

Yi-Hua Lin

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RESEARCH INTERESTS

- Biomedical Optical Spectroscopy & Computational Biophotonics
- Medical Image Processing & Edge AI for Healthcare
- Embedded Systems & Wearable Physiological Sensing

EDUCATION

National Taiwan University (NTU)	Taipei, Taiwan
M.S. in Precision Health and Intelligent Medicine	Sep 2025 – Present
National Cheng Kung University (NCKU)	Tainan, Taiwan
B.S. in Biomedical Engineering	Sep 2021 – Jun 2025

RESEARCH EXPERIENCE

Biomedical Optical Spectroscopy and Imaging Lab <i>Research Assistant (Advisor: Prof. Kung-Bin Sung)</i>	NTU
• Established computational workflows for modeling light-tissue interactions in complex biological structures.	
• Leveraged GPU-accelerated Monte Carlo simulations (MCXLAB) to analyze photon path distributions.	
• Investigated absorption-weighted sensitivity to enhance the depth resolution of optical diagnostics.	
Biomedical Imaging & Instrumentation Laboratory <i>Undergraduate Researcher (Advisor: Prof. Kuo-Sheng Cheng)</i>	NCKU
• Coordinated Institutional Review Board (IRB) protocols and managed human subject recruitment compliance.	
• Designed standardized measurement protocols for functional muscle analysis using bio-impedance.	
• Validated hardware safety and signal integrity for experimental physiological monitoring systems.	

SELECTED PROJECTS

Brain Aging Simulation & Optical Modeling	(MATLAB, MCXLAB)
• Engineered a dynamic 3D brain optical model based on the Colin27 human brain atlas.	
• Simulated physiological aging by mathematically modeling cortical shrinkage and CSF expansion.	
• Quantified regional degradation in absorption-weighted sensitivity to predict optical signal loss in aging brains.	
EIT-Based Muscle Motion Analysis System	(Circuit Design, Signal Processing, MATLAB)
• Built a custom Electrical Impedance Tomography (EIT) hardware system for dynamic muscle sensing.	
• Developed signal reconstruction pipelines to convert raw impedance data into real-time activity maps.	
• Achieved real-time visualization of muscle contraction in controlled motion experiments.	
Portable Multimodal Cardiac Screening System	(C++, MAX78000, Edge AI)
• Designed a low-power wearable integrating synchronized ECG and PCG sensors.	
• Deployed on-device CNN inference on the MAX78000 MCU for real-time cardiac abnormality detection.	
• Optimized the edge AI architecture for offline capability, ensuring reliability without cloud dependency.	
Interactive Star Trail Visualization Tool	(JavaScript, Chrome Extension API)
• Developed a browser extension integrating with Google Street View to visualize astronomical data.	
• Implemented Field of View (FOV) overlays and star trail rendering algorithms on panoramic images.	
• Engineered a user-friendly interface for real-time interaction with spatial data overlays.	

SKILLS

Programming: Python, C/C++, MATLAB

Embedded & AI: Arduino, ESP32, MAX78000 (Edge AI), TinyML, BLE, PCB Layout (KiCad)

Biomedical: Biomedical Optics, MCXLAB, Medical Image Processing, EIT, IRB Protocol Management

Tools: SolidWorks, UART, I²C, SPI

HONORS & AWARDS

3rd Place, 2025 9th Innovation Tech Challenge Taiwan

2025

3rd Place & Best Content, SOC-iCaps Interdisciplinary Competition

2024

3rd Place, National BME Innovation Medical Device Competition

2023

LEADERSHIP

Astronomy Club, NCKU

Equipment Manager (2022 – 2023)

- Maintained high-precision telescopes; organized stargazing events for 50+ participants.

Biomedical Engineering Camp, NCKU

Logistics Lead (2023)

- Led logistics for a 3-day camp serving 100+ students; managed venue crisis resolution.