WENJIE CHEN (陈文杰)

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http://wjchen84.github.io/

EDUCATIONS

Ph.D. **University of California, Berkeley** Mechanical Engineering 08/2012
Dissertation: *Intelligent Control of Robots with Mismatched Dynamics and Mismatched Sensing*
Advisor: Professor Masayoshi Tomizuka

M.S. **University of California, Berkeley** Mechanical Engineering 05/2009
Thesis: *Hybrid Adaptive Friction Compensation of Indirect Drive Trains Using Joint Sensor Fusion*
Advisor: Professor Masayoshi Tomizuka

B.Eng. **Zhejiang University**, China Mechatronic Engineering 06/2007
Rank: 1/55(major) ACEE of Chu Kochen Honors College (*63 elites from over 6000*)
Thesis: *Coordinated Motion Control of Biaxial Linear-Motor-Driven Stage*
Advisor: Professor Bin Yao, Professor Qingfeng Wang

POSITIONS

Director (所长), Midea Group (美的集团) 12/2019 – Present
Robotics and Automation Research Institute, Midea Corporate Research Center

- Manage the overall work of research institute, build and lead the institute research team
- Plan and explore core technologies, frontier technologies, and basic technologies in the area of robotics and automation

Professor of Practice, Southern University of Science and Technology 10/2020 – Present
Mechanical & Energy Engineering Department, College of Engineering

Adjunct Associate Professor, Zhejiang University 01/2019 – Present
ZJU-UIUC Institute

CTO, Sihe.ai (思核科技) 07/2018 – 11/2019

- Manage and lead company's R&D team and projects focusing on industrial AI & robotics
- Develop the technology strategy to align with company's business objectives

Chief Researcher (主任), FANUC Corporation 10/2017 – 06/2018
Robot Software Research Department, Basic Research Laboratory

- Technical lead for research development of robot software: motion planning and control, optimization and learning, human-robot collaboration, etc.
- Technical lead for the frontier robotic research collaboration with university

Chief Researcher (主任), FANUC Corporation 11/2013 – 09/2017
Learning Robot Development Department, Robot Laboratory

- Technical lead for research and development of next generation robot concept controller: motion planning and control, optimization and learning, human-robot collaboration, etc.
- Technical lead for the frontier robotic research collaboration with university
- Technical lead for algorithm research and technology development of "Learning Robot" product

Postdoctoral Scholar, University of California, Berkeley 08/2012 – 10/2013
Mechanical Systems Control Lab, Department of Mechanical Engineering

- Lead the research in exoskeleton design and control for a brain-machine-interface (BMI) study
- Lead the research in intelligent control for robot manipulator, including control, motion planning, sensor fusion, system modeling and identification, etc.

HONORS & AWARDS (SELECTED)

- **First Prize**, *Research Innovation Award*, Midea Corporate Reseaerch Center 2020
- **Second Prize**, *Research Innovation Award*, Midea Corporate Reseaerch Center 2020
- **Leading Talent of Elite Leader Program (A Level)**, Jiaxing, Zhejiang 2019
- **Leading Talent of Elite Leader Program**, Haining, Zhejiang 2018
- **First Prize**, *2018 Intelligent Manufacturing Venture Contest, Haining, Zhejiang* 2018
- **Best Application Paper Finalist**, *the 12th IEEE International Conference on Automation Science and Engineering (CASE)* 2016
- **Best Student Paper Finalist**, *IEEE/ASME International Conference on Advanced Intelligent Mechatronics (AIM)* 2015
- **Best Student Paper Finalist**, *the 6th IFAC Symposium on Mechatronic Systems (MECHATRONICS)* 2013
- **Best Paper in Session Award**, *ASME Dynamic Systems and Control Conference (DSCC)* 2012
- **Third place, Big Ideas @ Berkeley**, *"The PikaPen"* 04/2012
  "Information Technology for Society" Category, 5 winners out of over 125 submissions
- **Block Grant Award**, University of California, Berkeley 01/2011
- **Chiang Chen Overseas Graduate Fellowship**, China 2007 – 2008
  10 awardees each year for overseas graduates from China
- Numerous undergraduate awards, Zhejiang University, China 2002 – 2007
  Details at http://wjchen84.github.io/index.html#Honors

PROFESSIONAL AFFILIATIONS & SERVICES

Award Juror Panel:
IEEE/IFR IERA Award (Innovation and Entrepreneurship in Robotics and Automation), 2017

Proposal Review Panel:
External Reviewer of the Research Grants Council, Hong Kong (2013, 2014, 2016, 2017, 2020)

Supervisor & Academic Committee:
Young Talent Committee of Zhejiang Lab
Academic Juror Committee of Midea Corporate Research Center
Academic Committee of Midea Corporate Research Center

Editorial Board:
Editorial Board Member of the International Journal of Advanced Robotic Systems (IJARS)

Conference Committee:
Program Committee, 2016 ASME International Symposium on Flexible Automation (ISFA)
Associate Editor, 2016 American Control Conference (ACC)
Associate Editor & Session Organizer, 2015 ASME Dynamic Systems & Control Conference (DSCC)
Associate Editor, 2015 American Control Conference (ACC)
Topic & Session Organizer, 2014 ASME Dynamic Systems and Control Conference (DSCC)
Program Committee, 2013 IEEE International Conference on Information and Automation (ICIA)
Program Committee, 2013 IEEE International Conference on Robotics and Biomimetics (ROBIO)
Session Chair, 2013 ASME Dynamic Systems and Control Conference (DSCC)

Journal Referee:
IEEE Transactions on Robotics (T-RO)
IEEE Transactions on Industrial Electronics (TIE)
IEEE Transactions on Industrial Informatics (TII)
IEEE/ASME Transactions on Mechatronics (TMECH)
IEEE Transactions on Control Systems Technology (TCST)
IEEE Transactions on Automation Science and Engineering (T-ASE)
ASME Journal of Dynamic Systems, Measurement, and Control (JDSMC)
Robotics and Computer Integrated Manufacturing (Elsevier-RCIM)
Robotics and Autonomous Systems (RAS)
International Journal of Advanced Robotic Systems (IJARS)
International Journal of Intelligent Robotics and Applications (JIRA)
Advanced Robotics (RSJ-AR)
Asian Journal of Control (AJC)
Control and Cybernetics
Sensors (MDPI Journal)

Journal of Zhejiang University Science C (Computers & Electronics) (ZUSC)

Conference Referee:
IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)
IEEE International Conference on Robotics and Automation (ICRA)
IEEE Conference on Decision and Control (CDC)
American Control Conference (ACC)
IEEE/ASME International Conference on Advanced Intelligent Mechatronics (AIM)
ASME Dynamic Systems and Control Conference (DSCC)
ASME International Symposium on Flexible Automation (ISFA)
IFAC Symposium on Robot Control (SYROCO)
IEEE International Conference on Information and Automation (ICIA)
IEEE International Conference on Robotics and Biomimetics (ROBIO)

PATENTS

23 Granted + 28 Disclosed, across **China, Japan, US**, and **Germany**

1. Robot system having function to calculate position and orientation of sensor
   *JP6174654B2 (***Granted***), US9937620B2 (***Granted***),*
   *CN106584489B (***Granted***), DE102016012065B4 (***Granted***)*
2. Object posture calculation system
   *JP6208724B2 (***Granted***), US9903698B2 (***Granted***),*
   *CN106514712B (***Granted***), DE102016116404A1 (***Granted***)*
3. Robot apparatus having learning function
   *JP6386516B2 (***Granted***), US10254741B2 (***Granted***),*
   *CN106965171B (***Granted***), DE102017000063B4 (***Granted***)*
4. Robot control device
   *JP6514156B2 (***Granted***), US10507583B2 (***Granted***),*
   *CN107756423B (***Granted***), DE102017118276A1 (Disclosed)*
5. Robot system having learning control function and learning control method
   *US10618164B2 (***Granted***),*
   *CN108422420B (***Granted***), DE102018001026A1 (Disclosed)*
6. Device, system, and method for automatically generating motion path of robot
   US20180290302A1 (Disclosed),
   CN108687770A (Disclosed), DE102018107857A1 (Disclosed)
7. Shape recognition device, shape recognition method, and program
   *JP6499716B2 (***Granted***), US10521687B2 (***Granted***),*
   CN108932363A (Disclosed), DE102018206193A1 (Disclosed)
8. Gripper control device, gripper control method, and gripper simulation device
   *JP6640792B2 (***Granted***), US10744654B2 (***Granted***),*
   CN109202942A (Disclosed), DE102018115451A1 (Disclosed)

9. Robot system
   *JP6564433B2 (***Granted***),*
   *CN109421049B (***Granted***), DE102018214272A1 (Disclosed)*
10. Controller device and control method
    JP2019185742A (Disclosed), US20190317472A1 (Disclosed),
    CN110389556A (Disclosed), DE102019002644A1 (Disclosed)
11. Robot hand controller device and system
    JP2019181622A (Disclosed), US20190308333A1 (Disclosed),
    CN110355774A (Disclosed), DE102019108787A1 (Disclosed)
12. Robot motion teaching device, robot system, and robot controller device
    JP2019188477A (Disclosed), US20190321983A1 (Disclosed),
    CN110385694A (Disclosed), DE102019109624A1 (Disclosed)
13. Robot system
    JP2020011326A (Disclosed), US20200023518A1 (Disclosed),
    CN110722550A (Disclosed), DE102019118202A1 (Disclosed)
14. Robot controller device and robot control method
    JP2019181664A (Disclosed)
15. Parameter adaptation according to motion command
    JP2020035159A (Disclosed)
16. System, method and program of robust controller tuning
    JP2018122023 (Pending)
17. Robust tuning device and model generation method
    JP2018120417 (Pending)

PUBLICATIONS

Journal Publications

8. Zheng Chen, Fanghao Huang, **Wenjie Chen**, Junhui Zhang, Weichao Sun, Jiawang Chen, Jason Gu, Shiqiang Zhu, "RBFNN-based Adaptive Sliding Mode Control Design for Delayed Nonlinear Multilateral Tele-robotic System With Cooperative Manipulation," *IEEE Transactions on Industrial Informatics*, vol. 16, no. 2, pp. 1236–1247, Feb. 2020, doi: 10.1109/TII.2019.2927806
7. Junkai Lu, Kevin Haninger, **Wenjie Chen**, Masayoshi Tomizuka, Suraj Gowda, and Jose M. Carmena, "Design of a Passive Upper Limb Exoskeleton for Macaque Monkeys," *ASME Journal of Dynamic Systems, Measurement, and Control*, 138(11), 111011 (Jul 27, 2016); doi: 10.1115/1.4033837
6. Pedro Reynoso-Mora, **Wenjie Chen**, and Masayoshi Tomizuka, "A Convex Relaxation for the Time-optimal Trajectory Planning of Robotic Manipulators along Predetermined Geometric Paths," *Optimal Control Applications and Methods*, vol. 37, no. 6, pp. 1263–1281, Nov./Dec. 2016; doi: 10.1002/oca.2234

5. **Wenjie Chen**, Kyoungchul Kong, and Masayoshi Tomizuka, "Dual-Stage Adaptive Friction Compensation for Precise Load Side Position Tracking of Indirect Drive Mechanisms," *Control Systems Technology, IEEE Transactions on*, vol. 23, no. 1, pp. 164–175, Jan. 2015; doi: 10.1109/TCST.2014.2317776
4. **Wenjie Chen**, and Masayoshi Tomizuka, "Dual-Stage Iterative Learning Control for MIMO Mismatched System with Application to Robots with Joint Elasticity," *Control Systems Technology, IEEE Transactions on*, vol. 22, no. 4, pp. 1350–1361, July 2014; doi: 10.1109/TCST.2013.2279652
3. **Wenjie Chen**, and Masayoshi Tomizuka, "Direct Joint Space State Estimation in Robots with Multiple Elastic Joints," *Mechatronics, IEEE/ASME Transactions on*, vol. 19, no. 2, pp. 697–706, April 2014; doi: 10.1109/TMECH.2013.2255308
2. **Wenjie Chen**, and Masayoshi Tomizuka, "Comparative Study on State Estimation in Elastic Joints," *Asian Journal of Control*, vol. 16, no. 3, pp. 818–829, May 2014; doi: 10.1002/asjc.755
1. Jonathan Asensio, **Wenjie Chen**, and Masayoshi Tomizuka, "Feedforward Input Generation Based on Neural Network Prediction in Multi-Joint Robots," *Journal of Dynamic Systems, Measurement, and Control*, 136(3), 031002, May 2014; doi:10.1115/1.4025986

Peer Reviewed Conference Proceedings

26. Yongxiang Fan, Wei Gao, **Wenjie Chen**, and Masayoshi Tomizuka, "Real-Time Finger Gaits Planning for Dexterous Manipulation," *in Proceedings of the 20th World Congress of the International Federation of Automatic Control (IFAC)*, Toulouse, France, July 9–14, 2017
25. Chung-Yen Lin, **Wenjie Chen**, and Masayoshi Tomizuka, "Learning Control for Task Specific Industrial Robots," *in Proceedings of the 55th IEEE Conference on Decision and Control (CDC)*, Las Vegas, USA, December 12–14, 2016
24. Te Tang, Changliu Liu, **Wenjie Chen**, and Masayoshi Tomizuka, "Robotic Manipulation of Deformable Objects by Tangent Space Mapping and Non-Rigid Registration," *in Proceedings of the 2016 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Deajeon, Korea, pp. 2689–2696, October 9–14, 2016
23. Yu Zhao, **Wenjie Chen**, Te Tang, and Masayoshi Tomizuka, "Zero Time Delay Input Shaping for Smooth Settling of Industrial Robots," *in Proceedings of the 12th IEEE International Conference on Automation Science and Engineering (CASE)*, Fort Worth, TX, USA, August 21–24, 2016
22. Te Tang, Hsien-Chung Lin, Yu Zhao, **Wenjie Chen**, and Masayoshi Tomizuka, "Autonomous Alignment of Peg and Hole by Force/Torque Measurement for Robotic Assembly," *in Proceedings of the 12th IEEE International Conference on Automation Science and Engineering (CASE)*, Fort Worth, TX, USA, August 21–24, 2016 **(Best Application Paper Finalist)**
21. Te Tang, Hsien-Chung Lin, Yu Zhao, Yongxiang Fan, **Wenjie Chen**, and Masayoshi Tomizuka, "Teach Industrial Robots Peg-Hole-Insertion by Human Demonstration," *in*

Proceedings of the 2016 IEEE/ASME International Conference on Advanced Intelligent Mechatronics (AIM), Banff, Alberta, Canada, July 12–15, 2016

20. Yongxiang Fan, Hsien-Chung Lin, Yu Zhao, Chung-Yen Lin, Te Tang, Masayoshi Tomizuka, and **Wenjie Chen**, "Object Position and Orientation Tracking for Manipulators Considering Unnegligible Sensor Physics," *in Proceedings of the 2016 ASME International Symposium on Flexible Automation (ISFA)*, Cleveland, USA, August 1–3, 2016
19. Chung-Yen Lin, Yu Zhao, Masayoshi Tomizuka, and **Wenjie Chen**, "Path-Constrained Trajectory Planning for Robot Service Life Optimization," *in Proceedings of the 2016 American Control Conference (ACC)*, Boston, MA, USA,July 6–8, 2016
18. Hsien-Chung Lin, Te Tang, Yongxiang Fan, Yu Zhao, Masayoshi Tomizuka, and **Wenjie Chen**, "Robot Learning from Human Demonstration with Remote Lead through Teaching," *in Proceedings of the 2016 European Control Conference (ECC)*, Aalborg, Denmark, June 29–July 1, 2016
17. Hsien-Chung Lin, Te Tang, Masayoshi Tomizuka, and **Wenjie Chen**, "Remote Lead Through Teaching by Human Demonstration Device," *in Proceedings of the 8th ASME Dynamic Systems and Control Conference (DSCC)*, Columbus, Ohio, USA, October 28–30, 2015
16. Junkai Lu, Kevin Haninger, **Wenjie Chen**, and Masayoshi Tomizuka, "Design and Torque-Mode Control of a Cable-Driven Rotary Series Elastic Actuator for Subject-Robot Interaction," *in Proceedings of the IEEE/ASME International Conference on Advanced Intelligent Mechatronics (AIM)*, Busan, Korea, pp. 158–164, July 7–11, 2015 **(Best Student Paper Finalist)**
15. Junkai Lu, **Wenjie Chen**, Kevin Haninger, and Masayoshi Tomizuka, "A Passive Upper Limb Exoskeleton for Macaques in a BMI Study – Kinematic Design, Analysis, and Calibration," *in Proceedings of the 7th ASME Dynamic Systems and Control Conference (DSCC)*, San Antonio, Texas, USA, October 22–24, 2014
14. Kevin Haninger, Junkai Lu, **Wenjie Chen**, and Masayoshi Tomizuka, "Kinematic Design and Analysis for a Macaque Upper-Limb Exoskeleton with Shoulder Joint Alignment," *in Proceedings of the 2014 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Chicago, Illinois, USA, pp. 478–483, September 14–18, 2014
13. Yizhou Wang, **Wenjie Chen**, Masayoshi Tomizuka, and Badr N. Alsuwaidan, "Model Predictive Sliding Mode Control – for Constraint Satisfaction and Robustness," *in Proceedings of the 6th ASME Dynamic Systems and Control Conference (DSCC)*, Palo Alto, CA, October 21–23, 2013
12. Chung-Yen Lin, **Wenjie Chen**, and Masayoshi Tomizuka, "Automatic Sensor Frame Identification in Industrial Robots with Joint Elasticity," *in Proceedings of the 6th ASME Dynamic Systems and Control Conference (DSCC)*, Palo Alto, CA, October 21–23, 2013
11. Pedro Reynoso-Mora, **Wenjie Chen**, and Masayoshi Tomizuka, "On the Time-optimal Trajectory Planning and Control of Robotic Manipulators Along Predefined Paths," *in Proceedings of the 2013 American Control Conference (ACC)*, Washington, DC, pp. 371–377, June 17–19, 2013

10. Chi-Shen Tsai, **Wenjie Chen**, Daekyu Yun, and Masayoshi Tomizuka, "Iterative Learning Control for Vibration Reduction in Industrial Robots with Link Flexibility," *in Proceedings of the 2013 American Control Conference (ACC)*, Washington, DC, June 17–19, 2013

9. Junkai Lu, **Wenjie Chen**, and Masayoshi Tomizuka, "Kinematic Design and Analysis of a 6-DOF Upper Limb Exoskeleton Model for a Brain-Machine Interface Study," *in Proceedings of the 6th IFAC Symposium on Mechatronic Systems (Mechatronics '13)*, Hangzhou, China, pp. 293–300, April 10–12, 2013 **(Best Student Paper Finalist)**

8. Yizhou Wang, **Wenjie Chen**, and Masayoshi Tomizuka, "Extended Kalman Filtering for Robot Joint Angle Estimation Using MEMS Inertial Sensors," *in Proceedings of the 6th IFAC Symposium on Mechatronic Systems (Mechatronics '13)*, Hangzhou, China, pp. 406–413, April 10–12, 2013

7. **Wenjie Chen**, and Masayoshi Tomizuka, "Iterative Learning Control with Sensor Fusion for Robots with Mismatched Dynamics and Mismatched Sensing," *in Proceedings of the 2012 ASME Dynamic Systems and Control Conference (DSCC)*, Fort Lauderdale, Florida, USA, pp. 1480–1488, October 17–19, 2012 **(Best Paper in Session Award)**

6. Jonathan Asensio, **Wenjie Chen**, and Masayoshi Tomizuka, "Robot Learning Control Based on Neural Network Prediction," *in Proceedings of the 2012 ASME Dynamic Systems and Control Conference (DSCC)*, Fort Lauderdale, Florida, USA, pp. 1489–1497, October 17–19, 2012

5. **Wenjie Chen**, and Masayoshi Tomizuka, "Load Side State Estimation in Robot with Joint Elasticity," *in Proceedings of the 2012 IEEE/ASME International Conference on Advanced Intelligent Mechatronics (AIM)*, Kaohsiung, Taiwan, pp. 598–603, July 11–14, 2012

4. **Wenjie Chen**, and Masayoshi Tomizuka, "A Two-Stage Model Based Iterative Learning Control Scheme for a Class of MIMO Mismatched Linear Systems," *in Proceedings of the 2012 ASME International Symposium on Flexible Automation (ISFA)*, St. Louis, Missouri, USA, paper No. ISFA2012–7199, June 18–20, 2012

3. Cong Wang, **Wenjie Chen**, and Masayoshi Tomizuka, "Robot End-effector Sensing with Position Sensitive Detector and Inertial Sensors," *in Proceedings of the 2012 IEEE International Conference on Robotics and Automation (ICRA)*, Saint Paul, Minnesota, USA, pp. 5252–5257, May 14–18, 2012

2. **Wenjie Chen**, and Masayoshi Tomizuka, "Estimation of Load Side Position in Indirect Drive Robots by Sensor Fusion and Kalman Filtering," *in Proceedings of the 2010 American Control Conference (ACC)*, Baltimore, Maryland, USA, pp. 6852–6857, June 30–July 2, 2010

1. **Wenjie Chen**, Kyoungchul Kong, and Masayoshi Tomizuka, "Hybrid Adaptive Friction Compensation of Indirect Drive Trains," *in Proceedings of the 2009 ASME Dynamic Systems and Control Conference (DSCC)*, Hollywood, California, USA, pp. 313–320, October 12–14, 2009

TALKS & PRESENTATIONS

Besides the above conference presentations

- 01/04/2020 "Intelligent Robots: Robot Learning and its Industrial Applications", Polytechnic Institute, Zhejiang University
- 12/22/2018 "Intelligent Robotic Technologies and Industrial Applications", Polytechnic Institute, Zhejiang University
- 05/29/2017 "Robotic Learning in Industrial Applications", in *Workshop "Recent Advances in Dynamics for Industrial Applications"*, the 2017 IEEE International Conference on Robotics and Automation (ICRA), Singapore
- 08/14/2014 "Mechatronic Considerations for Mismatched Robotic Systems", Google Robotics
- 04/10/2013 "EFRI-M3C: A hybrid control systems approach to brain-machine interfaces for exoskeleton control (Overview)", Qiushi Academy for Advanced Studies, Zhejiang University, China
- 03/11/2013 "Mechatronic Considerations for Mismatched Robotic Systems", Department of Mechanical Engineering, Carnegie Mellon University
- 03/04/2013 "Mechatronic Considerations for Mismatched Robotic Systems", Department of Mechanical Engineering, Worcester Polytechnic Institute
- 02/26/2013 "Mechatronic Considerations for Mismatched Robotic Systems", Department of Mechanical Engineering and Engineering Science, University of North Carolina at Charlotte
- 08/09/2012 "Intelligent Control of Robots with Mismatched Dynamics and Mismatched Sensing", *Ph.D. seminar*, University of California, Berkeley
- 03/08/2012 "EFRI-M3C: A hybrid control systems approach to brain-machine interfaces for exoskeleton control (NSF EFRI-M3C 1137267)", *Poster presentation (group work), NSF EFRI Grantees Conference*, Arlington, VA, Mar. 07–09, 2012
- 02/28/2012 "Estimation in Robots with Mismatched Sensing", *The 1st International Workshop between University of California Berkeley and Keio University*, Berkeley, CA
- 04/26/2011 "Disturbance Cancellation Schemes for Indirect Drive Robot Manipulator", FANUC Corporation, Japan

Updated on October 18, 2020

http://wjchen84.github.io/