

# Yanhao Luo

Email address: luoyanhao@stu.xmu.edu.cn | Phone number: +86 18505972259  
Address: Department of Electronic Science, Xiamen University, Xiamen, 361102, China

## EDUCATION

### Xiamen University

Xiamen, Fujian, China

Master of Physical Electronics

Sep 2023 – Jun 2026

- GPA: 3.54/4.0.
- Supervisor: Prof. Xinqin Liao
- Research Focus: Flexible Sensor and Human-Machine Interactions

### Zhengzhou University

Zhengzhou, Henan, China

Bachelor of Measurement & Control Technology and Instruments

Sep 2019 – Jun 2023

- GPA: 3.46/4.0.
- Main Courses: Digital Electronics (98), Circuit Analysis (89), Analog Electronics (88), Microcontroller Principles (85), Object-Oriented Programming (95), Digital Image Processing (87), MATLAB & Mathematical Modeling (96), Automatic Control Theory (90), Digital Signal Processing (88), etc.

## PUBLICATIONS

### Papers

- Y. L., et al. In-Sensor Computing Tactile Devices for Well-Defined Confined Space Interactions. *ACS Nano*. (Minor Revision) (First Author; JCR Q1; IF: 16.1).
- H. C., Z. H., Y. L., et al. Bioinspired Cross-Modal Self-Adaptive Machine Intelligence for Event-Driven and Ultrahigh-Precision Underwater Grasping. *Advanced Materials*. (Major Revision) (Third Author; JCR Q1; IF: 26.8).
- Z. H., H. C., Y. L., et al. In-Device Topological Encoding for Intelligent Multimodal Interactions. *Advanced Functional Materials*, 2025, 202515750. (Accepted) (Third Author; JCR Q1; IF: 19.0.).
- W. L., H. W., R. W., Y. L., et al. Dielectrically Modified Polymer and Topologically Optimized Microstructure Enabling In-Sensor Decoupling for Multifunctional Human–Machine Interactions. *Advanced Functional Materials*, 2025, 202505912. (Accepted) (Fourth Author; JCR Q1; IF: 19.0).
- S. Y., Z. J., L. L., Z. H., Y. L., et al. A Hyperconformal Dual-Modal Metaskin for Well-Defined and High-Precision Contextual Interactions. *Nature Communications*. 2025, (Accepted) (Fifth Author; JCR Q1; IF: 15.7)

### Patents

- X. L., Y. L., et al. Flexible Sensor Continuous Mass Production System and Method. *Chinese Invention Patent*. No.: CN118849484A. (Granted) (Second Author; Supervisor as First Author).
- X. L., H. C., Y. L., et al. Fabric-Based Pressure Sensor and Preparation Method. *Chinese Invention Patent*. No.: CN120063542A. (Published) (Third author; Supervisor as First Author).

## RESEARCH EXPERIENCE

### Modular Tactile Sensors for Cut-and-Paste Interaction (Corresponding to Paper 1)

**Introduction:** Developed a high-throughput SH-CHTF system for scalable in-sensor computing tactile devices, enabling high-yield manufacturing, superb device performance and intelligent human-machine interactions.

- Developed a spray-heating continuous high-throughput fabrication system; optimized deposition through COMSOL to achieve uniform conductive film coatings and stable large-scale sensor production.

- Designed an ultrathin, symmetric double-layer sensor enabling cut-and-paste Interaction, whose stable and consistent fabrication allows replacement without calibration.
- Developed multiple interactive systems, including smart hat, bottle and bracelet, by integrating designed PCBs and Unity interaction scenes, forming a complete tactile sensing and real-time feedback platform.

### **Visual-Tactile Cross-Modal Fusion Systems** *(Corresponding to Paper 2)*

**Introduction:** Developed a bio-inspired visuo-tactile fusion system capable of 97.7% accuracy object recognition and adaptive grasping of challenging items like transparent and underwater objects.

- Built a vision–tactile fusion piano system powered by YOLOv5, enabling autonomous score reading, robotic performance, and volume control.
- Designed a vision–tactile fusion system integrating YOLOv5 visual features and 1D CNN tactile signals, optimizing recognition performance for visually similar objects with improved accuracy and robustness.

### **Multimodal Sensing Technology Based on Signal Linear Encoding** *(Corresponding to Paper 3)*

**Introduction:** Designed an in-device topological encoding interface, enabling addressable perception and fusion of tactile location and pressure within a single channel and adaptive human–machine interaction.

- Designed a tactile interaction system capable of detecting both touch position and pressure, enabling real-time 3D model control in Unity without the need for cameras or complex wiring.

### **Composite Structures for Pressure and Distance Detection in Tactile Sensors** *(Corresponding to Paper 4)*

**Introduction:** Engineered a dual-sensor haptic interface with extended detection range (7cm proximity, 360kPa pressure), facilitating accurate intention recognition for robotics and VR/AR applications.

- Built an embodied sensing network integrated with Unity classroom scene to enable diverse virtual interactions, and designed a proximity-based contactless presentation control system.
- Completed PCB design and embedded development, and created a closed haptic loop by integrating a Unity-based combat scene with thermal feedback that delivers heat sensations upon character hits.

### **Dual-Modal Skin: Enabling High-Precision Contextual Interactions** *(Corresponding to Paper 5)*

**Introduction:** Developed a hyperconformal dual-modal metaskin enabling high-precision, crosstalk-free proprioceptive and tactile sensing through polarity-differentiated signal decoupling from a single data channel.

- Developed a wearable sensing system integrated with a Unity object-grabbing scene, where motion type and signal amplitude were used to control grabbing direction and distance with precision.

## **HIGHLIGHT OF QUALIFICATIONS**

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- Data Analysis: **Origin** and **MATLAB**.
- Visualization: **Adobe Illustrator**, **Photoshop**, and **Premiere**.
- Programming & Development: **Python**, **C#**, **C++** and **Unity**.
- Virtual Development: **COMSOL**, **3ds Max** and **SOLIDWORKS**.
- Embedded System Development: **Altium Designer**, **Multisim**, **Proteus**, and **JLCPCB**; **Arduino** and **Keil**.
- Instrumentation: Proficient in fabricating **Flexible tactile sensors** and **Wearable devices**; Operating key lab equipment, including **SEM**, **optical microscopes**, **vacuum heat treatment furnaces**, **spin coaters**, etc.
- Language Proficiency: **IELTS 6.5** (6.0).

## **AWARDS**

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<b>Merit Student</b>	Xiamen University	<b>2025</b>
<b>Merit Student</b>	Zhengzhou University	<b>2020</b>
<b>Scholarship</b>	Zhengzhou University	<b>2020、2021、2022、2023</b>
<b>Second Prize (National)</b>	Undergraduate Mathematical Contest in Modeling (CUMCM)	<b>Sep 2021</b>
<b>Honorable Mention</b>	Mathematical Contest in Modeling (MCM/ICM), COMAP (USA)	<b>2022</b>