

Sam Bai

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EDUCATION

University of California, Berkeley

Expected May 2028

B.S. in Electrical Engineering and Computer Science

GPA: 4.0/4.0

Technical Courses: Computer Architecture · Digital Design · Machine Learning · Data Structures · Algorithms · Probability

Planned Courses (2026-27): Operating Systems · Compilers · Deep Reinforcement Learning

PROFESSIONAL EXPERIENCE

AMD Firmware Engineering Intern

May 2026 – July 2026

- Built a scalable, normalized PostgreSQL database with **4M records** across **23 tables** supporting 5 teams; integrated MinIO object storage for file retrieval; hosted an MCP server for **49k users**, decreasing information retrieval times by up to **97%**
- Applied encryption ideas from **discrete mathematics** class to manage private keys for version control and automatic deployment
- Volunteered for a CI/CD scheduler project and applied Tomasulo's algorithm from **computer architectures** class, and research;

UC Berkeley Undergraduate Researcher, Slice Lab

Jan 2026 – Present

- Develop a scheduling framework for ML robotic tasks (priority and periodicity) on heterogeneous compute, automatically mapping workloads onto hardware with efficient resource allocation; added a simple abstraction layer that keeps scheduling easy to use
- Implemented a quantization pipeline that converts trained models to MLIR, enabling deployment on resource-constrained targets

UC Berkeley Computer Architecture Tutor (CS 152), Undergraduate Course Staff I

Aug 2026 – Present

- Develop homework assignments, discussion, and lab materials for **154 students**; hold office hours and grade coursework

UT Graz Research Intern, Published Paper

May 2022 – May 2023

- Built a testbench GUI and collected data showing that higher contact force reduces harmonics from metal to metal contacts
- Mi R, Petzel L, **Bai S**, Mousavi S, Qu L, Zhang Y, Pommerenke D. Improved system for measuring contact induced harmonics. International Symposium on Electromagnetic Compatibility--EMC Europe 2023 IEEE

PROJECTS

4 Stage RISC-V Core, Winner UC Berkeley 151 Apple-sponsored ASIC Competition

Jan 2026 – May 2026

- Won **1st out of 82 students** in an Apple-sponsored ASIC design competition. Outperformed second place design with **8.2%** smaller die area (780K μm^2) and **14.2%** fewer execution cycles by optimizing cache design based on benchmark profiling.
- Designed a pipelined D-Cache with parallel tag/data reads (16-state FSM) and a **4x** smaller I-Cache with a 29-state FSM to support benchmark-based optimization; applied microcode experience from **computer architecture** class for cache and core FSM logic
- Verified RTL functionality using Synopsys VCS for simulation and timing analysis, with Synopsys Verdi for waveform analysis.

Jane Street ASIC Reverse Engineering Puzzle / KLayout · SAT Solving · RTL Reconstruction

Aug 2026 – Sep 2026

- Built a GDSII-to-netlist pipeline and encoding **728 cells**; Proved minimum 122 cycle success by using Z3 and Boolean DAG.
- Reconstructed RTL using dependency analysis and exhaustive truth tables; Recovered **9 modules**; Solved passing input and output

Audio Synthesizer Circuit Design · PCB Design · Signal Processing · Soldering · Multimeter

Sep 2025 – Dec 2025

- Designed circuit and created PCB layout for audio synthesizer; Debugged the board using a multimeter; Applied I2S protocol

CLUBS

UC Berkeley IEEE Vice President

Aug 2024 – May 2026

- Lead Berkeley's largest Electrical Engineering club, with **200** members; coordinate among 12 Directors; leading 5 committees
- Focused club direction towards strengthening existing programs, directed **\$11,500** semesterly budget towards 4 student run courses
- Represented UCB IEEE at CES and Rising Stars, coordinated Berkeley EECS career fair, built corporate network of **10+** companies; Ran hackathon with **143** participants and partnered with SWE and CSUA in outreach, research, and startup events

TECHNICAL SKILLS

Programming Languages: Python · C++/C · MLIR · Java · RISC-V · SystemVerilog

AI & Big Data: SQL · TensorFlow · NumPy · Pandas · MCP Servers · Quantization

Tools: Git · Vim · Tmux · Klayout · Docker · Kubernetes · MongoDB · PostgreSQL · KiCad · Verdi · VCS · Oscilloscope · Multimeter