Outstanding Graduate Thesis of Beihang University (for Master Degree) 2011
2. SIEMENS Scholarship for Outstanding Academic Performance 2009
3. Outstanding Undergraduate Thesis of Beihang University (for Bachelor Degree) 2008
4. Scholarship of "Climbing Up for Mechanics" for Excellent Student 2007
5. People's Scholarship for Outstanding Academic Performance 2005