Siddharth Sivalanka

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Education

University of California San Diego — La Jolla, CA

Bachelor of Science in Computer Science, Specialization in Bioinformatics — *Sep. 2024 – Present*

- Expected Graduation: June 2027
- **Courses:** Data Structures, Algorithms, Advanced Object Oriented Programming, Discrete Math, Probability and Statistics, Linear Algebra, Systems Programming, Computer Organization, Multivariable Calculus

Experience

Software Engineering Intern — May 2025 – Present

Wild Genomics — *La Jolla, CA*

- Built **Python** bioinformatics pipeline processing airborne plant DNA with FASTQ/BLAST parsing and ONT barcode demultiplexing
- Developed **TensorFlow** species classification models achieving 9x higher accuracy than traditional identification methods
- Created **OpenCV** geospatial analysis system mapping pest infestations across 1000+ acre farmlands for precision agriculture
- Tools: Python, ONT Barcoder, OpenCV, Pandas, NumPy, Seaborn

Research Assistant — April. 2024 – Present

University of California San Diego — *La Jolla, CA*

- Analyzed 100K+ neural spike recordings from mouse hippocampus CA3/DG regions using **Python** statistical methods
- Co-developed custom microscope hardware and tracking firmware increasing signal-to-noise ratio by 2x factor
- Processed calcium imaging data through **ImageJ** and **Suite2P** pipelines for behavioral neuroscience research
- Tools: Python, ImageJ, Suite2P, OpenCV, NumPy, Seaborn, TensorFlow

Projects

OpenLabel | *Python, Streamlit, TensorFlow, OpenCV (Diamond Hacks Winner))*

- Built AI-assisted data labeling platform with **OpenCV** image processing for object detection and **TensorFlow** confidence scoring
- Implemented computer vision pipelines using **OpenCV** for automatic bounding box generation and image annotation preprocessing
- Architected microservices design with **Python Flask** backend and **Redis** task queueing for concurrent labeling workflows

NebulaDB | *C++, Data Structures, Database Internals, Memory Management*

- Engineered in-memory database engine with custom **SQL** parser supporting SELECT/INSERT/UPDATE/DELETE operations
- Implemented **B+ tree** indexing and hash table storage achieving sub-millisecond query response times
- Built **ACID** transaction system with deadlock detection and rollback mechanisms for data consistency

StudySync | *TypeScript, React, Node.js, Claude API*

- Built full-stack flashcard application with **TypeScript** type safety and **React** component architecture
- Integrated **Claude API** for intelligent quiz generation with rate limiting and **Express.js** RESTful backend
- Developed repetition algorithms with timer-based quiz modes for flashcard auto-generation

Mini Shell | *C, Linux, Systems Programming, POSIX Compliance*

- Developed **POSIX**-compliant shell with multi-process piping and I/O redirection using **fork/exec** system calls
- Implemented signal handling (SIGINT/SIGTSTP/SIGCHLD) with **GNU Readline** integration for tab completion and command history
- Built job control system supporting 100+ concurrent background processes with memory-safe operations

Technical Skills

Languages: Java, Python, R, Typescript, HTML/CSS, Javascript, C, C++
Frameworks: React, Node.js, JUnit, Express.js, Pandas, Numpy, MatplotLib, OpenCV
Developer Tools: Git, Streamlit, Github, VS Code, PyCharm, IntelliJ