Jinshuo LIU

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EDUCATION

Shandong University (Top 20 in China), School of Control Science and Engineering — Jinan, China
M. Eng. in Robotics — Sep 2024 - Present

- Advisor: Prof. Yibin Li

Shandong University, School of Control Science and Engineering — Jinan, China
B.E. in Automation — Sep 2020 - Jun 2024

- GPA: 88.24/100
- Thesis: A Piezoelectric Platform for Precise Manipulation, *Best Undergraduate Thesis Award*

RESEARCH EXPERIENCE

Shandong University — Jinan, China
Undergraduate Student Researcher — Jan 2023 - Jan 2024

Resonant-Vibration-Induced Stick-Slip Piezoelectric Actuator

- **[Mechanism]**: Designed actuator structures and optimized parameters using SolidWorks and ANSYS.
- **[Hardware]**: Developed controlling and driving onboard circuits with Multisim and Altium Designer.
- **[Software]**: Programmed STM32 in C language for peripheral control and waveform generation.
- **[Paper]**: Conducted data analysis, prepared graphical figures, and wrote research paper independently.

PUBLICATIONS

[1] **J. Liu**, Z. Ding, J. Wu, et al. A self-moving piezoelectric actuator with high carrying/positioning capability via bending-resonant-vibration-induced stick-slip motion. ***IEEE Trans. Ind. Electron.***, 2024, Early Access.

[2] **J. Liu**, L. Ding, C. Pan, et al. A centipede-inspired bonded-type ultrasonic actuator with high thrust force density driven by dual-torsional-vibration-induced flexural traveling waves. ***Sens. Actuator A.***, 2024, 377, 115733.

[3] **J. Liu**, J. Wu, X. Gao, et al. Enhancement of torque density and power density of polymer-based ultrasonic motors via flexible usage of anisotropy in elastic property. ***Smart Mater. Struct.***, 2023, 32, 075020.

[4] **J. Liu**, T. Xu, and W. Xu. A highly accurate mathematical model for analyzing modular multilevel converters in transformer-less applications. ***Symmetry***, 2022, 14, 2498.

[5] W. Wei, J. Wu, Z. Ding, **J. Liu**, et al. A linear ultrasonic motor driven by torsional/bending vibrations. ***Sens. Actuator A.***, 2023, 357, 114404.

[6] **J. Liu**, Z. Ding, Z. Zhu, et al. A multi-DOF self-moving piezoelectric actuator utilizing a non-uniformly distributed ring-shaped electrode. ***IEEE Trans. Ind. Electron.*** (*Under Review*)

(More information is shown in the additional page.)

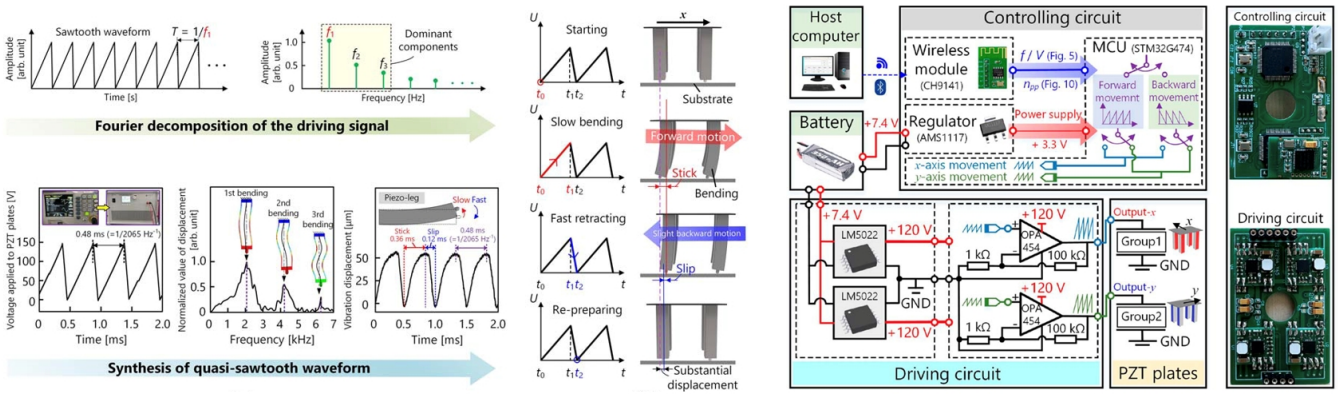
AWARDS & HONORS

- Best Undergraduate Award at Shandong University — 2024
- Best Undergraduate Thesis Award at Shandong University — 2024
- Academic Scholarship at Shandong University — 2023, 2022, 2021
- Second Prize for National Robot Competition ROBOCOM — 2022

TECHNICAL SKILLS

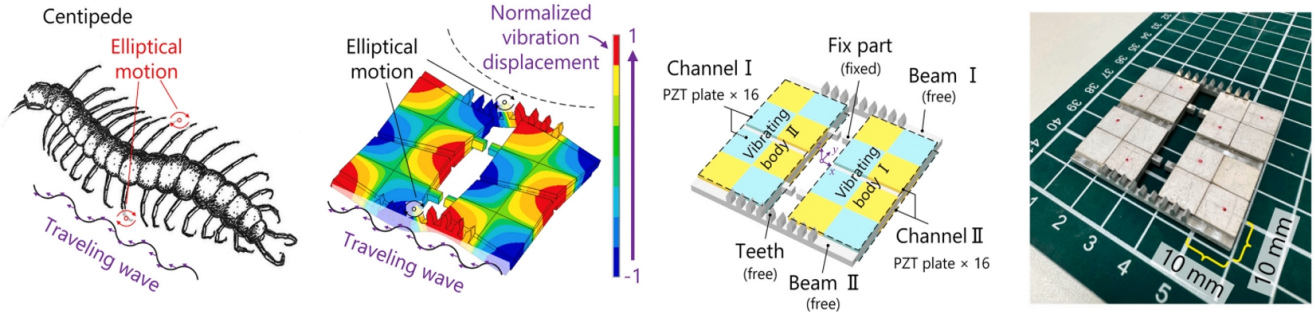
- **Software:** ANSYS, Solidworks, Multisim, Altium Designer, Keil, MATLAB
- **Engineering:** STM32, Circuit/PCB Design and Debug, Mechanical Assembly

[1] **J. Liu**, Z. Ding, J. Wu, et al. A self-moving piezoelectric actuator with high carrying/positioning capability via bending-resonant-vibration-induced stick-slip motion. ***IEEE Trans. Ind. Electron.***, 2024, Early Access.



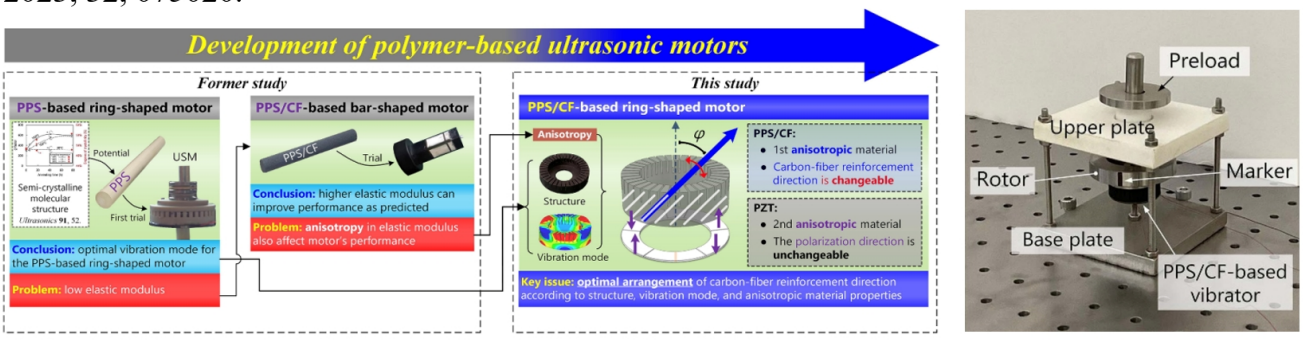
- **Integrated** resonant vibration with stick-slip principle to fabricate a piezoelectric actuator with high speed, high resolution, and high carrying capability.
- Developed controlling and driving **onboard circuits** to achieve **untethered** movement.

[2] **J. Liu**, L. Ding, C. Pan, et al. A centipede-inspired bonded-type ultrasonic actuator with high thrust force density driven by dual-torsional-vibration-induced flexural traveling waves. ***Sens. Actuator A***., 2024, 377, 115733.



- Inspired by **centipede's locomotion**, a traveling-wave piezoelectric actuator with high thrust force density was proposed.
- The traveling wave is generated by dual torsional vibrations, with the temporal and spatial phase differences achieved through structural design.

[3] **J. Liu**, J. Wu, X. Gao, et al. Enhancement of torque density and power density of polymer-based ultrasonic motors via flexible usage of anisotropy in elastic property. ***Smart Mater. Struct.***, 2023, 32, 075020.



- **Anisotropic** material PPS/CF was used to fabricate a ring-shaped ultrasonic motor.
- The effects of the carbon fiber orientation on stiffness, electromechanical coupling factor, and vibration velocity were investigated.