

Ph.D student at Peking University, China

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Education

Peking University, Beijing, China, Mechanics, Ph.D. candidate	2021 - 2026
Tsinghua University, Beijing/Shenzhen, China, Control Engineering, M.Eng.	2018 - 2021
North China Electric Power University, Beijing, China, Wind Power, B.Eng. (Honors)	2013 - 2017
Wrocław University of Science and Technology, Wrocław, Poland, Visiting Student	2017

Research Experience

Bionic design and automation of lighter-than-air aerial robots, Peking University	2021 - present
Perception and Control of Continuum Robots and Soft Robots, Tsinghua University	2018 - 2021

Publications

Journal Articles

- [1] **H. Cheng** and F. Zhang, "RGBlimp-Q: Robotic Gliding Blimp With Moving Mass Control Based on a Bird-Inspired Continuum Arm," *IEEE Transactions on Robotics (T-RO)*, vol. 41, pp. 5097-5116, 2025, doi: 10.1109/TRO.2025.3600135.
- [2] Y. Zhu, **H. Cheng**, and F. Zhang, "Data-Driven Dynamics Modeling of Miniature Robotic Blimps Using Neural ODEs With Parameter Auto-Tuning," *IEEE Robotics and Automation Letters (RA-L)*, vol. 9, no. 12, pp. 10986-10993, 2024, doi: 10.1109/LRA.2024.3484182.
- [3] **H. Cheng**, Z. Sha, Y. Zhu, and F. Zhang, "RGBlimp: Robotic Gliding Blimp - Design, Modeling, Development, and Aerodynamics Analysis," *IEEE Robotics and Automation Letters (RA-L)*, vol. 8, no. 11, pp. 7273-7280, 2023, doi: 10.1109/LRA.2023.3318128.

Conference Papers

- [1] Y. Fan, **H. Cheng**, H. Wang, and F. Zhang, "Multi-Waypoint Navigation Control for Robotic Blimps Using Deep Reinforcement Learning," *IEEE/ASME International Conference on Advanced Intelligent Mechatronics (AIM)*, 2025.
- [2] H. Wang, **H. Cheng**, Y. Fan, and F. Zhang, "Wind Disturbance Compensation for Path-Following Control of Robotic Blimps via Deep Reinforcement Learning," *IEEE/ASME International Conference on Advanced Intelligent Mechatronics (AIM)*, 2025.
- [3] **H. Cheng**, H. Xu, H. Shang, X. Wang, H. Liu, and B. Liang, "Orientation to Pose: Continuum Robots Shape Reconstruction Based on the Multi-Attitude Solving Approach," *IEEE International Conference on Robotics and Automation (ICRA)*, 2022. (**Oral Presentation**)
- [4] **H. Cheng**, H. Liu, X. Wang, and B. Liang, "Configuration Estimation of Continuum Robots Using Piecewise Constant Curvature Generalized Epi-Polar Constraint Model," *IEEE 17th International Conference on Automation Science and Engineering (CASE)*, 2021.

- [5] **H. Cheng**, H. Liu, X. Wang, and B. Liang, "Approximate Piecewise Constant Curvature Equivalent Model and Their Application to Continuum Robot Configuration Estimation," *IEEE International Conference on Systems, Man, and Cybernetics (SMC)*, 2020.

Patents

- [1] H. Liu, **H. Cheng**, X. Wang, B. Lan, and B. Liang, "Continuum Robot Shape Sensing Method Based on the Multi-attitude Solving Approach," Chinese Patent CN113211440B, 2020.
- [2] B. Liang, H. Liu, **H. Cheng**, X. Wang, and B. Lan, "Kinematic Equivalence Method of Continuum Robot and Its Application," Chinese Patent CN111695213B, 2020.

Awards & Honors

- **National Scholarship** (Doctoral), China, 2025
- **Academic Innovation Award**, Peking University, 2025
- Outstanding Research Award, Peking University, 2022
- Comprehensive Excellence Scholarship, Tsinghua University, 2020
- **Outstanding Graduate at Beijing**, China, 2017
- **National Scholarship**, China, 2015
- National Encouragement Scholarship, China, 2014 and 2016
- First-Class Scholarship, North China Electric Power University, 2014, 2015, and 2016

Competitions

- **1st Prize**, "Travel with Colors" Inclusive Design Comp. (Lead, suitcase for visually impaired), 2025
- 2nd Prize, China Graduate Future Flight Vehicle Design Comp. (Lead, robotic gliding blimp), 2024
- 2nd Prize, China Graduate Robotics Design Comp. (Lead, continuum spinal rehab Robot), 2021
- 2nd Place, ZC-Cup Frontier Tech. Challenge (contribution to autonomous maze navigation), 2020
- **1st Prize**, Capital Mechanical Innovation Design Comp. (Lead, packaging robot), 2016
- **1st Prize**, China Siemens-Cup Intelligent Manufacturing Challenge, 2016
- **Champion**, Robots Competition of Universities in Beijing (Lead, robot combat), 2015
- 2nd Prize, Beijing Engineering Competition (Lead, Bluetooth cargo robot), 2015
- 2nd Prize, China LQ-Cup C/C++ Programming Comp. (individual), 2015
- 2nd Prize, National Olympiad in Informatics in Provinces (NOIP, individual, C++), 2012

Academic Service

Reviewer for IEEE T-RO, ICRA, IROS, CDC, ACC, and IEEE/ASME AIM

Relevant Skills

Programming	C, C++, Python, Matlab
Software	ROS/ROS2, Solidworks, CFD
Hardware	Arduino, STM32, ESP32, Jetson
Engineering	Additive manufacturing, design and fabrication of soft/rigid robots
Language	English, Mandarin

Last updated: December 28, 2025