

# Liu Restrepo Sanabria

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## EDUCATION

### Trinity College

*Bachelor of Science, Electrical and Computer Engineering and Computer Science*

Aug 2023 – Expected May 2027

Hartford, CT, USA

- **GPA:** 4.13/4.00
- **Scholarships & Honours:** Davis Scholar (160,000 USD), Dean's Scholar, Faculty Honours (x4); Physics Prize (2024); Phi Gamma Delta Prize of Mathematics 2025.
- **Coursework:** Data Structures and Algorithms (A+), Embedded Systems Design (A+), Digital and Analogue Communication (A+), Digital Circuits (A).

### University of Edinburgh

*Electrical and Electronics Engineering and Informatics*

Aug 2025 – Expected December 2025

Edinburgh, UK

- **Coursework:** Embedded Programming, Computer Systems, Analogue Circuits.

### Mahindra United World College of India (MUWCI)

*International Baccalaureate Diploma Programme (IBDP)*

Aug 2021 – May 2023

Pune, MH, India

- Dare to Dream Scholarship (74,000 USD) recipient to complete the IBDP at one of the 18 United World Colleges.

## EXPERIENCE

### Undergraduate Research Assistant

*Department of Engineering at Trinity College*

Apr 2025 – Current

Hartford, CT, USA

- Applied linear (spectral, coherence) and nonlinear (chaotic) signal analyses using a modified Grassberger–Procaccia algorithm for stable EEG correlation dimension estimates.
- Discovered higher EEG chaotic complexity in dentate gyrus vs. CA1 at P15, a difference that is absent in adulthood (P90,) which reveals information in developmental differences.
- Co-authored peer-reviewed paper accepted at IEEE-sponsored CISP-BMEI 2025 (Qingdao, China) with proceedings in IEEE Xplore.

### IT Desk General Consultant

*Raether Library at Trinity College*

Feb 2024 – Current

Hartford, CT, USA

- Troubleshooted and resolved tech-related issues for a 2,200-student campus via the Halo ITSM ticketing system, and implemented Salto Systems for access control on campus.
- Managed and maintained multi-factor authentication (MFA) across Trinity College using Microsoft Azure, improving security and account reliability.

### Undergraduate Research Assistant

*Physics Department at Trinity College*

May 2025 – July 2025

Hartford, CT, USA

- Optimised a multi-photon, 4-channel coincidence counting system on a Xilinx Artix-7 FPGA using Verilog HDL, improving timing precision and stability at higher input rates.
- Reduced time resolution from 10 ns to 3.33 ns and increased stable counting rates from 40 MHz to 110 MHz by overclocking 100 MHz to 300 MHz using PLLs, critical path analysis, FSM restructuring, and static timing closure.
- Built UART interface and PyQt5 GUI for real-time monitoring, with low-latency plotting (pyqtgraph) and automated data logging.

### Hardware Design Intern

*Mahroy*

Aug 2020 – July 2021

Caracas, Distrito Capital, Venezuela

- Designed and implemented a new vending machine embedded system using a PIC18F77A in Assembly and helped design and implement an automatic conveyor belt system for garment sorting using an ESP32 with embedded C.

## PROJECTS

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### Real-Time UART GUI PyQt5 for Photon Coincidence

*Project for Research Position*

Summer 2025

Trinity College

- Developed a multithreaded PyQt5-based desktop GUI for monitoring 15-channel photon coincidence events from a custom FPGA, using UART communication and pyqtgraph for high-speed plotting.
- Implemented live numerical displays, adjustable coincidence windows, event plotting with colour customisation, and automated CSV logging with buffered autosave every one second.

### DC Motor PID Speed Control System

*Embedded Systems Design Final Project*

May 2025

Trinity College

- Designed and implemented a PID-based PWM controller on Arduino UNO R4 for closed-loop DC motor speed regulation. Integrated encoder feedback and displayed motor speed (in RPM) in real time on a 16×2 LCD.

### Heartbeat Monitoring System

*Embedded Systems Design Project*

Apr 2025

Trinity College

- Developed an 8051-based heartbeat monitor with an Assembly program that leverages 10-ms timer overflows to measure BPM from interrupt-driven pulse intervals as inputs.

### MOSPRO LIV

*Capstone Project for Technician Degree in Electronics*

Jan 2021 – Apr 2021

Caracas, Distrito Capital, Venezuela

- Arduino-Uno-based electric car prototype driven by a phone application developed with MIT App Inventor, with an HC-05 Bluetooth module for serial communication, and employed PWM for motor control.

## TECHNICAL SKILLS

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- **Languages:** Python, Java, C, Verilog HDL, Assembly.
- **Tools and Libraries:** Git, Vivado, Vitis, Proteus, LTSpice, MATLAB, Pandas, PyQtGraph.
- **Hardware:** Embedded Systems, FPGA, ESP32, UART, I2C, SPI.