# Kaleb Crans

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## Education

**The University of California, Davis** Graduated March 2023

*Bachelor of Science in Applied Mathematics, Computer Science Minor* *3.65 GPA*

- **Computer Science Coursework**: Object Oriented Programming, Data Structures and Algorithms, Computer Architecture & Assembly Programming, Discrete Math, Databases, Machine Learning
- **Math Coursework**: Multivariate Calculus, Statistics, Linear Algebra, Probability Theory, Real Analysis, Stochastic Processes, Differential Equations, Complex Analysis, Numerical Analysis, Optimization
- Outreach Coordinator for Davis Computer Science Club
- Dean's Honor List

## Technical Skills

**Languages**: Python, C/C++, Javascript, and SQL
**Libraries**: NumPy, Matplotlib, pandas, Tidyverse, and PyTorch
**Developer Tools**: Git, Linux, Bash scripting, Docker

## Projects

**Micromacro** | *C++, C, Python, Swift* February - March 2024

- Developed firmware intended for custom keyboards using ESP32-C3 microcontrollers
- Added support for extensive customization, n-key rollover, and debouncing
- Created native clients in C++ and Swift for Windows and MacOS respectively

**Ray Bandit** | *C and C++* January 2024

- In order to explore computer graphics, I built a CPU raytracer with physically based rendering features
- Supports Lambertian (diffuse), metallic (specular), and clear (dielectric) materials
- Has a simple declarative interface to create scenes, and outputs renders in either ppm or jpeg formats
- Can render triangulated surfaces defined in STL files

**Data Analysis of Little Free Libraries** | *R + Python* April 2023

- Used python to scrape data from littlefreelibrary.org and the associated map API
- Aggregated the (messy) data from multiple endpoints and transformed it into one dataset
- Performed regression analysis in conjunction with county-level ACS (American Community Survey) data

**L-Store Database System** | *Python* January – March 2022

- Developed a python-based version of L-Store, an experimental HTAP database system with columnar storage
- Experimented and visualized the effects of different bufferpool sizes on performance
- Created a simplified SQL-like query interface that supports operations like select, update, sum, etc.
- Used the threading Python module for multithreading with a strict 2PL concurrency protocol

## Experience

**Research Intern** April 2022 – December 2022

*Bales Lab* *Davis, CA*

- Worked on an app written in python designed for running visual stimuli experiments with non-human primates
- Incorporated feedback and suggestions from lab researchers throughout the whole development process
- Wrote multiple GUI utilities to make common administrative tasks easier for end-users
- The result is a multi-platform application which is easy to configure with JSON, has many more features than what was used previously in the lab, and can be adapted for entirely new experiments

**Undergraduate Reader** September 2021 – May 2022

*UC Davis* *Davis, CA*

- Performed grading duties in undergrad math courses
- Worked with professors and TAs to make grading schemes for homework assignments
- Read for each course in the Real Analysis sequence, Combinatorics, and Intro to Abstract Math

**Eagle Scout** May 2019

*BSA* *Troop 99*