Keenan Gugeler

Systems Developer
me@kgugeler.ca

💼 Work Experience

Embedded Security Developer
May - December 2024 & May - August 2025
ETAS

- Investigated Assembly and ARM intricacies to save thousands of bytes in an embedded application.
- Found and fixed a critical vulnerability related to device registers.
- Identified and removed a UART-related bottleneck in tests to halve test execution time.
- Leveraged C++ knowledge to reduce cost of abstractions while improving safety.
- Investigated and later documented a poorly understood device, finding several bugs and issues.
- Implemented, documented, and tested several proprietary security protocol implementations.
- **Technologies Used**: C++, ARM32, Assembly, Python, UART, CMake, BitBucket.

Database Developer
September - January 2023
Kùzu

- Designed and implemented a parallel hash index to replace the core database index.
- Researched and implemented a parallel CSV reader to improve import speeds.
- Integrated clang-tidy, a static-analyzer, and other checks to improve code quality.
- Sped up compile times by 40% using the Language Server Protocol to identify unused headers.
- Implemented automatic stripping of binaries to reduce binary size.
- **Technologies Used**: C++, SQL, Python, CI/CD, Atomics, CMake, GitHub.

Security Research Student
January - April 2023
Blackberry

- Created a custom fuzz target for a Blackberry product leveraging AFL++.
- Built a platform for fuzzing of Blackberry products, including triage and result reporting.
- Researched topics in security including Spectre and post-quantum cryptography.
- Contributed to an ongoing project for a security-related patent.
- **Techonologies Used**: C++, Alpine Linux, Fuzzing, Docker.

Full Stack Developer
May - August 2022 & May - August 2023
Curvegrid

- Investigated, diagnosed, and solved a long-term memory leak regarding websockets.
- Updated features and refactored tests to clean up the codebase.
- Returned part-time and migrated logging to a better solution for analytics and readability.
- **Technologies Used**: Go, Blockchain, Javascript, Vue.js.

⭐ Projects

CS452 Real Time Programming
January 2024 - April 2024

- Developed a real-time operating system on a Raspberry Pi for train control.
- Learned about the ARM architecture in great depth, including the MMU and exceptions.
- Implemented path-finding and collision avoidance to control two trains simultaneously.
- **Technologies Used**: C, AArch64, Assembly, QEMU, UART.

DMOJ Modern Online Judge
January 2021 - Present

- Prepared monthly programming contests for the site and supervised other contests.
- Contributed various features and bug-fixes to the open source codebase.
- **Technologies Used**: C++, Django, Python, Rust.

Miscellaneous

- Wrote a rotating wallpaper application in Rust for Wayland, using WebGPU for acceleration.
- Implemented GPU-accelerated SHA256 collision search with OpenCL for University Assignment.
- Developed an end-to-end encrypted file storage website using Javascript AES.
- **Other Technologies**: HTML, CSS, Angular, Flask.

📘 Education

UWaterloo Computer Science Bachelor of Honours, Japanese Diploma