

Minghui Zheng

September 22, 2020

Assistant Professor
Department of Mechanical and Aerospace Engineering
University at Buffalo, 1007 Furnas Hall, Buffalo, NY 14260
Email: mhzheng@buffalo.edu
Phone: (716) 645-1432
Homepage: <http://zh.eng.buffalo.edu>

EDUCATION

Ph.D.	University of California, Berkeley	05/2017
Major: Mechanical Engineering		
Advisor: Prof. Masayoshi Tomizuka		
Dissertation: Advanced Learning, Estimation, and Control in High-Precision Systems		
M.S.	Beihang University	03/2011
Major: Control Science and Engineering		
B.S.	Beihang University	07/2008
Major: Engineering Mechanics		

PROFESSIONAL EXPERIENCE

Assistant Professor, Department of Mechanical and Aerospace Engineering University at Buffalo	Aug 2017 - present Buffalo, NY
---	-----------------------------------

GRANTS

Summary of Research Funding:

Funding Category	Total	My Share as PI
External sources	\$3,719,867	\$1,081,392.83
Internal sources	\$80,000	\$26,666.67
Total Funded Research	\$3,799,867.00	\$1,108,059.50

PUBLICATIONS

Summary

Google Scholar (as of September 22, 2020)	Link
Citations	357
h-index	10
i10-index	14

Refereed Journal Articles

- J21.** 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.
- J20.** M. Zheng*, X. Lv, X. Liang, and F. Zhang, “A generalized design method for learning-based disturbance observer,” *IEEE/ASME Transactions on Mechatronics*, in early access, 2020.

- J19.** F. Zhang and M. Zheng, "Automatic kinematic calibration of multi-axis gimbals systems," *IEEE/ASME Transactions on Mechatronics*, in early access, 2020.
- J18.** 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*, in early access, 2020.
- J17.** 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.
- J16.** 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.
- J15.** 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.
- J14.** 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.
- J13.** 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.
- J12.** 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.
- J11.** 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.
- J10.** 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.
- J9.** 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.
- J8.** 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. (*Presented in IEEE Conference on Decision and Control, Miami Beach, FL, 2018)
- J7.** 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.
- J6.** 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.
- J5.** 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.
- J4.** 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.

- J3.** 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.
- J2.** 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.
- J1.** 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.

Refereed Conference Proceedings

- C26.** 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.
- C25.** M. Lee*‡, S. Behdad, X. Liang, and M. Zheng*, “Disassembly 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.
- C24.** 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.
- C23.** 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.
- C22.** R. Adlakh*‡ and M. Zheng*, “An optimization-based iterative learning control design method for UAVs’ trajectory tracking,” *American Control Conference (ACC)*, Denver, CO, 2020.
- C25.** M. Lee*‡, S. Behdad, X. Liang, and M. Zheng*, “Disassembly sequence planning consider human-robot collaboration,” *American Control Conference (ACC)* Denver, CO, 2020.
- C21.** 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.
- C20.** 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.
- C19.** 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.
- C18.** 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.
- C17.** S. Zhou, M. Zheng‡*, F. Zhang, and M. Tomizuka†, “Synthesized disturbance observer for vehicle lateral disturbance rejection,” *American Control Conference (ACC)*, Milwaukee, WI, 2018.
- C16.** 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.

- C15.** 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 paper finalist)
- C14.** 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.
- C13.** 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 (IFAC)*, Toulouse, France, 2017.
- C12.** M. Zheng[‡], S. Zhou, and M. Tomizuka[†], “Identification of resonance frequencies in dual-stage hard disk drives: A practical strategy,” in *ASME Dynamic Systems and Control Conference (DSCC)*, Virginia, USA, 2017.
- C11.** 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.
- C10.** 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.
- C9.** 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).
- C8.** 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.
- C7.** 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.
- C6.** 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.
- C5.** 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.
- C4.** 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.
- C3.** 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 (IFAC)*, Cape Town, South Africa, 2014.
- C2.** 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.
- C1.** 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

- P2.** 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.
- P1.** 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. “Toward Mass Customization: Learning-Based Control for Robotic Systems,” Aerospace Engineering (virtual), University of Texas at Austin, TX. 03/2020
2. “Toward Mass Customization: Learning-Based Control for Robotic Systems,” Mechanical Engineering, Purdue University, IN. 02/2020
3. “Toward Mass Customization: Learning-Based Control for Robotic Systems,” Mechanical and Aerospace Engineering, Case Western Reserve University, OH. 12/2019
4. “Intersection of Data-driven and Physics-based Learning for Robotic Systems,” Center for Cognitive Science, University at Buffalo, NY. 10/2019
5. “Reasoning from Physics: A Learning-Based Control Strategy for Robotic Systems,” Mechanical Engineering, City College of New York, NY. 09/2019
6. ”Human-Robot Collaboration in Remanufacturing,” Communities of Excellence, University at Buffalo, NY. 09/2019
7. “Robust iterative learning control considering uncertainties,” Autonomous Systems Laboratory, Stanford University, CA. 09/2016
8. “Frequency-shaped sliding mode control and root locus analysis,” Western Digital Corporation, Irvine, CA. 07/2014

PROFESSIONAL ACTIVITIES

Leadership

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

1. Chair 2020 – Present
2. Vice Chair 2019 – 2020
3. Secretary 2018 – 2019
4. Publicity Chair 2017 – 2018

Proposal Panelist/Reviewer

1. NSF, Future Manufacturing (FM), Panelist 2020
2. NSF, National Robotics Initiative (NRI) 2.0, Panelist 2020
3. NSF, Emerging Frontiers and Multidisciplinary Activities (EFMA), Panelist 2019
4. NSF, Division of Information and Intelligent Systems (IIS), Panelist 2019
5. NSF, Division of Civil, Mechanical and Manufacturing Innovation (CMMI), Panelist 2018
6. Natural Sciences and Engineering Research Council of Canada (NSERC), External Reviewer 2018

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, Dynamic Systems and Control Conference (DSCC) 2021
2. **Associate Editor (AE) and/or Program Committee (PC)**
AE, Ubiquitous Robots (UR) 2020
AE, American Control Conference (ACC) 2019 & 2020
AE, International Symposium on Flexible Automation (IFSA) 2018 & 2020
AE, International Conference on Control, Automation, Robotics and Vision (ICCARV) 2018
AE, International Conference on Autonomic and Autonomous Systems (ICAAS) 2018
AE, Dynamic Systems and Control Conference (DSCC) 2018, 2019, & 2020
3. **Session Chair, Co-Chair, and Organizer**
Session chair, International Conference on Intelligent Robots and Systems (IROS), 2020
Session chair, Dynamic Systems and Control Conference (DSCC), 2020
Organizer of Invited Session in Vibrations, Dynamic Systems and Control Conference (DSCC), 2020
Session chair and co-chair, American Control Conference (ACC), 2020
Session co-chair, Dynamic Systems and Control Conference (DSCC), 2019
Session organizer, ASME Conference in Information Storage and Processing Systems (ISPS) 2019
Session co-chair, IEEE Conference on Decision and Control (CDC), 2018.
Session chair, American Control Conference (ACC), 2018
Organizer of Invited Session in Vibrations, American Control Conference (ACC), 2018

Editor

1. **Guest Editor**
International Journal of Intelligent Robotics and Applications (2020)

Reviewer

1. **Journal Reviewer**
Aerospace Science and Technology (2)
ASME Journal of Dynamics Systems, Measurement and Control (7)
ASME Journal of Vibration and Acoustics (2)
Chaos: An Interdisciplinary Journal of Nonlinear Science (1)
Control Engineering Practice (1)
IEEE Access (1)
IEEE/ASME Transactions on Mechatronics (16)
IEEE Control Systems Letters (1)
IEEE Transactions on Control Systems Technology (2)
IEEE Transactions on Human-Machine Systems (1)
IEEE Transactions on Industrial Informatics (5)
IEEE Transactions on Network Science and Engineering (1)
IEEE Transactions on Systems, Man and Cybernetics: Systems (1)
International Journal of Control (2)
International Journal of Intelligent Robotics and Applications (1)
International Journal of Precision Engineering and Manufacturing (1)
Journal of Aerospace Engineering (1)
Mechanism and Machine Theory (1)
Mechatronics (5)
Microsystem Technologies (1)
Precision Engineering (1)
2. **Conference Reviewer**

American Control Conference (ACC) 2016 – 2020
 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
 International Federation of Automatic Control (IFAC) World Congress 2017 & 20

University Service

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
Demonstration of robotic techniques to faculty, students, and local community | 10/2018 |
| 3. | SMART Design Camp 2018
SMART Automation Sandbox lab tour | 08/2018 |
| 4. | CSExplore Camp 2018
Control and Automation lab tour | 07/2018 |

Department of Mechanical and Aerospace Engineering (MAE)

- | | | |
|----|--|-------------------|
| 1. | MAE Seminar Series Coordinator Committee | 08/2019 – Present |
| 2. | 2018 MAE Poster Competition Judging | 03/2018 |

TEACHING

University at Buffalo

- | | | |
|----|---|-------------|
| 1. | Instructor, MAE 340, Dynamic Systems, Sections A & B | Fall 2020 |
| 2. | Instructor, MAE 571, Linear Systems Analysis | Fall 2019 |
| 3. | Instructor, MAE 340, Dynamic Systems, Section A | Fall 2019 |
| 4. | Instructor, MAE 526, Special Topics: Advanced Control Systems | Spring 2019 |
| 5. | Instructor, MAE 571, Linear Systems Analysis | Fall 2018 |
| 6. | Instructor, MAE 505, Special Topics: Advanced Control Systems | Spring 2018 |
| 7. | Instructor, MAE 571, Linear Systems Analysis | Fall 2017 |

University of California, Berkeley

- | | | |
|----|---|-------------|
| 1. | Graduate Student Instructor, ME132, Dynamic Systems & Feedback | Spring 2017 |
| 2. | Graduate Student Instructor, ME234, Multivariable Control System Design | Fall 2016 |
| 3. | Graduate Student Instructor, ME132, Dynamic Systems & Feedback | Spring 2016 |
| 4. | Graduate Student Instructor, ME132, Dynamic Systems & Feedback | Summer 2015 |

AWARDS

Conference Awards

- | | | |
|----|--|------|
| 1. | Finalist (co-author) of Best Paper, AIM 2017 | 2017 |
| 2. | Finalist (1st author) of Best Student Paper, DSCC 2016 | 2016 |
| 3. | Student Travel Grant, DSCC 2016 | 2016 |
| 4. | Winner of Best Collaboration Idea, Competition at Postgraduate Workshop
MECHATRONICS 2016 | 2016 |

University of California, Berkeley

- | | | |
|----|---|------|
| 1. | Mechanical Department Travel Grant Award | 2016 |
| 2. | Graduate Division Block Grant Award | 2016 |
| 3. | Graduate Division Conference Travel Grant | 2016 |
| 4. | Fellowship of “Otto and Herta F. Kornei Endowment Fund” | 2014 |
| 5. | J.K. Zee Fellowship | 2012 |
| 6. | 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 |