

# Yudong Xie

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## EDUCATION

<b>Tsinghua University, Beijing, China</b> B.E. in Electronic Engineering (expected June 2026)	Sep 2022 – Present
<b>Cornell University, Ithaca, New York, United States</b> Exchange Student in Electrical and Computer Engineering <ul style="list-style-type: none"><li>GPA: 4.3/4.3</li><li>Coursework: Physics of Semiconductors and Nano (A+), Foundations Machine Learning, Independent Research</li></ul>	Jan 2025 – May 2025

## RESEARCH INTERESTS

- Human-Machine Interaction (HMI)
- Micro-electromechanical Systems (MEMS)
- Intelligent Sensors and Wearable Devices

## EXPERIENCE

<b>Piezoelectric Micromachined Ultrasonic Transducers (PMUTs)   Supervisor: Prof. Liwei Lin, University of California, Berkeley</b> <ul style="list-style-type: none"><li>An Acoustic Touch-Motion Button with Haptic Function via an In-Situ Fabricated Elastomeric Lens atop PMUTs<ul style="list-style-type: none"><li>Developed a multifunctional interface based on a PMUTs array, enabling gesture recognition, pressure estimation, and haptic feedback</li><li>Designed the PCB with a micro-controller to enable automatic transmitting-receiving switch</li><li>Developed the signal processing algorithm and CNN structure to analyze the echo, achieving 5% error rate on pressure estimation, and developed sequence detection algorithm to complete gesture sequence detection</li></ul></li><li>Wearable PMUTs Array for Multi-Target Transcranial Neuromodulation via Ultrasound<ul style="list-style-type: none"><li>Designed an underwater sound pressure field measurement system based on a 3D printer, which can automatically scans 3D space in a serpentine manner and records the sound pressure at the current position</li><li>Helped to build up the drive system for the PMUTs</li></ul></li></ul>	May 2025 – Sep 2025
<b>Active Acoustic Sensing   Supervisor: Prof. Cheng Zhang, Cornell University</b> <ul style="list-style-type: none"><li>EchoForce: Continuous Grip Force Estimation from Skin Deformation Using Active Acoustic Sensing on a Wristband<ul style="list-style-type: none"><li>Aiming to predict applied grip force from skin deformation using active acoustic sensing (FMCW combined with cross-correlation) on a wristband</li><li>Designed and renewed the deep learning pipeline for grip force regression task, achieving 9.08% error rate</li><li>Proposed different testing metrics, verified and improved the generalization performance of the method</li><li>Helped with building the hardware system, and built the ground truth acquisition system</li></ul></li></ul>	Jan 2025 – June 2025
<b>Silent Speech Interface   Supervisor: Prof. Tianling Ren, Tsinghua University</b> <ul style="list-style-type: none"><li>Silent Speech Sentence Recognition with Six-Axis Accelerometers Using Conformer and CTC Algorithm<ul style="list-style-type: none"><li>Attempting to design a system using accelerometers to capture the facial movements of a silent speaker and then translate the signals into words and sentences</li><li>Designed the FPCB, collected data from patients in the hospital and proposed Conformer combined with CTC algorithm to decode the data, achieving a mean accuracy of more than 97% in long sentence recognition</li></ul></li></ul>	Sep 2023 – Nov 2024

- Artificial Throat (National college students' innovation and entrepreneurship training)
  - As team leader for a national-level project with funding of ¥50,000 (~\$7000)
  - The artificial throat is graphene-based intelligent, wearable device for speech recognition and interaction.

## PUBLICATIONS

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### AN ACOUSTIC TOUCH-MOTION BUTTON WITH HAPTIC FUNCTION VIA AN IN-SITU FABRICATED ELASTOMERIC LENS ATOP PMUTS

Declan Fitzgerald\*, *Yudong Xie\**(co-first author), Sean Isomatsu, Nikita Lukhanin, Zihan Wang, Liwei Lin

*The 39th International Conference on Micro Electro Mechanical Systems (IEEE MEMS 2026)*

Preview: <https://xyd22.github.io/files/PMUTButton.pdf>

### EchoForce: Continuous Grip Force Estimation from Skin Deformation Using Active Acoustic Sensing on a Wristband

Kian Mahmoodi\*, *Yudong Xie\**(co-first author), Tan Gemiciooglu\*, Chi-Jung Lee, Jiwan Kim, Cheng Zhang

*In Proceedings of the 2025 ACM International Symposium on Wearable Computers (ISWC 2025)*

<https://dl.acm.org/doi/10.1145/3715071.3750405>

### Silent Speech Sentence Recognition with Six-Axis Accelerometers using Conformer and CTC Algorithm

*Yudong Xie*, Zhifeng Han, Qinfan Xiao, Liwei Liang, Luqi Tao, Tianling Ren

Submitted to *ICASSP 2026*

<https://doi.org/10.48550/arXiv.2502.17829>

### WEARABLE PMUT ARRAY FOR MULTI-TARGET TRANSCRANIAL NEUROMODULATION VIA ULTRASOUND

Declan Fitzgerald, Nikita Lukhanin, Sean Isomatsu, *Yudong Xie*, ..., Liwei Lin

In Preparation

## AWARDS AND HONORS

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2023 National Scholarship (4/261) (~\$1400)

2024 National Scholarship (9/263) (~\$1400)

2025 "December 9th" Scholarship (Top 2% in Tsinghua) (~\$2800)

2024 Tsinghua Alumni Zihua Integrated Circuit Scholarship (~\$1400)

Meritorious Winner of 2024 Mathematical Contest in Modeling

First Prize in The 39th National Regional College Student Physics Competition (Non-Physics Group A)

Champion of 2023 Ricoh Hackathon (Beijing, Tianjin and Hebei) (~\$4000)

Outstanding Innovation Award in 2023 Ricoh Hackathon Final

Champion of 2024 Beijing College Students Volleyball League (Division B)

Champion of 2024 Beijing College Students Beach Volleyball Championship (Division B)

Champion of 2024 Tsinghua University John Mo Cup (Men's Volleyball)

Gold Award in 2024 Tsinghua University Student Social Practice

## LEADERSHIP

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Department of Electronic Engineering Men's Volleyball Team | Captain

Sept 2023 – Dec 2024

- Organized a volleyball team of 27 members, arranged training, and taught 20 freshmen to play
- Won our team's first championship in a decade
- Won both the volleyball and beach volleyball championships in the same year.

## SKILLS

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Language Proficiency: English (TOFEL: 107/120), Chinese (Native)

Coding Languages: Python, Matlab, C/C++, Verilog

Technologies: Arduino, EasyEDA, L<sup>A</sup>T<sub>E</sub>X, Origin, ESP-IDF