Tianyi Wang

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Research Interests: Smart Sensors, MEMS, Micro and Nano Fabrication Technologies

EDUCATION

East China University of Science and Technology (ECUST) **Shanghai, China**
- **Major**: Process Equipment and Control Engineering | **GPA**: 90.08/100 | **Ranking**: 1/127 *Sept. 2022-Present*

University of Windsor (UWindsor) **Windsor, ON, Canada**
- **Research Assistant** (Mitacs Globalink Research Internship | **Full Scholarship**) *July 2025-Oct. 2025*

PUBLICATIONS

[1] **Tianyi Wang**, Longqi Wu, Guozhu Zhang*, et al. (2025). Humidity-Tolerant Chemiresistive Hydrogel Sensor for Real-Time Breath CO_2 Monitoring. (Under Review)

[2] Chao Zhang, **Tianyi Wang**, Guozhu Zhang*, et al. (2025). Rational Design and Fabrication of MEMS Gas Sensors toward Long-Term Stability: A Comprehensive Review. (Under Review)

[3] Chao Zhang, **Tianyi Wang**, Guozhu Zhang*, et al. (2025). S-TCN Neural Networks for Gas Detection: Algorithm Design and Implementation on Edge Devices. (Submitted)

[4] **Tianyi Wang**, Longqi Wu, et al. (2025). Method for Monitoring Human Health Based on a CO_2 Sensor and a Health-Monitoring Mask Integrated with the Sensor. (Patent)

[5] **Tianyi Wang**, Longqi Wu, et al. (2025). Encapsulation Structure of Epitaxial Gate ISFET pH Electrode. (Patent)

[6] Guozhu Zhang, Chengze Gao, **Tianyi Wang**, et al. (2024). Manufacturing Methods and Application of CO_2 Gas Sensor Based on Hydrogel Structure. CN 202411089663.5 (Patent)

RESEARCH EXPERIENCE

Embedded Hardware Development for GroGenesis V2 Greenhouse Sensor System

Research Assistant (Mitacs Globalink Research Internship) *July 2025-Present*
- Participated in circuit design and multilayer PCB layout for a miniaturized environmental monitoring node.
- Performed soldering, debugging, and functional testing on multiple hardware prototypes to ensure stable sensor communication and power regulation.
- Developed Arduino-based firmware and implemented long-term Wi-Fi data logging and stability monitoring to support cloud acquisition and remote visualization.

S-TCN Neural Networks for Gas Detection: Algorithm Design and Implementation on Edge Devices

Key Contributor *June 2024-July 2025*
- Built a multi-channel gas sensor array and designed a 4-layer PCB.
- Developed an S-TCN model using dilated depthwise separable convolutions to improve accuracy and efficiency.
- Deployed the model on a microcontroller, achieving real-time gas identification with over 98% accuracy.

Rational Design and Fabrication of MEMS Gas Sensors toward Long-Term Stability: A Comprehensive Review

Key Contributor *Sept. 2024-Apr. 2025*
- Reviewed MEMS gas sensors and identified core failure modes affecting long-term operational stability.
- Analyzed material degradation mechanisms and evaluated stable electrode/sensing materials through literature mining and theoretical comparison.

Humidity-Tolerant Chemiresistive Hydrogel Sensor for Real-Time Breath CO2 Monitoring

First Author & Leader *July 2024-Mar. 2025*
- Synthesized and optimized dimethylamine-functionalized hydrogels with enhanced CO_2 sensitivity, mechanical stretchability, and humidity-assisted ionic conductivity.
- Designed a flexible PCB with integrated microcontroller, analog interface, and wireless modules for real-time CO_2 signal acquisition and transmission.
- Integrated the sensor into a wearable smart mask and developed a mobile interface for real-time monitoring.

Design and Development of the Ion-Sensitive Field-Effect Transistor (ISFET) PH Sensor

Leader *Sept. 2023-Dec. 2024*
- Designed an epitaxial-gate ISFET sensor with a separated chip-packaging architecture to enhance long-term stability, replaceability, and signal isolation.
- Developed a compact signal acquisition circuit integrating low-noise amplification, temperature compensation, and reference electrode interfacing for stable pH readout.

HONOUR & AWARDS

First Prize, International Innovation and Entrepreneurship Competition	*2025*
First Prize, Challenge Cup National Competition	*2025*
National Scholarship (First in Major) & Top-tier School Scholarship (Top 3%)	*2024*
Yihai Kerry National Scholarship	*2024*
ECUST Outstanding Student (Top 6%)	*2024*
ECUST First-Class Student (Top 6%)	*2023*

SKILLS

- **Techniques**: Altium Designer, Ansys, MATLAB, 3ds Max, Python, CAD, SolidWorks, MS Office
- **Languages**: Mandarin Chinese (Native), English (TOEFL: 104 / Best Score:106)