

ChengXiang Qi

✉ kuangjux@outlook.com | github.com/KuangjuX | kuangjux.top |

Education

University of Chinese Academy of Sciences

2023/09- 2026/06(Expected)

Master of Computer Architecture

Beijing, China

TianJin University

2019/09 - 2023/06

B. Eng in Computer Science and Technology

TianJin, China

- Teaching Assistant for ICS(Introduction to Computer System) in Fall 2021
- 4.0 Courses: ICS, Computer Architecture, Advanced Computer Architecture, Operating System and so on.

Skills

- **Programming Languages:** Rust, C/C++, Go, Python, JavaScript, Assembly
- **Tools:** Linux, Git, GDB, QEMU, Makefile, Docker
- **System:** Familiar with the concepts and design of operating system kernels, and have experience designing and implementing operating system kernels using the Rust language. Passionate and knowledgeable about the RISC-V instruction set architecture, with multiple projects designed based on the RISC-V instruction set.
- **Arch:** I have previously designed and implemented a MIPS 32-bit processor core, have read some of CAAQA, and have implemented a out-of-order simulator of tomasulo algorithm in Rust.

Selected Awards

- NSCSCC Team Competition Third Prize in 2022
- OSCOMP Team Competition Thrid Prize in 2021
- Summer OSPP The Best Quality Award in 2021

Work Experience

Tsinghua University

2023/05 - 2023/07

OS kernel R&D Intern

Beijing, China

- **Performance Improvement.** Performed network performance benchmarking with tools like Apache Http Server and iperf, and developed benchmarking tools to evaluate the network card's raw socket send and receive capabilities. Made modifications to the Network Protocol Stack and its interface with Arceos to enhance network bandwidth.
- **NIC driver.** Wrote a driver for the Intel 82599 network interface card with Rust programming language. Referred to DPDK for performance optimization and integrated it as a crate into Arceos. Run successfully real-world applications such as httpserver, iperf, and Redis on an AMD machines.
- **Hypervisor based arceos.** Developed a type-2 hypervisor based on Arceos which be capable of booting Linux.

Selected Projects

ko-ok-OS/xv6-rust(★238)

2021/02 - 2021/08

- A Unix-like operating system implemented pure rust.
- Optimize memory module using Buddy Sytem.
- Redesign Spinlock/Sleeplock as smart pointer.
- Optimize file system, making it support Rust features.

hypercraft(★41)

2023/05 - Now

- Building upon hypocasut-2, Designed a Type-2 hypervisor inspired by projects like KVM, zicron, and RVM.
- Carefully designed traits allow for obtaining runtime information from the operating system and reusing the structure and algorithms of the kernel.

hypocaust-2(★34)

2023/02 - Now

- A hardware-assisted RISC-V type-1 hypervisor written in Rust.
- Implement SBI call process, two stage page table translation, PLIC emulation(interrupt inject), exception delegation, passthrough or emulate devices.
- Capable of booting rCore-Tutorial-v3, RT-Thread, Linux mainline.

hypocaust(★39)

2023/01 - 2023/02

- A S mode trap & emulate RISC-V type-1 hypervisor written in Rust.
 - Implement SBI call process, shadow page table construction, synchronization between shadow page table and guest page table, PLIC emulation(interrupt inject), exception delegation, passthrough or emulate devices.
 - Capable of booting minikernel(a small os kernel with filesystem).
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Talks & Presentations

Hypocaust, a Type-1 RISC-V hypervisor

2023/03/26

Invited talk in OS2ATC 2022

Beijing, China

- slide: <http://kuangjux.top/file/talks/hypocaust.pdf>
- vedio: <https://live.csdn.net/room/csdnlive5/VKfSCOiR>