

Kunal Pai

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Research Interests: Computer Architecture, open-source simulation, validation and known-good configurations, Machine Learning, Natural Language Processing.

EDUCATION

University of California - Davis **Davis, CA**
Master of Science in Computer Science *June 2025*

University of California - Davis **Davis, CA**
Bachelor of Science in Computer Science and Engineering *June 2023*

- Provost Award Recipient
- Dean's List (Fall 2019, Fall 2020, Winter 2022, Spring 2022)
- GPA: 3.830

Relevant Coursework: Object-Oriented Programming, Data Structures and Algorithms, Machine Dependent Programming, Computer Architecture, Advanced Algorithm Design, Theory of Computation, Statistical Modeling, Operating Systems, Embedded Systems, Computer Networks, Software Engineering.

RESEARCH EXPERIENCE

Davis Architecture Research Lab **Davis, CA**
Undergraduate Researcher *June 2022 - June 2023*

- Integrated the gem5 Standard Library components to create a pre-built board modeled after the HiFive Unmatched.
- Co-authored tutorials on perf compilation and documentation for the Standard Library.
- Currently validating the statistics returned by the board on gem5 to those returned by perf on real-life hardware.

DECAL Lab **Davis, CA**
Student Researcher *September 2022 - Ongoing*

- Co-authored paper on appending semantic information for better code summarization.
- Currently also testing effects of LLM models on mutation testing.
- Co-testing effects of uni-modal and multi-modal learning on random and selective sampling of buggy and fixed code snippets.

PUBLICATIONS

P. Shah, K. Pai, H. Patel, and A. Ali, "gem5 Vision," ISCA 2023: gem5 Workshop. Available: <https://www.gem5.org/assets/files/workshop-isca-2023/posters/gem5-vision-poster.pdf>.

K. Pai, Z. Qiu, and J. Lowe-Power, "Validating Hardware and SimPoints with gem5: A RISC-V Board Case Study," ISCA 2023: gem5 Workshop. Available: <https://www.gem5.org/assets/files/workshop-isca-2023/posters/validating-hardware-and-simpoints-with-gem5-poster.pdf>.

T. Ahmed, K. S. Pai, P. Devanbu, and E. T. Barr, "Improving Few-Shot Prompts with Relevant Static Analysis Products." arXiv, Apr. 13, 2023. doi: 10.48550/arXiv.2304.06815. Available: <http://arxiv.org/abs/2304.06815>.

WORK EXPERIENCE

humanID

Davis, CA

Tech Team Lead

April 2022 - June 2022

- Coordinated project task completion with global teams, delivering 10 completed projects.
- Implemented time-effective hiring practices for developers based on agile development principles, improving performance by 50%.
- Co-created documentation on the implementation of a Discord bot that combats spam and fake users.

humanID

Davis, CA

Software Development Intern

January 2022 - April 2022

- Algorithmically hierarchized 100 users and their associated permissions in a Django-based web application.
- Refactored part of the code base to follow software craftsmanship principles.
- Implemented interactive features for a frontend website in collaboration with the Design team.

SiTime Corporation

Santa Clara, CA

Technical Product Marketing Intern

July 2021 - September 2021

- Co-authored a product requirements document for a newly-released timing chip in the semiconductor industry.
- Conducted a market survey on optical transceivers and studied potential applications of MEMS timing chips.
- Presented strategy to hierarchize distributors and maximize stakeholders' earned profits by \$250,000.

PROJECTS

gem5 Vision

Davis, CA

NextJS, Python, MongoDB, JSON Schema

June 2023

- Implemented advanced search functionality to enhance resource discovery within the gem5 ecosystem.
- Introduced semantic versioning and built upon a comprehensive resource categorization system for easy access to newer resource versions under specific categories.
- Expanded gem5's database support by integrating local and remote JSON files and MongoDB, improving efficiency and user accessibility.
- Accepted poster at the gem5 Workshop in ISCA 2023.

UNify - Course Assistant

Davis, CA

Discord Bot, Python, Javascript

January 2022

- Utilized the UC Davis Schedule Builder API to extract class timings and professors.
- Formulated a class-based hierarchized dictionary to maintain schedules of over 100 server members in five Discord servers.
- Extracted data from APIs of Rate My Professor and Google Calendar to add additional features to the bot.
- Solidified skills of good software design to understand and solve problem domain.

OLED Paint

Davis, CA

C, Python

May 2022

- Utilized SPI and I2C to create a tilt-based paint application between the CC3200 and Adafruit OLED.
- Created a webserver and implemented a compression algorithm to transfer 128x128 bitmaps from a board to a computer.
- Conferred Best Lab Project for Spring 2022.
- Solidified skills of utilizing datasheet information to interact with hardware better.

SKILLS & INTERESTS

Languages Spoken: English, Hindi, Gujarati, Spanish, Marathi, Konkani.

Programming Languages: Python, C, C++, Javascript, CSS, HTML, Go, LISP, Prolog, Java, Chisel3.

Technical Skills: gem5, Adobe Photoshop, Audacity, DaVinci Resolve, WordPress, Microsoft Office Suite, Visio.