KAELAN **MOFFETT-STEINKE**

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Skills

Languages

Proficient Python, Rust, TypeScript, Javascript, Go, C++, Lua, Bash ***Familiar*** Kotlin, C, Java, x86

Technologies

TCP/IP, Kubernetes, GraphQL, Redis, Nginx, ReactJS, SvelteJS, Linux

Work Experience

Software Engineer Intern | NVIDIA | Remote *May '22 - Aug '22*

- Ported OmniGraph (scalable **graph** engine) nodes for vector math from **Python** to **C++**, resulting in 4x speedup.
- Improved OmniGraph extension installation with global cache, reducing build size by 18+%
- Fixed memory leaks from C++ extensions reloading with pybind11 ABI by forking Pybind as a hotfix.

Distributed Systems / Backend Engineer | Trexo Robotics | Toronto *Sep '21 - Dec '21*

- Created a **Kotlin**+**Spring Boot** server on **AWS** to manage live data to and from **200 exoskeleton robots**.
- Implemented a fault-tolerant bidirectional **DB sync** (robot ↔ cloud) using **Merkle Tree** based algorithm.
- Created three way integration testing (mobile ↔ robot ↔ cloud) in **Bash**, reducing QA testing workload by 15%
- Improved security, performance and maintainability by porting legacy **ExpressJS** login server to **Spring**/**Kotlin**

Backend/Infrastructure Engineer Intern | Pronti Inc. | Waterloo *Jan '21 - Apr '21*

- Created **Flask** server for registration/logins using SMS 2FA, **JWT**, and **GraphQL** to reduce API boilerplate.
- Reduced runtime of recommender algorithm by 75% by batching SQL queries, and caching results in **Redis**.
- Migrated server container from **GCP** to **Kubernetes** to scale with an influx of users, and implemented waitlist/referral system to manage growth rate.

Backend Developer Intern | Backr Inc. | Toronto *Jun '20 - Sep '20*

- Ported high-volume ingestion microservice to **Go**, resulting in 4x speedup over OG **Python** implementation.
- Reduced **AWS** costs by refactoring monolithic ML pipeline into microservices to enable granular scaling.
- Redesigned main DB schema to speed up CRUD with indexing and relationships, migrated **3M** rows using **Python** script, and used **GraphQL** to simplify the associated API endpoints.

Computer Vision Software Intern | North Inc. (Acquired by Google) | Waterloo *Jan '19 - Apr '19*

- Created optical raytracing engine using **OpenCV** matrices in **C++** and optimized for specialized ASIC.
- Worked with scientists to create a material property calculator with n-dimensional interpolation in **C++**.
- Improved optical raytracing accuracy by 36% by developing a **DLL** plugin in **C++** for a simulation engine

Projects

Final Year Design Project | Distributed Underwater Positioning System *Sep '22 - Apr '23*

- Awarded **Best Overall Project** out of 52 teams presenting at 2023 U of Waterloo Mechatronics Eng. symposium.
- Created positioning system for underwater robots using acoustics, outperforming commercial solutions in tolerance to reflections and obstructions, achieving 85 meter range with 98% accuracy.
- Responsible for a **Rust** Server exchanging high bandwidth data with each node and delivering the UI (app).
- Architected firmware (**C++** on ARM M7), implementing positioning, autocalibration, and fault-tolerant networking
- Enabled realtime freq. analysis, via **sliding window Fast Fourier Transform** at 2µs intervals, processing 20MB/s of acoustic samples.

Side Project | Packet Panic *Oct '23*

- High performance **Go** network proxy that emulates bad network conditions to verify the fault-tolerance of distributed systems in adverse conditions.
- **TUN** (kernel virtual interface) is used to transparently and bidirectionally intercept **15+ Gb/s** of **layer 3 packets**.
- **Coroutines** are dispatched to handle requests **concurrently**, apply packet loss/corruption/delay, fwd to dest.

Education

University of Waterloo | **Mechatronics Engineering BASc** | **Software Option** *Sep '18 - Apr '23*

Coursework ▶ Programming for Performance, Search Engines, Adaptive Algos, Datastructures and Algos, Microprocs.