Vijay Sharma

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Education

University of California, Berkeley **August 2024 – Present**

Bachelor of Science in Electrical Engineering and Computer Science (Graduating 2026) *Berkeley, CA*

- Relevant Coursework: Machine Learning, Deep Learning, Combinatorial Algorithms (Graduate), Efficient Algorithms and Computational Complexity, Database Systems, Operating Systems, Compilers, Data Structures and Algorithms, Information Systems Design, Circuit Design.

Experience

Berkeley Data Systems and Foundations Group **June 2025 – August 2025**

Research Intern *Berkeley, CA*

- Co-designed a specialized programming language for expressing ways to rewrite parts of queries to improve execution performance and accuracy.
- Implemented and validated rewrite rules in Apache Calcite, achieving measurable performance gains on benchmark queries.
- Extended testing framework to cover hundreds of equivalence cases, improving software robustness and maintainability.

NASA CA Space Grant Consortium **June 2024 – July 2024**

Robotics Intern *San Jose, CA*

- Engineered and implemented a high-precision soil moisture sensing system for space-optimized greenhouses, using C++ for real-time data processing and Rust for robust hardware interfaces.
- Presented prototype to NASA senior engineers after achieving 25% higher soil moisture detection accuracy and sub-second response times, evaluated for use in space agriculture systems.

Nanoblox Limited **July 2020 – August 2023**

Project Manager and Developer *Remote*

- Led a 10-person team in scaling and launching features for a Roblox game management system with over 50 million users.
- Built a Luau compiler for user-made programs, reducing execution time by 50% and improving gameplay experience.
- Developed new distributed data storage system with data-integrity mechanisms that provided a more reliable alternative storage solution and reduced data loss incidents by 55%.

Loncapa Solver **January 2022 – June 2023**

Lead Developer *San Jose, CA*

- Developed a system to understand and automatically answer user questions by matching them to over 10,000 known problems, successfully resolving over 80% of queries.
- Built an automated system to find and learn new problem solutions through web-scraping and text recognition.
- Maintained a highly reliable platform serving over 80,000 users for over a year without any downtime, ensuring a consistent and dependable user experience.
- Increased system reliability by 50% and improved efficiency by implementing load-distribution and consensus algorithms for a network of computers.

Projects

- **RookieDB:** Built a single-node relational database from scratch with B+ tree indexes, System R-style query optimizer, and ACID compliance (ARIES recovery + strict 2PL with multi-granularity locking).
- **Felix:** Developed a gradient descent–based compiler optimization framework for tensor programs, achieving 2.2x faster execution than PyTorch and reaching optimal performance 3.4x faster than state-of-the-art search methods.
- **RusTOS:** Designed and implemented a real-time computer operating system for ARM and RISC-V, prioritizing safety and speed with a maintainable architecture and partial POSIX compliance.
- **LLVM:** Prototyped improvements to instruction scheduling and register allocation cost models in LLVM, demonstrating performance gains on compiler benchmarks.
- **Dasu:** Built a Discord chatbot managing promotions for over 2 million users, handling high-throughput interactions reliably.
- **Alex AI:** Created an AI-powered tool to automate legal workflows for creating and managing companies; TEDxMicrosoft AI Hackathon 2023 Semi-finalist.
- **Flick:** Built a rocket flight controller with thrust vectoring, sensor fusion, and safety mechanisms for real-time performance.

Skills

Systems: C, C++, Rust, Assembly (x86, RISC-V), Linux, OCaml
ML and Data: Python, PyTorch, NumPy, Pandas, Scikit-learn, SciPy
Other Languages and Tools: Luau/Lua, TypeScript, Java, Git, Docker, NixOS