Zebang He

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Education

ShanghaiTech University *2023 - Present*
Undergraduate | *Computer Science* *Shanghai, China*

Shanghai Jiao Tong University - IPADS Lab *2025 - Present*
Research Assistant | *MLSys @ Zhichao Hua* *Shanghai, China*

Research Interests: I am currently focusing on ***computer architecture***, ***high performance*** and ***intelligent storage***, with a particular focus on optimizing heterogeneous computing and parallel computing, as well as high-concurrency and distributed file system.

Skills

Expertise: HPC | Architecture | OS | Compiler | Full-stack Developing | Product Design
Languages: `Python` | `C/C++` | `Javascript/Typescript` | `OCaml` | `C#` | `Golang` | `LaTeX/Typst`

Competitions

NSCSCC 2025 (Loongson Cup) | Special Prize (Rank 1st) **Verilog, Vivado, C, ASM**
National Student Computer System Capability Challenge *2025 Jun.*

- We are designing a **high-performance** chip supporting the **LoongArch** instruction set on the FPGA of the Artix-7 kit. And **we've defeated Tsinghua University and Fudan University, ranked 1st!**
- We have run the **Linux system** on this chip and ported specific programs, performing targeted **profiling** and **optimization** for the performance of those specific programs.

ASC 25 | 2'nd Prize **Slurm, C, Python, ARM-Forge**
Student supercomputing challenge of ASC *2025 Jan.*

- We have optimized **HPL** and **HPCG** with special tuning based on the CPU and GPU architectures we use, allowing them to achieve more than 90% of the theoretical results!
- We've transferred **AlphaFold3** from GPU to CPU, and we've done some optimizations.

Projects

JPO - An Order-Based Market Data feed | Jump Trading School Project **C++**
An efficient implementation of orderbook. *Oct 2025*

- I implemented an efficient orderbook with high efficiency. Profiled between different hash implementation, high performance data structure and algorithms.
- Supports Augumented BST Tree to trace history, uses Flat Hashmap, and optimized in instruction-level with Intel VTune to be cache friendlier.

GCC-Fortran with Multi-Versioning Support | OSPP Personal Project **C, C++, Fortran**
Function Multi-Versioning `target_clones` support for GFortran compiler. *Jun 2025 - July 2025*

- I implemented the correct registration and parsing of `ATTRIBUTE` in the frontend, implemented the attribute handling function, and modified the `IFUNC` function generation mechanism.

PintOS | Personal **C, x86 Assembly**
An operating system for the 80x86 architecture. *Mar 2024 - Jun 2024*

- I implemented the advanced scheduling, system call, user/kernel mode, virtual memory and file system of the operating system.
- PintOS contains basic shell and filesystem, and is able to run programs in user mode.

OATC Language Compiler | Personal **OCaml, LLVM, X86lite**
A simple language compiler for the OATC language. *Aug 2024 - Jan 2025*

- I implemented an X86lite instruction set simulator and assembler. And the OATC language interpreter using OCaml.
- I've also developed the compiler from OATC to LLVMlite IR, and final to X86lite platform.

RISC-V RV32I CPU with pipeline | Personal **RISCV, Logisim**
A full-function RV32I CPU, with 5 stages & hazard solving *Feb 2024 - Jun 2025*

- My CPU supports a classic five-stage pipeline capable of handling structure adventures, data adventures, and control adventures.

QRTech-web | Personal Project **React + Golang + WebRTC; Redis + SQLite**
Real-time Wide-Area-Network Data Broadcasting. *Sep 2023 - Present*

- My project focuses on developing a wide area network data broadcasting system, aimed at sharing datas with short lifecycle within short time.

Internships

UbiQuant | System Dev **C++, Python, k8s**
AI Infra - Distributed storage / cache system. Connects to LMCache. *Sep 2025 - Nov 2025*

- I was responsible for developing the dynamic scaling and failover features for distributed storage, and I implemented a task queue based on a sliding window to avoid performance spikes.
- I also wrote correctness tests and a large number of unit tests for the project to ensure that the functions worked properly.

Roles

GeekPie Association, GeekPie HPC Team | President
*I'm the **president of GeekPie Association**, a comprehensive technology-based science and innovation society. I'm also the **team leader of the GeekPie HPC team**, participated in ASC/SCC.*

SI 100+ / Intro to Computer Science | Instructor & Main Developer
*I'm the **main instructor** and person in charge of the course SI 100+ for freshmen in ShanghaiTech.*