

# KIVA OYAMA

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## EDUCATION

Southwest Jiaotong University, Chengdu, China

2019/09 - 2023/06

Major in Physics, GPA 3.72/4.00

## WORK EXPERIENCE

PLCT Lab, Remote

2023/07 - present

*full-time* Compiler Engineer

### LLVM Compiler Infrastructure

<https://github.com/ruyisdk/llvm-project>

Implementing full-featured **vector extension** for T-Head RISC-V SoCs in the LLVM compiler.

- Lead to refactor the compiler architecture: coexistence with RISC-V standard vector extension.
- Lead to implement the compilation-optimization flow of T-Head vector intrinsic functions.
- Contributed to vector-related passes: auto-insertion of vector length registers, vector length deduction, etc.

PLCT Lab, Remote

2020/11 - 2023/07

*intern* PL Researcher

### The Aya Theorem Prover

<https://github.com/aya-prover/aya-dev>

A dependently-typed programming language and a proof assistant based on Cubical Type Theory.

- Contributed to theory: implementation of de Morgan Cubical Type Theory.
- Contributed to DX: inference of typechecking order, termination checker, generalized operator parser, library system, etc.
- Contributed to tooling: language server, pretty-printing framework, IntelliJ and VSCode plugin.

## PERSONAL PROJECTS

### Valheim Emulator

<https://github.com/imkiva/valheim>

A RISC-V 64 bit emulator which is capable of running modern Linux.

- Type-safe instructions making decoding safe and correct.
- Full emulation trace like persistent data structures for debugging real hardware or differential testing.
- Used as the reference implementation when testing LLDB RISC-V Instruction Emulator.

### KiVM

<https://github.com/imkiva/KiVM>

A Java Virtual Machine designed for embedded platforms, following JVM specification version 8.

- Support most of Java 8's new features, such as lambda expressions and streams.
- Garbage Collector by applying mixed G1-Copying algorithm.
- Standard JNI interfaces and bytecode control flow analysis.
- Learned a lot about language runtimes.

## SKILLS

- **Programming Languages: multilingual** (not limited to any specific language), and especially experienced in Java/Scala/Rust/Haskell, comfortable with Kotlin/TypeScript/C++ (in random order).
- **Java/Scala/Kotlin:** Know about their frontend: mostly the Java compiler. Know about their backend: HotSpot VM, GC algorithms and JIT compiler. Implemented a self made JVM.
- **Rust:** Familiar with Rust language features and implementations, especially its LLVM backend.
- **Proof assistants: Aya/Agda/Arend:** Participated in the core development of the Aya Prover. Especially experienced in type-driven development.
- **Tooling:** Comfortable with any OS/editors. Once contributed code to IntelliJ IDEA community version. Especially experienced in Git and GitHub.

## MISCELLANEOUS

- Language: English - CET6, TOEFL-101, Chinese - native
- Open Source Contribution: <https://github.com/imkiva>
- **2 kyu** on CodeWars, primarily in Haskell
- Prefer remote work. Programming for interest, powered by love.