

# Kunal Pai

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## EDUCATION

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**M.S., Computer Science**, University of California, Davis (GPA: **4.0/4.0**) Expected: June 2026  
**B.S., Computer Science & Engineering**, University of California, Davis (GPA: **3.8/4.0**) June 2023

## WORK EXPERIENCE

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**Graduate Student Researcher, DArchR Lab @ UC Davis** Jun 2023 – Present

- Designed a graph accelerator based on superconducting logic, simulated using gem5 for cryogenic systems.
- Developed performance-accurate simulation models for cryo-CMOS with direct relevance to emerging hardware ecosystems.
- Devised an autotuning methodology with 90% alignment to real hardware traces, improving model reliability.
- Led and mentored a cohort of 5 undergraduates, resulting in a co-authored ModSim 2024 research poster.

**Student Researcher, DECAL Lab @ UC Davis** Sept 2022 - Dec 2024

- Created code-documentation alignment dataset from 200 open-source projects.
- Built pipeline assessing LLM calibration for code repair.
- Validated semantic augmentation methods for code summarization using ROUGE metrics.

**Technical Product Marketing Intern, SiTime Corp., Santa Clara** Jul 2021 - Sep 2021

- Presented distributor margin strategy with \$250K potential upside.
- Conducted market survey on optical transceivers in AI networking for MEMS timing.
- Created technical diagrams for product requirements documents.

**Software Developer Intern & Tech Lead, humanID, Davis** Jan 2022 - Jun 2022

- Led Django web app development for permission management (100+ users).
- Documented Discord bot implementation for combating spam and fake users.

## PROJECTS

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**Automated Prompt Optimization for Math Solving in LLMs** Apr 2024 – Jun 2024  
*Machine Learning Project* Python, NLP, Prompt Engineering

- Boosted prompting and fine-tuning performance by 10–60% via few-shot selection and chain-of-thought guidance.
- Implemented scalable benchmarking framework to evaluate alignment and generalization across tasks.

**gem5 Vision Framework** Jan 2023 - Jun 2023  
*Web Development Framework* Next.js, Python, MongoDB, JSON Schema

- Built Next.js/MongoDB platform for 500+ industry and academic users.
- Boosted resource discovery speed by 20x with optimized search functionality.

**Spectre Vulnerability Assessment** Oct 2023 - Dec 2023  
*Computer Security Project* Python, C++, gem5, Docker

- Demonstrated 55% reduction in speculative execution vulnerability while analyzing security-performance tradeoffs.

## PUBLICATIONS (SELECTED)

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**CoDocBench: A Dataset for Code-Documentation Alignment in Software Maintenance** [Pai, K.](#), Devanbu, P. & Ahmed, T.  
Mining Software Repositories (MSR) 2025: Data and Tool Showcase Track

**Calibration and Correctness of Language Models for Code** Spiess, C., Gros, D., [Pai, K.](#), et. al.  
International Conference on Software Engineering (ICSE) 2025

**Automatic Semantic Augmentation of Language Model Prompts (for Code Summarization)** Ahmed, T., [Pai, K.](#), et. al.  
International Conference on Software Engineering (ICSE) 2025

## TECHNICAL SKILLS

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**Languages:** Python, C++, C, JavaScript, Java  
**ML/AI:** TensorFlow, PyTorch, scikit-learn, LLMs, Prompt Engineering  
**Web/Data:** React, Next.js, Django, Flask, MongoDB, pandas, NumPy, Matplotlib  
**Tools:** Git, Docker, Unix/Linux, gem5, Jupyter, LLVM, Clang