Yudong Xie

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EDUCATION

Tsinghua University, Beijing, China   Aug 2022 – Present
B.E. in Electronic Engineering (expected June 2026)

- **GPA: 3.92/4.0 Rank: 10/259**
- **Coursework:** Signals & Systems (A+), Media & Cognition (A-), Probability & Stochastic Processes (A), Object-Oriented Programming (A), Data Structures & Algorithms (A-), Fundamentals of Electronic Circuits and System (A+), Quantum Statistics (A), Calculus (A+), Physics (A+)

RESEARCH INTERESTS

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

EXPERIENCE

Piezoelectric Micromachined Ultrasonic Transducers (PMUT) | May 2025 – Sep 2025
Supervisor: Prof. Liwei Lin, University of California, Berkeley

- An Acoustic Touch-Motion Button With Haptic Function Via An In-Situ Fabricated Elastomeric Lens Atop PMUTS
    - Developed a multifunctional interface based on a PMUT array, enabling gesture recognition, pressure estimation, and haptic feedback
    - Designed the PCB with a micro-controller to enable automatic transmitting-receiving switch
    - 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
- Wearable PMUT Array for Multi-Target Transcranial Neuromodulation Via Ultrasound
    - Designed an underwater sound pressure field measurement system using a 3D printer, which can automatically scans 3D space and records the sound pressure at the current position
    - Helped to build up the drive system for the PMUT

Active Acoustic Sensing | *Supervisor: Prof. Cheng Zhang, Cornell University*   Jan 2025 – June 2025

- EchoForce: Continuous Grip Force Estimation from Skin Deformation Using Active Acoustic Sensing on a Wristband
    - Aiming to predict applied grip force from skin deformation using active acoustic sensing (FMCW combined with cross-correlation) on a wristband
    - Designed and renewed the deep learning pipeline for grip force regression task, achieving 9.08% error rate
    - Proposed different testing metrics, verified and improved the generalization performance of the method
    - Helped with building the hardware system, and built the ground truth acquisition system

Silent Speech Interface | *Supervisor: Prof. Tianling Ren, Tsinghua University*   Sep 2023 – Nov 2024

- Silent Speech Sentence Recognition with Six-Axis Accelerometers Using Conformer and CTC Algorithm
    - 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
    - As main contributor: designed the PCB circuit board, collected data from patients in the hospital and proposed Conformer combined with CTC algorithm to decode the data, achieving an average accuracy of more than 97% in long sentence recognition
- 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

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 Gemicioglu*, 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

2023 National Scholarship (4/261) (~$1400)
2024 National Scholarship (9/263) (~$1400)
2024 Tsinghua Alumni Zhihua Integrated Circuit Scholarship (~$1400)
2025 "December 9th" Scholarship (Top 2% in Tsinghua) (~$2800)
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

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 the **first championship** in team history
- Won both the **volleyball and beach volleyball championships** in the same year.

Class | *Monitor*   Sept 2023 – Sept 2024
- Organized a class of **37** students
- Co-hosted an event "Tsinghua & Peking: Navigating History, Collaborating Towards Future" with Peking University
- Organized social practice activities, book clubs, and other events, with a cumulative participation of over 100 people

SKILLS

Language Proficiency: English (TOFEL: 107/120), Chinese (Native)
Coding Languages: Python, Matlab, C/C++, LaTex
Technologies: Arduino, EasyEDA, Origin, ESP-IDF