

# Xin Hung Chan

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## EDUCATION

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### University of Massachusetts Amherst

Amherst, MA

*Computer Engineering (BS), Applied Mathematics (BS)*

*Sept. 2023 – May 2027*

- **GPA: 3.9/4.0**
- **Dean's List:** Fall 2023 – Present
- **Computer Engineering Coursework:** Data Structures, Security Engineering, Computer Networks, Embedded Systems, Signal Processing, Artificial Intelligence, VLSI, Systems Programming, Hardware Design for Machine Learning
- **Mathematics Coursework:** Multivariate Calculus, Linear Algebra (Graduate), Discrete Math, Statistics I, Mathematical Modeling

## EXPERIENCE

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### UMass CubeSat

Aug 2024 – Present

*Onboard Processing Team*

*Amherst, MA*

- Collaborated with a team of 30 graduate and undergraduate students to build a small satellite of  $10\text{cm}^3$  with 312 spectral bands, designed for space launch through NASA.
- Developed a CNN model for real-time processing of hyperspectral data, fine tuned for identifying signatures of rare earth elements.
- Working on the hardware acceleration of **quantized neural networks** on FPGA, implementing custom layers and optimizing performance using the FINN framework.

### Computer Vision Engineer

Sept 2025 – Present

*Lunabotics Team, University of Massachusetts Amherst*

*Amherst, MA*

- Contributed to the development of a robotic mining system for NASA's Lunabotics Competition, focused on designing computer vision algorithms and communication protocols.
- Integrated vision with autonomous navigation, used sensor fusion techniques to combine camera input with LIDAR and IMU data, allowing the robot to interpret its environment.

### Undergraduate Teaching Assistant

Sept 2025 – Dec 2025

*University of Massachusetts, College of Engineering*

*Amherst, MA*

- Held office hours for students in ECE 201 (Analytical Tools for ECE) with complex numbers, linear algebra, and differential equations.
- Assisted students in ECE 202 (Computational Tools for ECE) with MATLAB, Excel, and Python.

## PROJECTS

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### LC-3 Virtual Machine | *C, Assembly, Systems Programming*

June 2025 – July 2025

- Implemented a virtual machine for the **LC-3 architecture** from scratch in **C**, including instruction decoding, memory management, register simulation, and I/O trap handling.
- Built a **custom assembler** and an **interactive debugger** supporting step execution, breakpoints, and real-time memory inspection

### Verifiable Federated Learning | *Rust, Python, Machine Learning, Cryptography*

Sept 2025 – Dec 2025

- Formulated a heavily mathematical protocol in Rust that allows clients to prove honest training using **zero-knowledge proofs**.

### Parallel N-Body Gravitational Simulator | *C++, MPI, Parallel Programming*

June 2025 – Dec 2025

- Developed a distributed N-body simulation modeling gravitational interactions among 100K+ particles using domain decomposition across MPI ranks
- Implemented local Barnes-Hut trees with periodic particle redistribution to mitigate load imbalance from non-uniform particle distributions

### Monte Carlo Option Pricing on FPGA | *Finance, Verilog, Hardware Acceleration*

July 2025 – Aug 2025

- Implemented a Monte Carlo simulation for European option pricing using **Geometric Brownian Motion** in **SystemVerilog** on a Xilinx Spartan-7 FPGA.
- Meshed principles of **stochastic modeling**, pipelining, and **parallel programming** to optimize random number generation and maximize throughput.

## TECHNICAL SKILLS

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**Languages:** Java, Python, C/C++, SQL, JavaScript, HTML/CSS, MATLAB, Rust

**Frameworks:** Git, React.js, Node.js, MongoDB, Excel, CUDA, AWS, PyTorch, FastAPI, Valgrind

**Hardware:** Vivado, ARM Assembly, SystemVerilog, Linux, HSPICE, Cadence Virtuoso, ESP32, STM32, MIPS