

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)
M.S. in Precision Health and Intelligent Medicine

Taipei, Taiwan
Sep 2025 – Present

National Cheng Kung University (NCKU)
B.S. in Biomedical Engineering

Tainan, Taiwan
Sep 2021 – Jun 2025

RESEARCH EXPERIENCE

Biomedical Optical Spectroscopy and Imaging Lab

NTU

Research Assistant (Advisor: Prof. Kung-Bin Sung)

- 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

NCKU

Undergraduate Researcher (Advisor: Prof. Kuo-Sheng Cheng)

- 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.