

Honghao Lv

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State Key Laboratory of Fluid Power and Mechatronic Systems

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EDUCATION

- ◆ Feb. 2018–Jun. 2023 (expected):
Doctoral Candidate in Mechatronic Engineering, School of Mechanical Engineering, Zhejiang University (ZJU), Hangzhou, China
- ◆ Dec. 2021– Dec. 2022:
Guest Researcher (Traineeship Ph.D.) in Communication & Robotics Lab, ABB AB, Corporate Research Center, Västerås, Sweden
- ◆ Sep. 2021– Dec. 2022:
Visiting Ph.D. Student in Information Technology and Robotics, Division of Information Science and Engineering, EECS, KTH Royal Institute of Technology, Stockholm, Sweden
- ◆ May 2018: Training Programme of Simulation in RobotStudio, ABB Engineering Ltd., Shanghai, China
- ◆ Sep. 2014–Jun. 2018:
B. Eng. in Mechanical Engineering, School of Mechatronic Engineering, China University of Mining and Technology (CUMT), Xuzhou, China
Academic Achievement: average score 91.2(100), GPA 3.88(4), rank 2/339
- ◆ Computer Skills: Python, C++, MATLAB, RAPID (ABB), ROS, RobotStudio, OpenCV, NCRE Rank II (Visual Basic), NCRE Rank III (Internet Technology)

SPECIALTY

- ◆ Dual-arm Robotic Teleoperation & Human-Robot Collaboration
- ◆ Human-Robot Intelligent Interface & Safe Interaction
- ◆ Artificial Intelligence and its Applications in Robotics
- ◆ Mobile Robot and Multi-Robot Coordination

PUBLICATION LIST

- ◆ Journal Papers:
 - [1] **Honghao Lv**, Zhibo Pang*, Koushik Bhimavarapu, and Geng Yang, “Impacts of Wireless on Robot Control: The Network Hardware-in-the-Loop Simulation Framework and Real-Life Comparisons”, IEEE Transactions on Industrial Informatics (IEEE TII), IF: 11.648, DOI:10.1109/TII.2022.3227639, Dec. 2022. (1 ✕, **TOP**)
 - [2] **Honghao Lv**, Depeng Kong, Gaoyang Pang, Baicun Wang, Zhangwei Yu, Zhibo Pang, and Geng Yang*, “GuLiM: A Hybrid Motion Mapping Technique for Teleoperation of Medical Assistive Robot in Combating the COVID-19 Pandemic,” IEEE Transactions on Medical Robotics and Bionics (IEEE TMRB), vol. 4, no. 1, pp. 106–117, Jan. 2022. DOI: 10.1109/TMRB.2022.3146621 (**Popular Article**)
 - [3] **Honghao Lv**, Geng Yang*, Huiying Zhou, Xiaoyan Huang, Huayong Yang, Zhibo Pang, “IoT-enabled Dual-arm Motion Capture and Mapping for Telerobotics in Home Care,” IEEE Journal of Translational Engineering in Health and Medicine (IEEE JTEHM), IF: 2.075, Jun. 2020. DOI: 10.1109/JTEHM.2020.3002384.
 - [4] Geng Yang*, **Honghao Lv**, Zhiyu Zhang, Liu Yang, Siqi You, Juan Du, Huayong Yang, “Keep Healthcare Workers Safe: Application of Teleoperated Robot in Isolation Ward for COVID-19 Prevention and Control” Chinese Journal of Mechanical Engineering (CJME), IF: 1.413, vol. 33, no. 47, Jun. 2020. DOI: 10.1186/s10033-020-00464-0. (**1st author is my supervisor, 2020 Highly-Cited CJME Articles TOP1, the Outstanding Papers of CAST in 2022, 第七届中国科协优秀科技论文**)
 - [5] Huiying Zhou, Geng Yang*, **Honghao Lv**, Zhibo Pang, Xiaoyan Huang, Huayong Yang, “IoT-enabled Dual-arm Motion Capture and Mapping for Telerobotics in HomeCare” IEEE Journal of Biomedical and Health Informatics (IEEE JBHI), 2019.

- [6] Geng Yang, **Honghao Lv**, Feiyu Chen, Zhibo Pang, Jin Wang, Huayong Yang, Junhui Zhang*, “A Novel Gesture Recognition System for Intelligent Interaction with a Nursing-Care Assistant Robot” *Applied Sciences-Basel*, IF:2.217, vol. 8, (12), art. no. 2349, Dec. 2018. DOI: 10.3390/app8122349. **(1st author is my supervisor)**
- [7] Feiyu Chen, **Honghao Lv**, Zhibo Pang, Junhui Zhang, Yonghong Hou, Ying Gu, Huayong Yang and Geng Yang*, “WristCam: A Wearable Sensor for Hand Trajectory Gesture Recognition and Intelligent Human-Robot Interaction” *IEEE Sensors Journal*. IF: 3.076, pp. 1-1, Oct. 2018. DOI: 10.1109/JSEN. **(project leader)**
- [8] Depeng Kong, Geng Yang*, Gaoyang Pang, Zhiqiu Ye, **Honghao Lv**, Zhangwei Yu, Fei Wang, Xi Vincent Wang, Kaichen Xu, and Huayong Yang, “Bioinspired Co-Design of Tactile Sensor and Deep Learning Algorithm for Human-Robot Interaction,” *Advanced Intelligent Systems*, vol. 4, no. 6, DOI: 10.1002/aisy.202200050, Jun. 2022. **(build the verification platform)**
- [9] Zakka Vincent Gbouna†, Gaoyang Pang†, Geng Yang*, Zeyang Hou, **Honghao Lv**, Zhangwei Yu, and Zhibo Pang, “User-Interactive Robot Skin with Large-Area Scalability for Safer and Natural Human-Robot Collaboration in Future Telehealthcare,” *IEEE Journal of Biomedical and Health Informatics*, IF:5.772. DOI: 10.1109/JBHI.2021.3082563, May 2021 **(build the verification platform)**
- [10] Wenzheng Heng, Geng Yang, Gaoyang Pang, Zhiqiu Ye, **Honghao Lv**, Juan Du, Guodong Zhao, and Zhibo Pang, “Fluid-Driven Soft CoboSkin for Safer Human-Robot Collaboration: Fabrication and Adaptation,” *Advanced Intelligent Systems*, Jun. 2020. DOI: 10.1002/aisy.202000038. **(build the verification platform)**
- [11] Zhiqiu Ye†, Gaoyang Pang†, Kaichen Xu, Zeyang Hou, **Honghao Lv**, Yiren Shen, and Geng Yang*, “Soft Robot Skin with Conformal Adaptability for On-body Tactile Perception of Collaborative Robots,” *IEEE Robotics and Automation Letters*, vol. 7, no. 2, pp. 5127-5134, DOI: 10.1109/LRA.2022.3155225, Apr. 2022. **(build the verification platform)**

◆ Conference Papers (peer-reviewed):

- [1] **Honghao Lv**, Zhibo Pang, Geng Yang, “Hardware-in-the-Loop Simulation for Evaluating Communication Impacts on the Wireless-Network-Controlled Robots”, in the 48th Annual Conference of the IEEE Industrial Electronics Society (IECON 2022), Brussels, Belgium, 17-20 October. 2022. **(IEEE IES Students & Young Professionals Paper Award)**
- [2] Ruibin Zhang, **Honghao Lv**, Huiying Zhou, Yurui Zhang, Chenhao Liu, and Geng Yang*, “A Gait Recognition System for Interaction with a Homecare Mobile Robot”, in the 46th Annual Conference of the IEEE Industrial Electronics Society (IECON 2020), Singapore, 16-20 October. 2020. **(project leader)**
- [3] Yuqi Wang, **Honghao Lv**, Huiying Zhou, Qi Cao, Zikang Li, and Geng Yang*, “A Sensor Glove Based on Inertial Measurement Unit for Robot Teleoperation”, in the 46th Annual Conference of the IEEE Industrial Electronics Society (IECON 2020), Singapore, 16-20 October. 2020. **(project leader)**
- [4] Huiying Zhou†, **Honghao Lv**†, Kang Yi, Zhibo Pang, Huayong Yang, Geng Yang*, “An IoT-Enabled Telerobotic-Assisted Healthcare System Based on Inertial Motion Capture” in the 2019 IEEE International Conference on Industrial Informatics (INDIN 2019), Helsinki, 22-25 Jul., 2019. **(co-first author)**
- [5] Shimin Pan, **Honghao Lv**, Hong Duan, Gaoyang Pang, Kang Yi, and Geng Yang*, “A Sensor Glove for the Interaction with a Nursing-Care Assistive Robot”, in the 2019 IEEE International Conference on Industrial Cyber-Physical Systems (ICPS 2019), Taipei, 6-9 May, 2019. **(project leader)**
- [6] Huiying Zhou, Liu Yang, **Honghao Lv**, Kang Yi, Huayong Yang, and Geng Yang*, “Development of a Synchronized Human-Robot-Virtuality Interaction System using Cooperative Robot and Motion Capture Device”, in the IEEE/ASME International Conference on Advanced Intelligent Mechatronics (AIM 2019), Hongkong, 8-12 Jul., 2019. **(build the verification platform)**

◆ Patents:

- [1] Yang Geng, **Lv Honghao**, Pang Gaoyang, Yang Huayong, Zhejiang University; A Dirigible Dual-arm Omnidirectional Mobile Nursing-care Robot: ZL. 2018 1 0534638.1 [P]. 2018-10-26. (Granted) **(1st author is my supervisor)**
- [2] Yang Geng, **Lv Honghao**, Zhang Zhiyu, Yang Huayong, Zhejiang University; A Software for Acquisition and Analysis of Dual-arm Robot’s motion Status: Registration No.2020SR0061078. **(1st author is my supervisor)**
- [3] Yang Geng, **Lv Honghao**, Wang Ruohan, Yang Huayong, Zhejiang University; A Human Motion Capture and Guidance Data Generation Software for Dual-arm robot teleoperation: Registration No.2022SR0816120. **(1st author is my supervisor)**
- [4] Yang Geng, Li Le, **Lv Honghao**, Yang Huayong, Zhejiang University; A Software for Controlling and Monitoring the Robot Torso Motion Status: Registration No.2022SR0816145.
- [5] **Lv Honghao**, Hao Jingbin, Jia Kun, China University of Mining and Technology; A Smart Home System Based

on LabView and TCP/IP Network Protocol: CN201721694857.3[P]. 2017-12-07. (Utility model)

- [6] Ding Haigang, **Lv Honghao**, Cheng Gang, Zhao Jiyun, Cao Chao, China University of Mining and Technology; A Speed Measuring Device for Large Diameter Rotating Shaft without Protruding End.: CN201711391943.1[P]. 2017-12-21. (Invention publication) (**build the verification platform**)

RESEARCH PROJECTS

- ◆ Preparatory research Supported by a Research Project * 2021:
Project Leader *Research on impedance control and digital twin modeling for dual-arm mobile robot, using **Kinova Gen2** Ultra Robot*
- ◆ Preparatory research Supported by a Research Project * 2020:
Project Leader *Research on teleoperation technology for dual-arm special robot, using **Kinova Gen2** Ultra Robot*
- ◆ Zhejiang University Special Scientific Research Fund for COVID-19 Prevention and Control (Grant No. 2020XGZX017) 2020:
Project Leader *Application of Tele-Robotic Technology for Auxiliary Diagnosis and Treatment of COVID-19 in Isolation Ward, using **YuMi** Robot*
- ◆ Robotics Institute of Zhejiang University (Grant No. K18-508116-008-03) 2019:
Project Leader *Human-robot Collaborative Assembly Based on Target Recognition Using Kinect and Security Interaction Design, using **YuMi** Robot*
- ◆ Robotics Institute of Zhejiang University (Grant No. K18-508116-008-03) 2018:
Project Leader *Cooperative Control System of Dual-Arm Robot Based on Human Action Recognition, using **YuMi** Robot*

FUNDED PROJECTS I'M INVOLVED IN

- ◆ Feb. 2020–Aug. 2020, “Application of intelligent robot technology in assistive diagnosis and treatment of COVID-19 isolation ward and in promotion of patients’ mental health.” Supported by the Zhejiang University Special Scientific Research Fund for COVID-19 Prevention and Control, Grant No. 2020XGZX017, Project Investigator: Prof. G. Yang (PI), J. Du, H. Wang, J. Su, J. Wang, Y. Sun, **H. Lv**, Z. Ye, D. Kong, G. Pang, J. Deng, H. Zhou, L. Yang, Z. Zhang, Z. Hou, and Z. Li. (CNY 500,000)
- ◆ Jan. 2020–Dec. 2023, “Research on emotional recognition and behavioral interaction method of safety-oriented two-arm cooperative robots for senior citizens.” Supported by the National Natural Science Foundation of China, Grant No. 51975513, Project Investigator: Prof. G. Yang (PI), **H. Lv**, G. Pang, J. Deng, H. Zhou, L. Yang, Z. Zhang, W. Sun, and T. Qiu. (CNY 600,000) (Indexed by NSFC ISIS)
- ◆ Jan. 2020–Dec. 2023, “Research on multimodal soft sensing and natural human-robot cognitive interaction for collaborative robots.” Supported by the Zhejiang Provincial Natural Science Foundation of China, Grant No. LR20E050003, Project Investigator: Prof. G. Yang (PI), **H. Lv**, G. Pang, J. Deng, H. Zhou, L. Yang, and Z. Zhang. (CNY 800,000)
- ◆ Apr. 2020–Apr. 2024, “Research on cooperative teleoperation of dual arm robot based on inertial motion capture.” Supported by Open Foundation of the State Key Laboratory of Fluid Power and Mechatronic Systems, The State Key Laboratory of Fluid Power and Mechatronic Systems, Grant No. SKLoFP_ZZ_2002, Project Investigator: Prof. G. Yang (PI), **H. Lv**, Z. Ye, D. Kong, H. Zhou, L. Yang, Z. Zhang, Z. Hou, and Z. Li. (CNY 600,000)

AWARDS & SCHOLARSHIPS

- ◆ IEEE Students & Young Professionals Paper Assistance Award Oct. 2022
- ◆ Scholarship under China Scholarship Council (CSC) for Joint PhD Student Jun. 2021
- ◆ National Scholarship (for Doctoral Candidate) Nov. 2020
- ◆ ZJU Innovation and Entrepreneurship Individual Award Nov. 2020
- ◆ Gold Prize, National Machinery Industry Design Innovation Contest Nov. 2021
- ◆ Gold Prize, International College Students’ “Internet+” Innovation and Entrepreneurship Competition of Zhejiang Province Aug. 2020
- ◆ 2nd Prize in China Postgraduate Robot Innovation and Design Competition Sep. 2022

◆ 3 rd Prize in China Postgraduate Robot Innovation and Design Competition	Sep. 2020
◆ 1 st Prize in Robot Innovative Design Competition of ZJU	Jun. 2020
◆ 2 nd Prize, ChapHoyea Scholarship of ZJU	Dec. 2019
◆ 2 nd Prize in Robot Innovative Design Competition of ZJU	Jun. 2019
◆ Excellent Graduation Project of CUMT	Jun. 2018
◆ National Scholarship (for Undergraduate Student)	Nov. 2017
◆ National Scholarship (for Undergraduate Student)	Nov. 2016
◆ National Scholarship (for Undergraduate Student)	Nov. 2015
◆ 2 nd prize, China Undergraduate Mathematical Contest in Modeling	Sep. 2015
◆ 3 rd prize, Virtual Instrument Contest of Jiangsu Province	Oct. 2016
◆ 3 rd prize, Mathematical Modeling Contest of Jiangsu Province	May 2016
◆ 1 st prize, Curriculum Design of Machine Design Contest	Mar. 2017

HONORS & MISCELLANEOUS

◆ TOP10 Student of ZJU ME	2021
◆ Merit Graduate Student of ZJU	2019, 2020
◆ Excellent Graduate Student of ZJU	2019, 2020
◆ Sun-Yueqi Outstanding Student Award	2018
◆ Outstanding Graduates of CUMT	2018
◆ Merit Student of Jiangsu Province	2018
◆ Outstanding Student Cadre of Shandong Province	2014
◆ Merit Student of Zibo City	2011
◆ Excellent Individual in Military Training	2014
◆ Vice president of Party Workstation	2017
◆ Excellent Student Cadre and League Member of CUMT	2015, 2016, 2017
◆ Excellent volunteer of Xuzhou Central Hospital	2015

RESEARCH EXPERIENCE in CUMT

- ◆ **Project Leader** Apr. 2016–Dec. 2016
Participated in Training Program of Innovation for Undergraduates with the project called *the development of a portable friction coefficient tester*; Built a prototype which has been tested successfully; In charge of designing the hardware circuit and programming the whole LabVIEW codes.
- ◆ **Participant** Jul. 2016–Jun. 2018
Took part in the project called *the development of intelligent home based on face recognition and voice control*; Obtained the 3rd prize in the Virtual Instrument Contest of Jiangsu Province; In charge of assembling and debugging of the hardware.
- ◆ **Participant** Apr. 2017–Jun. 2018
Involved in the project named *the design of robot key parts based on the 3D printing*; In charge of modeling and analyzing the 3D models.