



# Qi Shao

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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 <b>Tsinghua University, Beijing, China</b> PhD student in Mechanical Engineering (Expected completion: Oct. 2025) Supervisor: Huichan Zhao
July 2022 September 2019	Department of Mechanical Engineering <b>Tsinghua University, Beijing, China</b> Master's student in Mechanical Engineering Supervisor: Huichan Zhao
July 2018 September 2014	Department of Mechanical and Electrical Engineering <b>Northeast Forestry University, Harbin, China</b> 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] 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.
- [6] J. Zhou, **Q. Shao**, C. Tang, F. Qiao, T. Lu, X.-J. Liu, and H. Zhao\*, "Conformable and Compact Multi-axis Tactile Sensor for Human and Robotic Grasping via Anisotropic Waveguides," *Advanced Materials Technologies*, p. 2200595, 2022.

- [7] 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.
- [8] 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.
- [9] 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.
- [10] 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.
- [11] 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.
- [12] 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.
- [13] 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)**
- [14] 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

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

## Academic Services

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- › **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)