Kohei Asano

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Technical Skills

- **Languages**: C/C++, Rust, Go, JavaScript, TypeScript, Python, SQL
- **Compilers & Engines**: LLVM (Middle-end, Peephole Optimization), WebKit (Rendering, Refactoring)
- **Systems**: Computer Architecture, RISC-V, Emulation, Reservoir Computing, Fuzzing
- **Mathematics**: Formal Methods, Gröbner Bases, Polynomial Invariants, Symbolic Differentiation

Education

The University of Tokyo Tokyo, Japan
Master of Science in Computer Science *Apr 2022 - Mar 2024*

Hokkaido University Hokkaido, Japan
Bachelor of Science in Mathematics *Apr 2018 - Mar 2022*

Work Experience

Software Engineer Apr 2024 - Present
Sony Interactive Entertainment *Tokyo, Japan*

- Developing and maintaining **PS5 WebKit** (browser engine) and PlayStation's **WebView** component
- Developed infrastructure for web-based Media Apps during a 3-month overseas assignment
- Focus on performance, stability, and security-level production software

Mitou Fellow 2023 - 2024
IPA (Information-technology Promotion Agency, Japan) *Japan*

- Developed **RiP**: High-Efficiency Reservoir-in-Processor Computing utilizing RISC-V internal states
- Designed a reservoir-computing architecture reusing micro-architectural state
- Developed a cycle-accurate RISC-V emulator with branch prediction and performance statistics

GSoC Contributor May 2023 - Oct 2023
LLVM Project (Google Summer of Code 2023) *Remote*

- Contributed to LLVM middle-end passes, including **MemCpyOpt** and **InstCombine**
- Implemented stack-move optimizations and investigated peephole optimizations

Selected Projects & OSS

- **LLVM**: Contributed middle-end passes and optimizations (GSoC 2023 and beyond)
- **WebKit**: Contributed to Windows rendering and general refactoring
- **Reservoir-In-Processor Simulator**: Cycle-level RISC-V emulator with CI/CD and detailed statistics
- **Polynomial Invariant Calculator**: Rust implementation of algebraic invariant computation using Gröbner bases
- **Symbolic Differentiator**: Rust implementation of mathematical expression parser and differentiation

Awards & Certifications

- **Poster Award**, xSIG 2023 – "Could an LLM be an LLVM Superoptimizer?"
- **TOEIC Reading & Listening**: 840 (Sep 2024)