

# Ryota Shioya

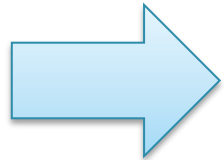
- Ryota Shioya

- ◇ Associate Professor

- Research Field:

- ◇ Computer Architecture

# Computer Architecture



Application Software  
Graphics / Voice Recognition / Signal Processing / Machine  
Control / WEB Service / Encryption ...

System Software  
OS / Compiler / Interpreter / Virtual Machine

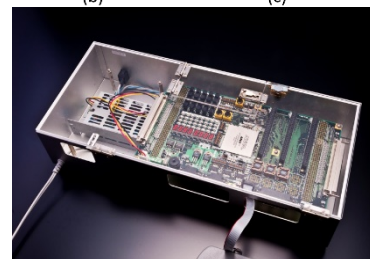
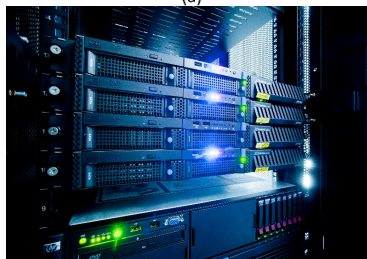
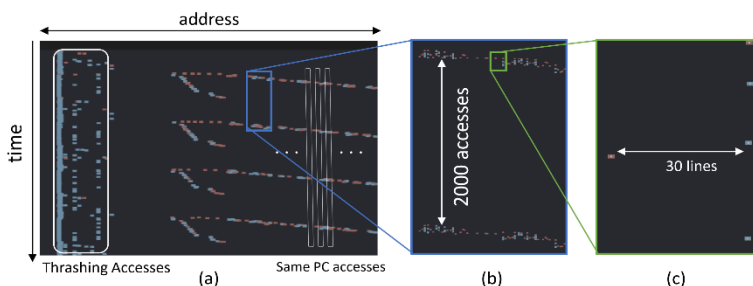
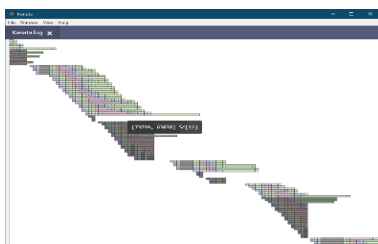
## Computer Architecture

Logic Circuit / Integrated Circuit / Semiconductor Device

- ◇ Computer architecture is at the boundary between software and hardware.

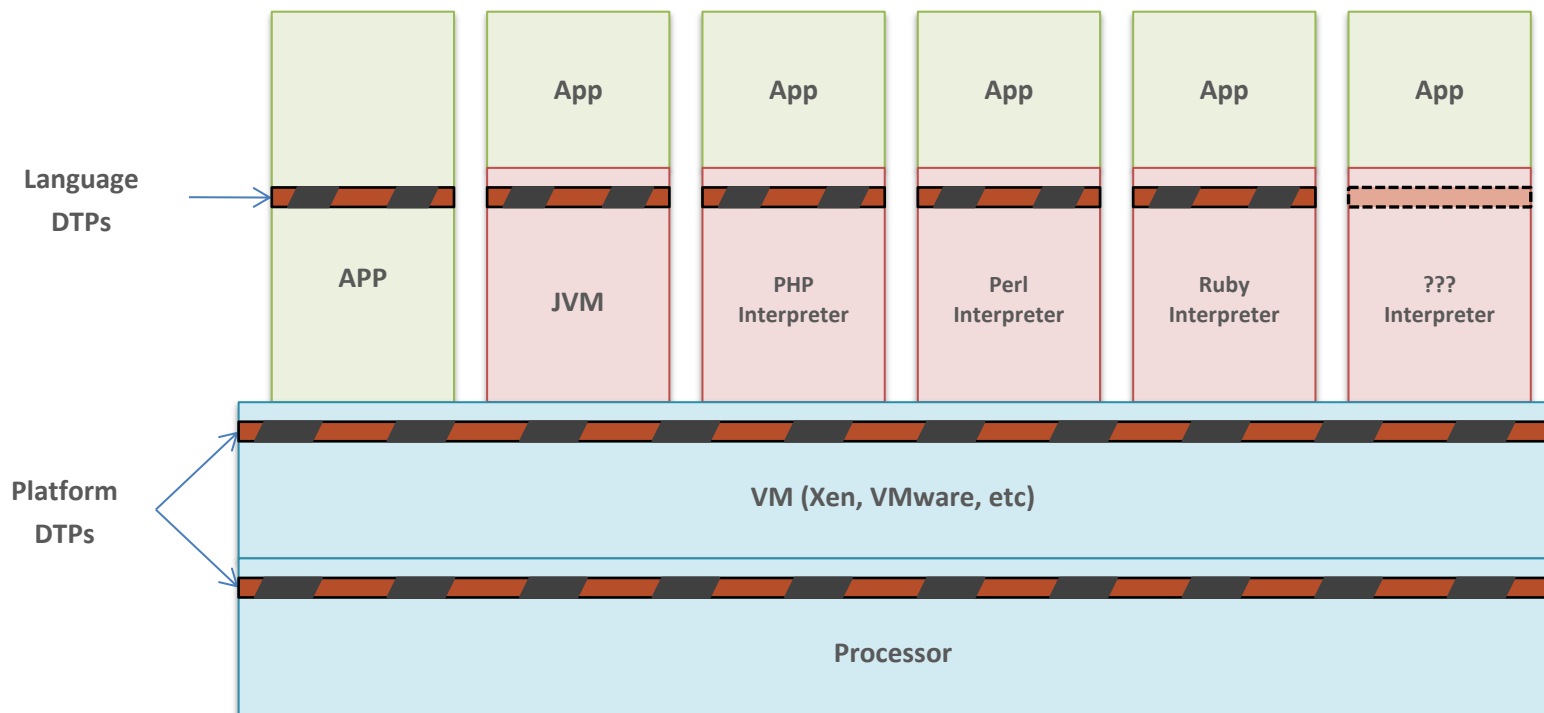
# Our mission: Improving Computer Systems

- Focus on computer hardware and system software
  - ◇ High performance, energy efficient, and secure CPU architecture
  - ◇ Hardware assist for programming language systems/OSs
  - ◇ Visualize the internal behavior of a computer, etc.
- Joint projects with industries
  - ◇ Advanced RISC-V CPUs / SoC for self-driving cars



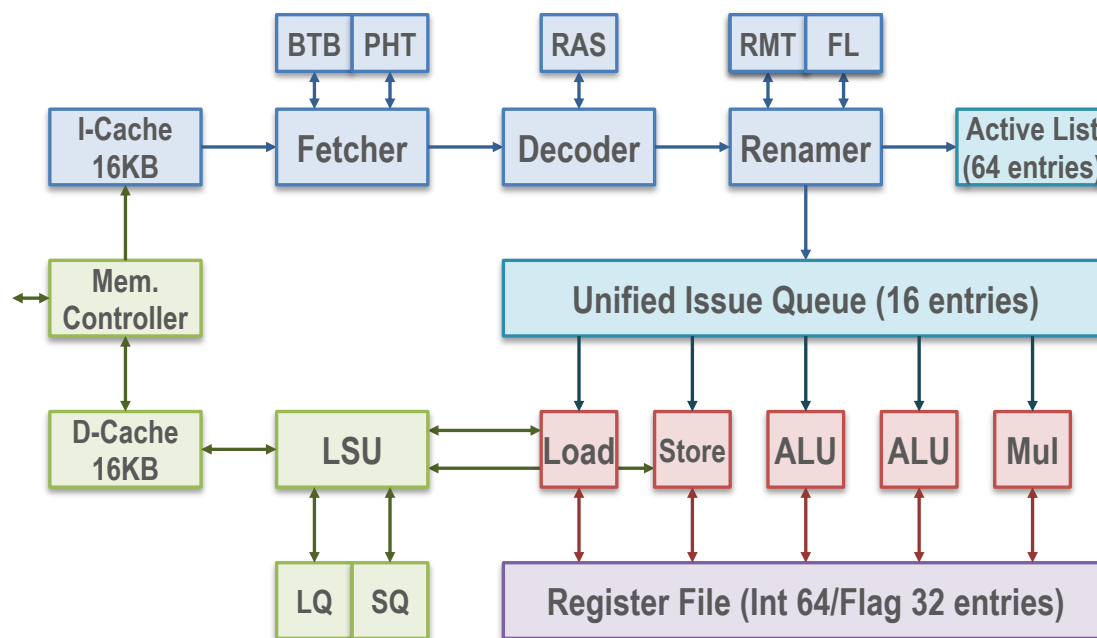
# Dynamic Information Tracking for Security

- Instead of relying on endless fixes of security vulnerabilities, we explore a "fundamentally secure" system by tracking dynamic information flows.



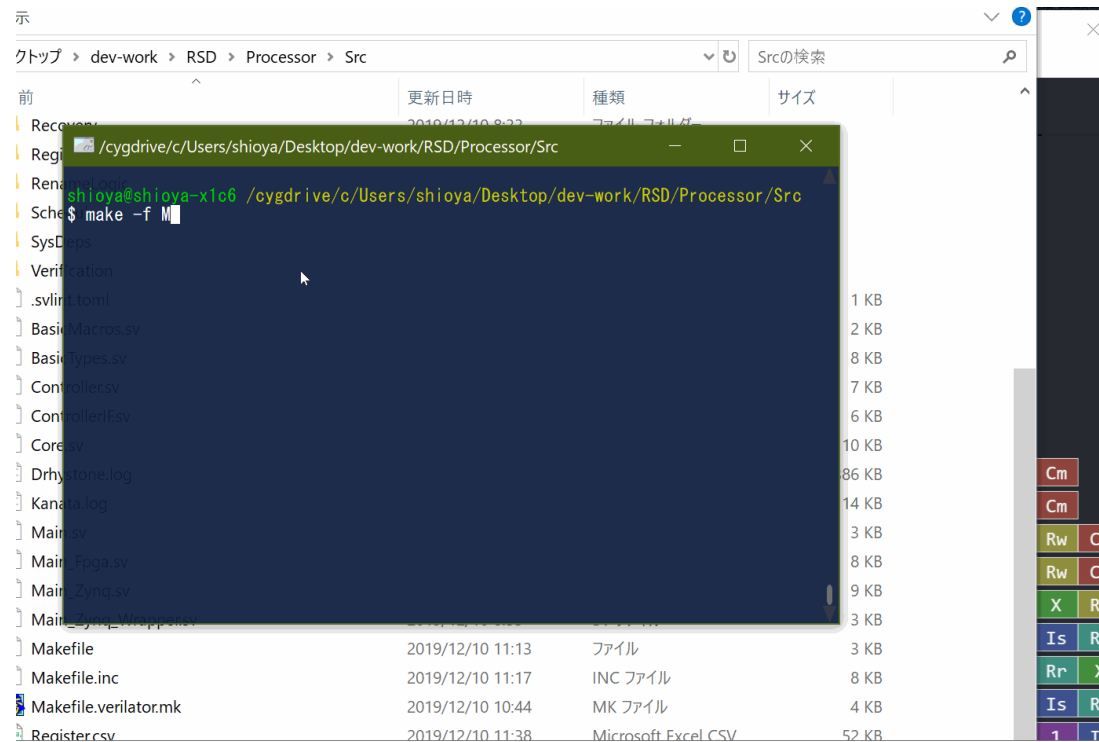
# Advanced RISC-V CPU "RSD"

- ◇ RISC-V is an open CPU standard, which has recently appeared. This is analogous to the appearance of Linux against a closed OS.
- ◇ We are conducting research and development of an advanced RISC-V compatible CPU "RSD" that introduced our research results.
  - Susumu Mashimo et al., "An Open Source FPGA-Optimized Out-of-Order RISC-V Soft Processor", IEEE International Conference on Field-Programmable Technology (FPT), 2019
  - <https://github.com/rsd-devel/rsd>



# Other Research Topics

- ◇ Hardware Assist for Scripting Languages
- ◇ Instruction Fetch Techniques for Server Apps.
- ◇ SRAM Circuit Simulator
- ◇ CPU Pipeline Visualization Tool



- Relatively small laboratory
  - ◇ Postdoctoral Researcher (1)
  - ◇ Doctor course student: D1(2)
  - ◇ Master course student: M1(3)
- We welcome students who have interests in computer hardware or system software.