

# Vincent Cheong

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## Education

University of California – Santa Barbara

Sep. 2022 – June 2026

BS in Computer Engineering

GPA: 3.89 (Dean's List Engineering)

## Experience

Computer Architecture Researcher

Santa Barbara | Sep. 2024 - Present

- Conducted research on automated control logic synthesis for distributed systems in UCSB's ArchLab, optimizing HDL code to improve processor performance and minimize control flow errors.
- Enhanced logic correctness leveraging Microsoft's Z3 SMT solvers, resulting in greater system reliability and simpler designs.
- Designed control logic synthesis tools in Yosys to extend support for Verilog and PyRTL. Improved synchronization accuracy and reduced latency in fault-prone hardware systems through robust logic transformations.
- Developed a bitvector theory tailored for hardware semantics, enabling efficient modeling of netlists and RTL designs. Streamlined analysis and accelerated simulations for distributed hardware systems.

## Projects

Script | C++, Git

Sep. 2023 – Dec. 2023

- Built a custom Python-like language in C++ with full support for functions, conditional expressions, arrays, and loops.
- Engineered a lexer and parser to tokenize raw input and construct abstract syntax trees, enabling accurate evaluation of infix and S-expression inputs.
- Leveraged object-oriented programming principles, such as inheritance and polymorphism, to design versatile node structures, effectively handling complex operator precedence.
- Conducted over 100 unit tests, ensuring functionality, reliability, and adherence to expected language behavior.
- Implemented robust error handling, reducing user-reported debugging issues through clear and descriptive messages.

Embedded Garage Door | Embedded C, UART, I2C, SPI

Nov. 2024 – Dec. 2024

- 3D designed an automatic smart garage door using a STM32L4x6 ARM microcontroller that rotates based on user input and temperature.
- Enabled open/close functionality using UART and leveraging a HC-05 Bluetooth module, creating an easy-to-use remote control that is accessible from any Android phone.
- Incorporated an ADXL345 accelerometer using the SPI communication protocol to provide real-time updates on the door's position and static acceleration in Termite
- Engineered a temperature-based control system utilizing a TC74 sensor and I2C to reasonably open and close.

Rate My Resume | React, Next.js, JavaScript, HTML/CSS, FastAPI, MongoDB

Jan. 2024

- Collaborated effectively with a team of 4 at SB Hacks X to develop an advanced web app that gives users a place to receive unbiased feedback on their resumes.
- Incorporated Amazon's Comprehend to automatically censor personally identifiable information, anonymizing uploaded resumes using Python.
- Built a reliable backend with FastAPI and Next.js to efficiently process real-time data, and leveraged MongoDB for optimized storage of redacted resumes and reduced database query time.

Decor Goods | React, Next.js, JavaScript, HTML/CSS

Sep. 2023 – Oct. 2023

- Created a full stack, mobile-friendly e-commerce website that allows the user to shop and purchase items.
- Utilized Next.js framework for frontend and backend, creating an effortlessly simple user interface embedded with modern features and functionality.
- Used Stripe API to track over 100 orders, creating a concise platform for performing quick and secure live transactions.

## Relevant Coursework

- |                                   |                     |                    |                           |
|-----------------------------------|---------------------|--------------------|---------------------------|
| • Data Structures & Algorithms    | • Computer Networks | • Embedded Systems | • Computer Architecture   |
| • Computer Vision / Deep Learning | • Machine Learning  | • Digital Design   | • Analog Circuits/Systems |

## Technical Skills

**Languages:** C/C++, Python, Java, HTML, CSS, JavaScript, TypeScript, SQL, MATLAB, Verilog, PyRTL

**Developer Tools:** Git, MongoDB, Google Cloud, Linux, VS Code, FPGA development, Dokku, Chromatic

**Libraries:** OpenCV, OpenGL, Scikit-Learn, Numpy, Pandas, SMT-LIB, Pygame, Matplotlib

**Frameworks:** React, Next.js, Django, FastAPI, TensorFlow, PyTorch, Keras, Spring

**Personal:** Communication, Attention to Detail, Problem Solving, Adaptation, Collaboration