Yifei LIU

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EDUCATION BACKGROUND

Rice University Houston, US
PhD of Engineering in Electronic and Electrical Engineering *Jan. 2025 - Present*

University College London London, UK
Master of Engineering in Electronic and Electrical Engineering *Sep. 2023 - Jun. 2024*

- **Relevant Courses:** *Biomedical Ultrasound, Advanced Digital Design, Nanoscale Processing & Characterization for Advanced Devices, Advanced Photonics Devices, RF Circuits & Devices*

University College London London, UK
Bachelor of Engineering in Electronic and Electrical Engineering *Sep. 2020 - Jun. 2023*

- **GPA:** First Class Honors
- **Relevant Courses:** *Analog Electronics, Sensor & Instrumentation, Digital Design, Robotics for Electronic Engineering, Control Systems, Data Mining & Analysis, Medical Electronics & Neural Engineering*

PROJECT EXPERIENCE

Optical Microscopy Design for In Vivo Detection of Cancer-Derived Extracellular Vesicles in Brain Tissue *Houston, US* *Feb. 2025 – Sep.2025*

- Completed training in laser safety, animal handling (mice), and biological experiment protocols, enabling safe, independent, and compliant laboratory research.
- Redesigned and optimized miniscope illumination with custom filters and LED wavelengths, improving compatibility with multiple fluorophores and enhancing imaging performance.
- Prepared and analyzed biological samples (KPC cell cultures and kidney tissue) using staining, sectioning, and instruments (ultracentrifuge, confocal/super-resolution microscopy, NanoSight) to produce high-quality data for imaging studies.

Skills: *IHC Staining Method, Cell Culturing, Laser Safety, Biological Experiment Safety, Optical System Optimization, Ultracentrifugation, Confocal Microscopy, Super-Resolution Microscopy (Nanoimager), NanoSight*

PCR Temperature Cycler System *London, UK* *Sep. 2023 - Jun. 2024*

- Designed and implemented a PCR thermal cycling system using PID control, integrating Peltier elements, power driver circuits, and fan-based cooling to achieve automatically precise heating and cooling cycles.
- Developed and tested hardware circuit and control system code, including noise-optimized Peltier driver circuits, thermometer simulations, ensuring accurate and stable temperature regulation.
- Validated system performance by analyzing cycling temperature data, confirming reliable, automated PCR thermal cycling suitable for molecular biology experiments.

Skills: *Control System Design, Power Driver Circuit Design, Hardware/software integration, Thermometer Simulation, Heating and Cooling System Design, Data Acquisition (Adruino) for The Thermal Cycling*

A Study and Design on Multimodal Hand Gesture Recognition System in the Field of Electronic and Bioengineer *London, UK* *Sep. 2022 - Mar. 2023*

- Designed a two-channel gesture signal recognition system that can recognize the trajectory and direction of gestures, including EMG sensor and microcontroller firmware development, PCB circuit layout and bring-up testing.
- Integrated a MEMS sensor to capture hand gesture trajectories, enabling recognition of dynamic and static hand postures for improved control accuracy.
- Developed embedded firmware and processing algorithms. Performing digital filtering and MVC calculation in MATLAB and implementing classification models in Python, to classify muscle signals and enhance recognition performance.

Stills: *EMG Sensor Design, PCB Design and Bring-up, MEMS Sensor Integration, Signal Processing (Matlab), Machine Learning (Python), Embedded System Design and Coding*

Real-time Audio Descrambler London, UK
Member *Nov. 2022 - Dec. 2022*

- Developed and analyzed a voice scrambling system by recording audio samples, performing time- and frequency-domain analysis in MATLAB, and implementing MATLAB-based descrambling algorithms.

- Configured and tested MSP432 peripherals, including ADC, DAC, and anti-aliasing filters, to enable reliable audio signal acquisition and reconstruction.
- Designed and implemented a digital filter using MATLAB, converted the design into C code for MSP432 microcontroller firmware, and validated functionality through input signal testing.

Skills: *Audio Signal Processing, Matlab (frequency analysis, filter design), MSP Microcontroller Programming, ADC/DAC Configuration*

To Design and Built a Digital Power Supply Shall London, UK
Member *Jan. 2022 - Mar. 2022*

- Developed a regulated power supply capable of delivering two state DC outputs (5V & 12V), and fabricated a functional PCB prototype.
- Created and validated a simulated design in Multisim with selected component that meet the circuit requirements.
- Executed PCB layout and optimization, routing connections efficiently to minimize board size, followed by assembly, debugging, and successful hardware validation.

Skills: Power Supply Design, Circuit Simulation (Multisim), PCB Layout, Circuit Testing and Troubleshooting.

WORK EXPERIENCE

BGI *Shenzhen, China*
Mgitech(MGI), Research & Development Department *Jul. 2023 - Oct.2023*

- Collaborated with cross-functional engineering teams on the development of the T7 upgraded molecular sequencer, contributing to control circuit design, full-system testing, and firmware programming for board-level operation.
- Delivered a reliable temperature control module by implementing thermoelectric cooling (TEC) and validating RTD thermal sensor circuits, ensuring stable heat and cooling cycles for biochemical processes.
- Integrated stepper motor drivers to achieve precise motion control, directly supporting the accuracy and throughput of sequencing operations.
- Developed and debugged embedded firmware in C with PID control, enabling consistent instruction handling and system performance optimization.
- Outcomes included improved temperature regulation, stable motion control, and validated communication protocols, contributing to the successful assembly and testing of the upgraded sequencer platform.

ADDITIONAL INFORMATION

Programming Language: Python (panda, skimage), C, Matlab
Embedded: Arduino, SystemVerilog, Diptrace, KiCad, Multisim
Languages: Mandarin, English