

Jun Huo

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RESEARCH INTERESTS

My current research focus on flexible medical robot (surgery robot) and human-centered wearable rehabilitation assistive robot (supernumerary robotic limb (SRL), exoskeletons and other bio-inspired robots). My research lies in the mechanism design, optimization, and learning-based control.

EDUCATION

- **Huazhong University of Science and Technology (HUST)** Sept. 2018 - Dec. 2025
Ph.D. in Control Science and Engineering (Combined master's and doctoral program) Wuhan, China
 - Advisor: Prof. Jian Huang
 - Dissertation: Research on Multi-functional Universal Supernumerary Robotic Limb for Hemiplegic Patients Motion Assistance
- **Northeastern University (NEU)** Oct. 2014 - June 2018
B.E. in Mechanical Engineering Shenyang, China
 - Advisor: Prof. Zhiguo Lu
 - Thesis: Structural Design and Analysis of Hybrid Drive Humanoid Multi-Finger Dexterous Hand

PROFESSIONAL EXPERIENCE

- **Research Associate, The Chinese University of Hong Kong (CUHK)** April 2026 - March 2027
Mechanical and Automation Engineering HongKong, China
 - Postdoctoral supervisor: Shing Shin Cheng

HONORS AND AWARDS

- **Best Paper Finalist Award** July 2024
2024 International Conference on Advanced Robotics and Mechatronics (ICARM)
 - [Jun Huo](#), Xinyi Wang, Bo Yang, Qingyang Yan, Zhaofan Yuan, and Jian Huang*. **Active Compliance Variable Impedance Control of Lower Supernumerary Robotic Limb.**
- **The Sixth China Post-Graduate Student Robot Innovation Design Competition, National Second Prize** Oct. 2024
China Association for Science and Technology
 - [Jun Huo](#), Haoyuan Wang, Zhongzheng Fu, Xingjian Chen, Chengyao Li. A universal supernumerary robotic limb for motion function assistance
- **The Third China Post-Graduate Student Robot Innovation Design Competition, National Second Prize** Aug. 2021
China Association for Science and Technology
 - Hongge Ru, Runzhe Zhang, [Jun Huo](#), Cheng Chen, Mengshi Zhang. Pneumatic flexible hand for grip assistance in hemiplegic patients

PUBLICATIONS AND PATENTS

C=CONFERENCE, J=JOURNAL, P=PATENT, S=IN SUBMISSION, T=THESIS, B=BOOKS

- [J.1] [Jun Huo](#), Jian Huang*, Jie Zuo, Bo Yang, Zhongzheng Fu, Xi Li, and Samer Mohammed. **Innovative Design of Multi-functional Supernumerary Robotic Limbs with Ellipsoid Workspace Optimization.** IEEE Transactions on Robotics, vol. 41, pp. 4699-4718, 2025.
- [J.2] [Jun Huo](#), Kehan Xu, Chengyao Li, Yu Cao, Jie Zuo, Xinxing Chen and Jian Huang*. **Variable Impedance Control for Floating-Base Supernumerary Robotic Leg in Walking Assistance.** IEEE Robotics and Automation Letters, vol. 10, no. 9, pp. 8698-8705, Sept. 2025.
- [J.3] [Jun Huo](#), Hongge Ru, Bo Yang, Xingjian Chen, Xi Li and Jian Huang*. **Air-Chamber-Based Soft Six-Axis Force/Torque Sensor for Human-Robot Interaction.** IEEE Transactions on Instrumentation and Measurement, vol. 73, pp. 1-12, 2024, Art no. 9501612.
- [J.4] [Jun Huo](#), Jian Huang*, Xikai Tu and Zhongzheng Fu. **Force sensorless admittance control of body weight support system.** Advanced Robotics, 35:7, 425-436, 2021.
- [J.5] Jie Zuo#, [Jun Huo](#)#, Xiling Xiao, Yanzhao Zhang and Jian Huang*. **Human-robot Coordination Control for Sit-to-Stand Assistance in Hemiparetic Patients with Supernumerary Robotic Leg.** IEEE Transactions on Automation Science and Engineering, vol. 22, pp. 16591-16602, 2025.
- [J.6] Zhongzheng Fu, Xinrun He, Enkai Wang, [Jun Huo](#), Jian Huang* and Dongrui Wu. **Personalized Human Activity Recognition Based on Integrated Wearable Sensor and Transfer Learning.** Sensors. 2021, 21(3):885.

- [J.7] Hongge Ru, Jian Huang*, Wenbin Chen, Caihua Xiong, Junzhe Wang and [Jun Huo](#). **Design, modelling and identification of a fiber-reinforced bending pneumatic muscle**. Science China Information Sciences, 62, 1-3, 2019.
- [J.8] Hongge Ru, Weijian Gao, Weixuan Ou, Xingyue Yang, Andong Li, Zhongzheng Fu, [Jun Huo](#), Bo Yang, Yanzhao Zhang, Xiling Xiao, Zhaohui Yang, Jian Huang. **A Flexible Wearable Supernumerary Robotic Limb for Chronic Stroke Patients**. Journal of Visualized Experiments, 200, e65917, 2023. doi:10.3791/65917.
- [J.9] Kehan Xu, [Jun Huo](#), Yize Zheng, Zixin Chi, Yu Cao, Zhaohui Yang and Jian Huang*. **Adaptive Gait Assistance for Foot Drop Rehabilitation Based on Uncertainty Fusion of Contra-lateral Limb Information**. IEEE Transactions on Neural Systems and Rehabilitation Engineering, vol. 34, pp. 2337-2348, 2026.
- [J.10] Bo Yang, Zejia Zhang, Yu Cao, [Jun Huo](#), Jie Zuo, Xiling Xiao, Wei Luo and Jian Huang*. **Gaze Foot Hybrid Upper Limb Assistive Robotic System: An Innovative Approach to Aid Individuals with Limb Impairments**. IEEE Transactions on Biomedical Engineering (Accepted). doi: 10.1109/TBME.2026.3695684.
- [J.11] Zhongzheng Fu, Haoyuan Wang, Yongkai Liao, Xinrun He, Xingjian Chen, [Jun Huo](#) and Jian Huang*. **Adaptive Fuzzy Residual Learning Framework for On-Skin Triboelectric Sensor Gesture Recognition**. IEEE Transactions on Fuzzy Systems (Accepted), doi: 10.1109/TFUZZ.2026.3695771.
- [S.1] Wei Meng, Wenbo Liu, Xinyu Zhang, [Jun Huo](#), Nan Xia, Jie Zuo*, Quan Liu and Jian Huang. **Long-Sequence Lower Limb Action Recognition via Action-Specific Attention and Logic Correction for Daily Rehabilitation**. IEEE Transactions on Neural Systems and Rehabilitation Engineering (In Revision (Revision 2)).
- [S.2] [Jun Huo](#), Rui Lei, Yuanyuan Yuan, Xiling Xiao, Xinxing Chen, Jie Zuo, Yu Cao and Jian Huang*. **Gaze-driven Wearable Supernumerary Robotic Limb for Grasping Assisted Control**. IEEE/CAA Journal of Automatica Sinica (Chinese Version, In Revision (Revision 2)).
- [S.3] Yuanyuan Yuan, Yu Cao, Yifei Guo, [Jun Huo](#) and Jian Huang*. **Adaptive Soft-Constraint Barrier Lyapunov Functions for Safety-Critical Control with Application to Active Suspended Backpacks**. Automatica (In Revision (Revision 1)).
- [C.1] [Jun Huo](#), Xinyi Wang, Bo Yang, Qingyang Yan, Zhaofan Yuan, and Jian Huang*. **Active Compliance Variable Impedance Control of Lower Supernumerary Robotic Limb**. 2024 International Conference on Advanced Robotics and Mechatronics (ICARM), Tokyo, Japan, 2024, pp. 19-24.
- [C.2] [Jun Huo](#), Bo Yang, Hongge Ru, and Jian Huang*. **Parametric Design Optimization of a Universal Supernumerary Robotic Limb**. The 32nd 2021 International Symposium on Micro-NanoMechatronics and Human Science (MHS), Nagoya, Japan, 2021, pp. 1-6.
- [C.3] Zhiguo Lu*, [Jun Huo](#), Yuce Wang, Tongle Xin and Zhengbo Xie. **Design and simulation analysis of a lower limbs exoskeleton powered by hydraulic drive**. 2017 2nd International Conference on Advanced Robotics and Mechatronics (ICARM), Hefei and Tai'an, China, 2017, pp. 173-177.
- [C.4] Bo Yang, Jian Huang*, Menglin Sun, [Jun Huo](#), Xiaolong Li and Caihua Xiong. **Head-free, Human Gaze-driven Assistive Robotic System for Reaching and Grasping**. 2021 40th Chinese Control Conference (CCC), Shanghai, China, 2021, pp. 4138-4143.
- [C.5] Yu Cao, Jian Huang*, Zhangbo Huang, Xikai Tu, Hongge Ru, Cheng Chen and [Jun Huo](#). **Dynamic Model of Exoskeleton Based on Pneumatic Muscle Actuators and Experiment Verification**. 2018 IEEE-RAS 18th International Conference on Humanoid Robots (Humanoids), Beijing, China, 2018, pp. 334-339.
- [P.1] Jian Huang, [Jun Huo](#), Mengshi Zhang, Caihua Xiong, Xiling Xiao. (2021). **A human motion-assisted dual-use supernumerary robotic limb**. Chinese invention patent, Patent No. CN201910611936.0.
- [P.2] Jian Huang, [Jun Huo](#), Xikai Tu, Hongge Ru. (2021). **A kind of dynamic suspension weight support system**. Chinese invention patent, Patent No. CN201910694048.X
- [P.3] Jian Huang, [Jun Huo](#), Bo Yang, Hongge Ru. (2022). **Parameter optimization method for supernumerary robotic limb based on workspace similarity**. Chinese invention patent, Patent No. CN202110609611.6
- [P.4] Jian Huang, Hongge Ru, [Jun Huo](#), Xikai Tu, Xiao Li. (2022). **A pneumatic driven variable stiffness omnidirectional bending drive device**. Chinese invention patent, Patent No. CN202110423767.5
- [B.1] Jian Huang, Jie Zuo, [Jun Huo](#), Yifei Guo. **Multi-functional Supernumerary Robotic Limb**. Science Press, Beijing, China. (Under preparation, funded by the National Science and Technology Academic Monograph Publication Fund of 2025).

INVITED TALKS

• Multi-functional Universal Supernumerary Robotic Limb for Motion Assistance

- 04/2025, Zhejiang University of Technology
- 06/2026, Hunan University

ACADEMIC SERVICE

Journal Reviewer: IEEE Transactions on Robotics (T-RO), IEEE Transactions on Automation Science and Engineering (T-ASE), IEEE Robotics and Automation Letters (RA-L), Journal of Field Robotics (J-FR), IEEE Transactions on Neural Systems and Rehabilitation Engineering (T-NSRE), IEEE Transactions on Instrumentation and Measurement (T-IM), Advanced Intelligent Systems (AIS), Bioinspiration & Biomimetics (BB), Frontiers in Bioengineering and Biotechnology

Conference Reviewer: IEEE International Conference on Robotics and Automation (ICRA), Chinese Control Conference (CCC), IEEE International Conference on Cyborg and Bionic Systems (CBS), International Conference on Advanced Robotics and Mechatronics (ARM)

REFERENCES

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