Jun Huo

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Wuhan, Hubei Province, China

Research Interests

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

Education

- **Huazhong University of Science and Technology** *Sept. 2021 - Dec. 2025*
  Ph.D. in Control Science and Engineering Wuhan, China
  - Advisor: Prof. Jian Huang
  - Dissertation: Research on Multi-functional Universal Supernumerary Robotic Limb for Hemiplegic Patients Motion Assistance
- **Huazhong University of Science and Technology** *Sept. 2018 - June 2021*
  M.E. in Control Science and Engineering Wuhan, China
  - Advisor: Prof. Jian Huang
- **Northeastern University** *Sept. 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, Mechanical and Automation Engineering** *Jan. 2026 -*
  The Chinese University of Hong Kong 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

[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.

[S.1] 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 (Under Review).

[S.2] 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 (In Revision (Revision 2)).

[S.3] 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 (Under Review).

[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.

[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

Invited Talks

- **Multi-functional Universal Supernumerary Robotic Limb for Hemiplegic Patients Motion Assistance**
  - 04/2025, Zhejiang University of Technology

Academic Service

Journal Reviewer: 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 (TNSRE), IEEE Transactions on Instrumentation and Measurement (TIM), 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

1. **Jian Huang**
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