CHRISTOPHER ANDRADE

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EDUCATION

University of Washington, *Seattle, WA*   *September 2022 - March 2025*
Bachelor of Science, Electrical and Computer Engineering, *GPA: 3.9*

Concentrations:	*Embedded Systems, Computing*
Relevant Coursework:	*Data Structures & Algorithms, Embedded Systems I & Capstone, Databases, Computer Architecture, VLSI, Network Cryptography*
Honors:	*Cum Laude, Tau Beta Pi, IEEE Eta Kappa Nu*

RELEVANT SKILLS

- **Languages:** Java (extensive), SystemVerilog (extensive), C (extensive), Python (moderate), SQL (moderate), ARM (moderate), JavaScript (moderate), HTML/CSS (moderate), HSpice (beginner)
- **Web & Cloud:** React, Jakarta, WebSockets, Docker, Vercel, Render
- **Tools & Frameworks:** Git, KiCad, FreeCad, Maven, SQLite, FreeRTOS, Linux
- **Hardware Design:** Cadence Virtuoso, ModelSim, Quartus Prime

RELEVANT EXPERIENCE

Undergraduate Teaching Assistant — *EE/CSE 469: Computer Architecture I*   *Autumn 2024*
- Hosted 20+ office hours a week to help 80+ students with assignments on RTL design, CPU architecture, and memory systems
- Led lab demonstrations to help students debug and verify functionality of their designs in SystemVerilog
- Evaluated student understanding through verbal reviews of CPU component implementations
- Assisted students with simulation tools (ModelSim) and HDL development process in SystemVerilog

Undergraduate Grader — *EE/CSE 474: Embedded Systems I*   *Winter 2025*
- Evaluated C/C++ programming assignments for 70+ students on the ESP32 microcontroller
- Assessed student implementations of embedded systems concepts, including interrupt handling, GPIO register manipulation, timer configuration, and FreeRTOS scheduling.
- Maintained and graded homework assignments on embedded data structures, memory management, and pointer operations

PROJECTS

Embedded Wildfire Detection System   *Winter 2025*
- Led a team of 5 in developing a fire risk and detection system using a Pi 4, STM32, sensor suite, and computer vision
- Wrote Python firmware for Bluetooth communication, UI rendering on OLED display, and API weather data integration
- Trained a TensorFlow model for image-based fire detection; handled preprocessing of dataset images to fit camera output
- Debugged C firmware for STM32 using CubeIDE to improve sensor data throughput
- Built and mounted a physical model house with a sprinkler system and sensor enclosure for demonstration and testing

Collaborative Real-time Sudoku Game   *Spring 2025*
- Architected a full-stack web application using React, Java, Docker, and cloud deployment (Vercel/Render)
- Utilized WebSocket communication using Jakarta WebSocket API and JSON messages
- Implemented a concurrent backend with thread-safe data structures to manage multiple simultaneous game sessions
- Developed UX features including generated player names/colors, real-time position tracking, and solution validation
- Designed a frontend with CSS to create both desktop and mobile-friendly layouts
- Implemented an automated Python Script, scheduled in Java, to refresh puzzle content by scraping NYT Sudoku puzzles

32-bit ARM Pipelined Processor   *Spring 2024*
- Designed and implemented a complete 5-stage pipelined processor in SystemVerilog supporting the ARM ISA
- Architected a hazard detection unit with data forwarding paths to resolve RAW hazards while minimizing pipeline stalls
- Implemented branch handling with branch prediction and pipeline flushing mechanisms
- Created pipeline stages with intermediate registers and forwarding muxes to maintain data integrity across pipeline stages

Register File Layout   *Autumn 2024*
- Developed layout of a 16-bit, 13-entry register file with one write port and two asynchronous read ports in Cadence Virtuoso
- Delivered a design that was DRC and LVS clean, with full hierarchical layout verified through Hspice simulations
- Optimized layout to achieve expected behavior at a clock of 3.67 GHz while minimizing area to 4200 um²

Content-Aware Image Resizing   *Spring 2023*
- Applied Dijkstra's algorithm to identify and remove low-energy seams from 2D image matrices
- Implemented resizing and visualization in Java with a focus on preserving image quality