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I am a PhD candidate in the Department of Mechanical Engineering at the **Tsinghua University**, advised by Prof. **Huichan Zhao**. I am a member of the THU Soft Robotics Research Group, where I conduct research on **soft actuators** and **bio-inspired robotic systems** driven by soft actuators. My research focuses on dielectric elastomer artificial muscles, pneumatic elastomer actuators, and millipede-inspired multi-legged robots.

🎓 Education

Present September 2022	Department of Mechanical Engineering Tsinghua University, Beijing, China PhD student in Mechanical Engineering (Expected completion: Oct. 2025) Supervisor: Huichan Zhao
July 2022 September 2019	Department of Mechanical Engineering Tsinghua University, Beijing, China Master's student in Mechanical Engineering Supervisor: Huichan Zhao
July 2018 September 2014	Department of Mechanical and Electrical Engineering Northeast Forestry University, Harbin, China Bachelor of Engineering in Mechatronic Engineering

🏆 Academic Awards

- ▶ **Best Poster Award**, Bio-inspired, Biomimetics, and Biohybrid (Cyborg) Systems Workshop, IEEE/RSJ IROS 2024, Abu Dhabi, October 2024.
- ▶ **Outstanding Academic Presentation**, The 3rd Annual Academic Conference of the State Key Laboratory of Tribology in Advanced Equipment, December 2024.
- ▶ **Excellent Poster Award**, Tsinghua University 734th PhD Forum (Department of Mechanical Engineering), April 2024.

🌸 Publications

- [1] **Q. Shao**, L. Zhou, J. Zhou, X.-J. Liu, and H. Zhao*, “Long, Fibrous, and Tailorable Dielectric Elastomer Artificial Muscles via Mask-Free Stamping of Carbon Nanotube Electrodes,” *Advanced Functional Materials*, Early View, p. 2422905, 2025.
- [2] **Q. Shao**, X. Dong, Z. Lin, C. Tang, H. Sun, X.-J. Liu, and H. Zhao*, “Untethered Robotic Millipede Driven by Low-Pressure Microfluidic Actuators for Multi-Terrain Exploration,” *IEEE Robotics and Automation Letters*, vol. 7, no. 4, pp. 12142–12149, 2022. **(Oral Presentation at ICRA 2023, Best Poster Award at IROS 2024 Workshop.)**
- [3] **Q. Shao**, Q. Xia, Z. Lin, X. Dong, X. An, H. Zhao, Z. Li, X.-J. Liu, W. Dong*, and H. Zhao*, “Unearthing the History with A-RHex: Leveraging Articulated Hexapod Robots for Archaeological Pre-Exploration,” *Journal of Field Robotics*, vol. 42, no. 1, pp. 206–218, 2024.
- [4] **Q. Shao**, X.-J. Liu, H. Zhao*, “Portable, High-Frequency, and High-Voltage Control Circuits for Untethered Miniature Robots Driven by Dielectric Elastomer Actuators,” in *2025 IEEE International Conference on Robotics and Automation (ICRA)*, Atlanta, USA, 2025. **(Accepted)**
- [5] J. Zhou†, **Q. Shao†**, Y. Wang, X.-J. Liu*, and H. Zhao*, “Modular and Compact Three-Axis Tactile Sensors and their Network for Enhancing Human-Machine-Environment Interactions,” *IEEE Transactions on Robotics*. **(Under Review, co-first authorship†)**
- [6] Z. Lin, **Q. Shao**, X.-J. Liu, and H. Zhao*, “An Anthropomorphic Musculoskeletal System with Soft Joint and Multifilament Pneumatic Artificial Muscles,” *Advanced Intelligent Systems*, vol. 4, no. 10, p. 2200126, 2022.

- [7] J. Zhou, **Q. Shao**, C. Tang, F. Qiao, T. Lu, X.-J. Liu, and H. Zhao*, “Conformable and Compact Multiaxis Tactile Sensor for Human and Robotic Grasping via Anisotropic Waveguides,” *Advanced Materials Technologies*, p. 2200595, 2022.
- [8] C. Tang, B. Du, S. Jiang, **Q. Shao**, X. Dong, X.-J. Liu, and H. Zhao*, “A pipeline inspection robot for navigating tubular environments in the sub-centimeter scale,” *Science Robotics*, vol. 7, no. 66, p. eabm8597, 2022.
- [9] Z. Lin, **Q. Shao**, B. Du, X.-J. Liu, and H. Zhao*, “Monolithic Soft Fibrous Valves Capable of Generating Air Pressure Cutoff, Maintaining, and Oscillation for Pneumatic Systems,” *Advanced Materials Technologies*, vol. 9, no. 8, p. 2301633, 2024.
- [10] X. An, Y. Cui, H. Sun, **Q. Shao**, and H. Zhao*, “Active-Cooling-in-the-Loop Controller Design and Implementation for an SMA-Driven Soft Robotic Tentacle,” *IEEE Transactions on Robotics*, pp. 1–17, 2023.
- [11] X. Dong, C. Tang, S. Jiang, **Q. Shao**, and H. Zhao*, “Increasing the Payload and Terrain Adaptivity of an Untethered Crawling Robot Via Soft-Rigid Coupled Linear Actuators,” *IEEE Robotics and Automation Letters*, vol. 6, no. 2, pp. 2405–2412, 2021.
- [12] Y. Cui, W. Yu, J. Li, **Q. Shao**, D. Weng, G. Yin, X. Zhang, X.-J. Liu, J. Ye*, J. Wang*, and H. Zhao*, “An Automatic Implementation of Oropharyngeal Swab Sampling for Diagnosing Respiratory Infectious Diseases via Soft Robotic End-Effectors,” *Chinese Journal of Mechanical Engineering*, vol. 37, no. 1, p. 29, 2024.
- [13] Z. Li, Z. Nie*, H. Zhao, **Q. Shao**, F. Xie, and X.-J. Liu*, “A Bio-Inspired Deformable Mouthpart Device with Adaptive Control for Negative Pressure Therapy on Unstructured Limb Surfaces,” *IEEE Robotics and Automation Letters*, vol. 9, no. 5, pp. 4361–4368, 2024.
- [14] R. Cheng, **Q. Shao**, X.-J. Liu, H. Zhao*, “Beyond Traversing in a Thin Pipe: Self-Sensing Odometry of a Pipeline Robot Driven by High-Frequency Dielectric Elastomer Actuators,” in *2025 IEEE International Conference on Robotics and Automation (ICRA)*, Atlanta, USA, 2025. **(Accepted)**
- [15] Z. Li, Z. Nie*, H. Zhao, **Q. Shao**, F. Xie, and X.-J. Liu*, “Design of a Novel Vacuum Head with Haptic Perception for Negative Pressure Therapy on Limbs,” in *2024 Intelligent Robotics and Applications (ICIRA)*, Xi’an, China, 2024.

Teaching Assistant

- › **Fundamentals of Computer Literacy**, Tsinghua University, Fall 2022, Fall 2023.
- › **Database Technology and Applications**, Tsinghua University, Spring 2023, Spring 2024.

Academic Services

- › **Journal Reviewer:**
 - IEEE Robotics and Automation Letters (RA-L)
 - Scientific Reports
- › **Conference Reviewer:**
 - IEEE International Conference on Robotics and Automation (ICRA)
 - IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)
 - International Conference on Intelligent Robotics and Applications (ICIRA)