Caden Roberts

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Education

University of California, Santa Cruz *Santa Cruz, CA*

Computer Science and Engineering MS Sep. 2025 – Jun. 2026, Computer Engineering BS Aug. 2023 – Jun. 2025

West Valley College Saratoga, CA

Honors Program, Mathematics AS Aug. 2021 – Jun 2023, Liberal Arts: Math and Sci AA Aug. 2021 – Jun 2023

Graduate Coursework: *Machine Learning, Neural Computation, Artificial Intelligence, Projects in Artificial Intelligence, Ind. Research, Analysis of Algorithms, Database Systems, Storage Systems, Programming Languages, VLSI Digital System Design*

Relevant Undergraduate Coursework: *Data Structures and Algorithms, Computer Architecture, Embedded System Design, Computer System Design, Engineering Design Project I/II, Full Stack Web Development, Python Programming, C Programming, C++ Programming I/II, Computer Networks, Assembly Language, Logic Design, Electronic Circuits, Signals and Systems*

Experience

Machine Learning Intern *Paystand, Santa Cruz, CA*, Dec. 2025 – Present

- Incoming Winter and Spring Machine Learning Intern for a cloud-based B2B financial transaction platform.
- Expected to complete a 12-wk project applying machine learning to financial systems.

Machine Learning Researcher *BioMedAI, UCSC, Santa Cruz, CA*, Jul. 2025 – Present

- Benchmarking **HelixNet**, a Coarse-Grained DNA-protein SchNet (GNN) model, with 50ns of explicit-solvent OpenMM, Martini, WESTPA-OpenMM, and WESTPA-HelixNet simulations across 10 DNA-protein pdbs.
- Wrote scripts to handle processing, simulation, and automation of DNA-protein specific pdb runs and evaluate sampling efficiency, RMSD, and step speed of enhanced CG model runs against MD, enhanced MD, and CG baseline runs.

Group Tutor and Grader *Baskin Engineering, UCSC, Santa Cruz, CA*, Jan. 2025 – Present

- Tutoring 5-15 students / 5-hr session / 2x per week per class for Applied Discrete Mathematics and Python Programming.
- Grading exams of 200+ students for Python Programming.

Undergraduate Research Assistant *Baskin Engineering, UCSC, Santa Cruz, CA*, Jan. 2025 – Mar. 2025

- Implemented custom FIFO, LIFO, and Round-Robin schedulers in Linux using sched_ext.
- Developed and evaluated custom scheduling policies for **Ecovisor**, an AI-driven framework leveraging cloud computing to select optimal software schedulers and improve energy efficiency at renewable energy plants.

Projects

CliniRepGen | *Python, PostgreSQL, Tongyi DeepResearch, RAG, AWS Bedrock, Supabase, Git LFS* Sep. 2025 – Present

- Developing an automated pipeline to generate CONSORT/ICH-E3 compliant drug clinical trial reports from structured and unstructured biomedical data from AACT Postgres, Drugs@FDA, PMC OA, PMC Citation Explorer, and ClinicalTrials.gov.
- Wrote data-ingestion and preprocessing scripts to fetch the IDs, studies, and data to give Tongyi via OpenRouter for a given drug.

iMessageAI | *SwiftUI, Python, SQLite, Ollama, JSON* Nov. 2025 – Dec. 2025

- Built a macOS SwiftUI application, using Python to parse iMessages with SQLite and generate AI replies with a local Ollama LLM, with a Python-SwiftUI JSON interface for data exchange.
- Users can send, edit, regenerate, or skip replies and set their personality, moods, and list of phone numbers to include or exclude.

ClinImCL | *Google Cloud, PyTorch, MONAI, NIfTI, UMAP* Oct. 2025 – Dec. 2025

- Developed a self-supervised contrastive learning framework for longitudinal MRI analysis by training a 3D CNN (InfoNCE) on A100 GPUs with mixed-precision sampling of NIfTI-standardized MONAI-preprocessed OASIS-3 (2800 MRIs, 1300 subjects).
- Evaluated learned representations through UMAP visualizations and cosine-distance, confirming temporally consistent, subject-specific embeddings suitable for downstream Alzheimer's progression modeling.

TheraHand | *Node.js, Express.js, React.js, PostgreSQL, ESP32C3, AWS EC2, OpenAPI, Swagger* Jan. 2025 – Jun. 2025

- Led full-stack development of the Node.js–Express–React-PostgreSQL application, deployed on AWS EC2 with RESTful API endpoints defined through OpenAPI specification, for a cable-servo automated physical therapy hand rehabilitation device
- Messaging, exercise management, 3D-modeling and playback of device data, doctor/patient/admin roles with unique UI/privileges

Technical Skills

Languages: Python, C++, C, SQL, Bash, JavaScript, R, HTML/CSS, Verilog, RISC-V, MATLAB
Frameworks and Libraries: PyTorch, TensorFlow, MONAI, NumPy, Pandas, Scikit-learn, OpenMM, WESTPA, React.js, Node.js, Express.js
Tools and Platforms: Google Cloud, AWS, HPC (NERSC Perlmutter), CUDA, Docker, Slurm, PostgreSQL, SQLite, Supabase, Jupyter, Git, VS Code, Xcode, Tableau, SolidWorks
APIs and Protocols: RESTful API Design, OpenAPI/Swagger, JSON, YAML

Certifications

Google Data Analytics Professional Certificate | *R, SQL, Tableau* May 2024