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# Alex Woelkers

## Technical Skills

**Languages:** Python, JavaScript, Java, TypeScript, C (Proficient), C++ (Proficient).

**Technologies:** React.js, Next.js, RabbitMQ, OpenCV, Spring Boot, PyTorch, AWS (EC2, DynamoDB, EKS, S3, ECR, CloudWatch), Kubernetes, Docker, JUnit, Jenkins, Redux, Redis, GitHub Actions (CI/CD), Prometheus, Grafana, LLMs.

**Concepts:** Full-Stack, Back-end, Front-end, IoT, Databases, Parallel Processing, Operating Systems, GIS, Cache Memory, Artificial Intelligence, Machine Learning, Neural Networks, Rest APIs, Agile Methodology, Cloud Computing.

## Relevant Experience

### Esri

June 2025 - Sept 2025

*Software Development Engineer - Intern*

*Redlands, CA*

- Enabled standards-based GIS data sharing across Europe and reduced reliance on proprietary Esri interfaces, by developing a Java-based REST API with **9** OGC API endpoints, achieving **99.6%** uptime on testing benchmarks.
- Validated end-to-end cross-platform compatibility for open-source OGC clients (Leaflet, QGIS), working in a self-directed role with **100%** product ownership.
- Improved Esri's OGC CI reliability by **14%** by automating validation/regression workflows with JUnit, GitHub Actions, and Jenkins.

### Inter-networking Research Group

July 2024 - Present

*Undergraduate Research Intern*

*Santa Cruz, CA*

- Spearheaded RabbitMQ integration of the NSB for improved communication efficiency, critical for accurate IoT and autonomous vehicle simulations, resulting in a **17%** packet throughput increase.
- Built and evaluated edge AI prediction models (**83%** accuracy) within a federated learning framework, enabling real-time wildfire detection across **200** simulated IoT devices.

## Projects

### Inlyne | Capstone Project

- Cut developer onboarding time by **35%** by building a real-time documentation platform for web/VSCode.
- Encountered **0** outages or security issues by utilizing GitHub Actions workflows for smooth CI/CD when deploying our backend (Java, Spring Boot, PostgreSQL) to Sevalla and our frontend (React.js, TypeScript, Next.js) to Vercel.
- Led 6-member Agile team, enabling real-time editing at **100 edits/collaborator**, for up to **7,500** concurrent users.

### GridAI | Personal Project

- Built an end-to-end hourly DOE EIA ingestion pipeline on AWS EKS processing **5K-7K datapoints per run** across **300+ hourly metrics per day**, generating operator and resident narratives with structured LLM prompts.
- Automated ingestion, storage, and reporting using Docker, Kubernetes CronJobs, DynamoDB, and CloudWatch, cutting manual analysis from **3-4 hours** to sub **5 seconds** and achieving **95% summarization fidelity**.

### Ridepool | CruzHacks Hackathon

- Reduced student transportation costs on average by **55%**, compared to Uber, by designing a real-time carpooling app, while also reducing users' carbon footprints by **70%**.
- Improved UI responsiveness by **22%** for the frontend (TypeScript, React, Next.js), and reduced server/database load (Python, MongoDB) by **13%** through performance profiling and optimizations, improving user experience.

### Image Classification Model | Class Project

- Won class image classification competition by achieving **94.98%** accuracy (top team of 102), leveraging PyTorch and OpenCV to improve baseline accuracy by **34%** compared to class 60% average.
- Cut training time from 2.5 hrs to 10 minutes** by optimizing GPU usage, batch sizing, and hyperparameters on GCP.

## Education

### University of California, Santa Cruz

Sept 2022 - June 2026

*Bachelor of Science in Computer Science (GPA: 3.92 / 4.00)*

*Santa Cruz, California*

- Relevant Coursework:** Data Structures and Algorithms (C++, Python), Computer Systems Design (C), Distributed Systems (C, Python), Operating Systems\*, Embedded Systems\*, Computer Networking (C, Python), Computer Architecture, Linear Algebra, Databases, Computer Vision