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 Undergraduate Researcher **Santa Barbara | Sep. 2024 - Present**

- Conducted research on automated control logic synthesis for distributed systems in UCSB's ArchLab, focusing on generating correct-by-construction HDL code to optimize logic performance and minimize control flow errors.
- Leveraged Microsoft's Z3 SMT solvers to reduce design complexity and improve system reliability across multiple hardware modules.
- Collaborated in the design of control logic synthesis tools in Yosys to support languages like Verilog and PyRTL, achieving a 25% decrease in system latency and improving synchronization accuracy in fault-prone environments.
- Contributed to the development of a new bitvector theory optimized for hardware semantics, facilitating efficient modeling of netlists and RTL designs.

Projects

Scrypt | *C++, Git* **Sep. 2023 – Dec. 2023**

- Built a custom Python-like language that fully supports the logic and outputs of functions, conditional expressions, arrays, and loops using only C++
- Conducted over 300 test units of extensive testing to ensure the quality and stability of the language implementation and logic
- Implemented specific error messages that reduced self-reported issues by 20%, giving users clear descriptions and reducing debugging times.

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 website that allows the user to shop and purchase items.
- Utilized Next.js framework for front and back end, including a local database to track orders.
- 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
- Digital Design
- Analog Circuits/Systems

Technical Skills

Languages: C/C++, Python, Java, HTML, CSS, JavaScript, SQL, TypeScript, Verilog, PyRTL
Developer Tools: Git, MongoDB, Google Cloud, Dokku, Chromatic, VS Code
Libraries: OpenGL, Scikit-Learn, Numpy, Pandas, SMT-LIB, Pygame, Matplotlib
Frameworks: React, Next.js, Django, FastAPI, TensorFlow, PyTorch, Keras