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)

Relevant Coursework: Data Structures & Algorithms, Computer Networks, Embedded Systems, Operating Systems, Computer Architecture, Cybersecurity, Computer Vision

Experience

Computer Architecture Researcher | ArchLab **Sep. 2024 - Mar 2025**

- Conducted research on automated control logic synthesis for distributed systems, 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

Scrypt | *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 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.
- Integrated AWS Comprehend to automatically censor personally identifiable information, anonymizing uploaded resumes.
- 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.
- Developed RESTful API endpoints using Rails' Action Controller, enabling full CRUD functionality and asynchronous feedback processing.

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.

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